SCHOOL OF ECONOMICS AND MANAGEMENT
Lund University

Reinterpreting China's Regional Disparities from 'New Economic Geography' Perspective

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Authors: Shuning Sun

Supervisor: Karl-Johan Lundquist

Abstract

The persistence of regional disparities at different spatial dimensions, especially the income gap among three major economic belts (i.e. East, Central, and West), is one of the most striking characters of economic development process in China since the reform and opening-up policy in the late 1970s. In recent years, the regional disparity in China is not only a matter of serious academic concern but also increases the level of political awareness. However, there is a lack of widely accepted consensus among a growing body of theoretical and empirical literature on the causes of regional disparities and on a list of effective policy instruments which may promote or ameliorate the divergence between different regions. Geographical determinism and standard neoclassical regional economics are two important theories of regional development which provide different causal explanations for the evolution of regional disparities at different spatial scales. However, both theories have explicit weaknesses in identifying and explaining the major factors which have influenced and continue to influence the uneven distribution of economic activities and its resulting large disparities among countries and regions in many real-world cases.

Since the early 1990s, the growing "new economic geography" (NEG) literature, initiated by Krugman and synthesized by his co-writers including Fujita and Venables, has contributed a new analytical framework to interpret the emergence of economic concentration and regional disparities at variant spatial scales. The core building blocks of new economic geography models are product differentiation, increasing return to scale, across-sectional mobility of labor, and transport cost and the models are designed to show how economic agglomeration have emerged at different geographical scales from the interaction of important factors.

This paper borrows the main ideas from new economic geography to investigate China's regional disparities between 1978 and 2009. The calculation of Theil index shows that the disparities between East, Central, and West have contributed the largest proportion of China's total regional disparities during the post-reform period. In addition, the results of analysis show that the evolutionary process of China's regional disparities is consistent with 'core-periphery' diagram. The paper argues that the important factors, such as policy intervention, geography, and new economic geography all have contributed to the changes of China's regional disparities. Therefore, the introduction of economic policy should attempt to promote the process of market integration, facilitate the across-sectional movement

of human and physical resources, and accelerate the gradual shift of traditional industries from coastal regions to inland areas.

Content

1. Introduction

1.1 Research Background

Since the launching of economic reform and opening policies in the late 1970s, China has been the most rapidly growing economy in the world over the past three decades. Some of the key features of China's evolution have been the extraordinary increase in real living standards and historically unprecedented poverty reduction in both rural and urban areas from more than sixty per cent at the beginning of economic reform to less than ten per cent by 2010. Such a growth record is impressive by international standards. In achieving this development, Chinese policy makers have followed a strategy essentially based on two western schools of regional growth theory, namely the 'centre-down paradigm' and Kuznets's inverted-U approach (Zhao & Tong, 2000).

In the meantime, the transition from centrally planned economy to market-oriented one has inevitably caused different kinds of social costs. Among them *income inequality* and *an imbalance in regional development* are two of the most disturbing factors in reshaping the landscape of contemporary China. Apparently, the economic prosperity associated with the coastal regions and urban locations has clearly not effectively spread further to the interior regions and rural locations of China to eliminate their disparities in income, as expected by the central planners (Ramesh, 2005). The standard of living and economic growth of China's interior and rural locations has considerably fall behind coastal areas and cities. In recent years, the situation of worsening regional disparities appear to be persistent and difficult to be reversed since many locations in coastal areas are currently in the process of rapid industrial modernization and urbanization.

A set of recent studies has pointed out that in the ongoing process of openness and global integration, China now has been one of the most unevenly developed countries in the world. This situation in China has led many economic and political observers to suggest that China's transformation has arrived at its turning point and called for adjustment or reform of the China's economic system. Hu Angang (1996), an influential economic commentator in China, has expressed his deep concerns on China's regional inequality in many occasions. He warned that rapid expansion of the differentials might eventually result in China's dissolution like the former

Yugoslavia. Although we can hardly foresee the emergence of such an extreme circumstance in any near future with proposed policy interventions, China's growing inequality has created serious social and political problems in recent years. Such important problems, as a consequence, have already threatened the social compact and thus the political basis for economic growth (Kanbur & Zhang, 1998). In China's case, uneven development and growing income inequalities in recent years has become of the most concerned economic issues as well as an ethical one due to the fact that egalitarian principle has long been considered as legitimacy of Chinese regime (Golley, 2010). Most recently, at the Fourth Session of the Eleventh National People's Congress on March 5, 2011, Premier Wen Jiabao reiterated that stabilization is the priority of the Party and the Government, and reduction of the worsening inequality, both spatially and socially, is essential to that stabilization and country's sustainable development.

Not surprisingly, a frequent aim of academic literature on contemporary China has been to identify those sources have caused the present disparities and attempt to describe and explain its evolutionary patterns. However, a wide range of conclusions has been made and some are highly debatable. This problem mainly stem from the usage of a number of different data sources, different time periods, and different methodologies. The review of the existing literature shows that the sources causing the regional disparities can be classified into four larger groups: *factors of production, policy and institutional settings, economic structure, and geographical elements*. Much of the literatures identify *classical growth determinants* within the framework of convergence theorem. They shed the light on the interregional flows and allocation of foreign direct investment (FDI), investment in both human and physical capital, and the resulting regional divergence of productivity (Chen & Fleischer, 1996). Others are *policy oriented* (Yang, 1997). They highlight a long tradition in China to favor development in the coastal provinces to the inland. Akerman (2003) argues that this tradition date back to the tenth century Song Dynasty up to present day with modern policy drives such as the 'get rich first' policy and the 'coastal development strategy'. Lin (2002a, 2002b) and Lin et al (2002c) argues that the development of heavy industries was considered as the overriding priority for China's economic modernization and catch-up. However, such strategies unevenly affected Chinese regional economies due to the fact that those firstly industrialized regions could enjoy the advantages of capital accumulation and technological progress.

China's experience is not unique. In many developing countries or transitional economies, a positive correlation of the level of openness and inequality has been found. However, a more fundamental fact is that a widespread emergence of

economic agglomeration in specific regions of those countries at various degrees has occurred alongside uneven development and inequality. As a result, in order to determine the main sources of regional disparities in economic performance and per capita incomes, a set of economic literature has turned their focuses on economic agglomeration with a variety of different spatial scales. The economic agglomeration is highly complex. A wide range of interactive factors might be responsible for this process. Although a growing number of competing or supplementary theories has attempted to explore its mechanism, a consensus has not been made. However, a general accepted idea is that strong growth effects can be generated by economic agglomeration within clusters and emergence of agglomeration is at spatially uneven pace (Akerman, 2003).

In China's case, a great number of empirical studies have found a close relationship between economic agglomeration and uneven development. In an investigation of comparing thirty sample Chinese provinces from 1978 to 2000, An (2005) discovers striking interregional differences in growth performances. The results show that coastal regions which with the highest level of economic agglomeration have outperformed non-coastal regions in terms of economic growth and productivity improvement. On the other hand, those non-coastal provinces, covering a majority of China's interior provinces, have been registered by a considerable low level of economic agglomeration.

In recent years, a growing body of theory has been developed to offer predictions about the forces that lead to the emergence of economic concentration, namely 'new economic geography' (NEG). The core-periphery model is the most representative general equilibrium model in NEG literature. It illustrates the mechanism of two regions, with many similarities in their original condition, developed into a persistent rich-poor structure. Paul Krugman (2010) in his recent paper argued that China's experience fits into the new economic geography framework very well. He argues that the establishment of a dramatic core-periphery pattern and a massive migration from inland to the coastal areas is very reminiscent of economic history in industrial countries in the early twentieth century.

Recent years we have witnessed an increasing number of Chinese academics have started to use new economic geography traditions to analyze China's case. Hu (2002) sets up a new economic geography model to examine the relationship between international trade, industrial agglomeration, and regional disparities. Li *et al* (2003) within the similar framework, attempt to identify the relationship between industrial agglomeration, population distribution, and regional disparities. Lin *et al* (2006) analyze the nature of industrial agglomeration and its resulting regional disparities from a transportation costs and labor migration perspective. Finally, Jin

et al (2006) discuss the impacts of important factors such as economic geography and economic policy on the evolution of China's regional disparities.

In this paper, the subject of China's regional disparities between coastal areas and non-coastal areas is re-stressed within the framework of new economic geography. However, it is worthy to mention that the recent progress of regional growth theory has seen an explicit integration of many strands of thinking (Dawkins, 2003). The potential of integration stems from the spaces of overlap among different branches of regional growth theory. It also reflects the direction of further researches in regional development studies. Accordingly, in a bid to generate a comprehensive interpretation of China's regional disparities, important factors such as policy intervention and economic geography are also taken into the consideration.

1.2 Research Questions

This paper attempts to probe an analysis in China's economic agglomeration and regional disparities since the reform and opening-up in the late 1970s within a systematic new economic geography framework. Agglomeration and disparity can be defined in different ways, but this paper particularly emphasizes on agglomeration of industries and important production factors and on its resulting uneven development between coastal regions and non-coastal regions. Three major questions are concerned:
(1) How severe are China's current regional disparities in economic development?
(2) What is the main cause(s) in dynamic changes of China's regional disparities since the reform and opening-up based on the review of literature?
(3) What policy measures can be implemented to reduce the growth of regional disparities in a way which both the national economy and the economy of the coastal areas are not harmed.

1.3 Research Justification

The study of China's regional disparities has great theoretical meaning and practical significance. First, at a global level, China is the world's most populous country with a population of over 1.3 billion by the late 2010. It represents a full 20 per cent of the world's population. Residence number is expected to continue its growth over the next few decades and then slowly start dropping by 2030. With a population of about 100 million, China's Guangdong province has surpassed Henan to become the most populous province in 2005. If it were a country by itself, Guangdong would be amongst most populous countries in the world. A township (in China's administrative system, townships ranked fourth behind provinces, cities, and

counties) in Jiangsu province can easily serve a population of more than one million. It is larger than that of many cities outside of China. In this background, China's regional issues, particularly interregional disparities, are difficult to be overestimated.

Second, although regional disparity is a ubiquitous phenomenon in many developing and transitional countries, they significantly differ from each other in many ways such as causes, level, and effects. China's case has its own characteristics. It offers a valuable case study of the importance of economic geography since its huge population has distributed unevenly across third-one provinces with an apparent economic and ecological diversification.

Moreover, more than three decades into the implementation of reform and opening-up, it is now the right time to evaluate China's achievement in social and economical development from a rational and subjective viewpoint. However, it is difficult to do so if we do not properly measure the current regional disparities, understand how theses disparities have changed over time, and identify their major driving forces. In addition to measuring past policies, they are also important as theoretical guidance for new directions in public policy implementation.

1.4 The Basic Frame of the Article

This paper attempts to probe an analysis in China's regional disparities within a framework of new economic geography. The paper is divided into five chapters. The first chapter is an introduction. The intent of this introduction is to discuss the background and meaning of subject selection and present the formulated research questions. The scope and problems to limit the work is pointed out at the end of this chapter.

The goal of the second chapter is to set up the important theoretical underpinning for the investigation. It integrates information from publications and discusses different strands of theory in understanding the process generating the profound development disparities prevalent in contemporary societies and in indentifying the underlying causes behind this phenomenon. In this chapter, more attention is paid to new economic geography, including its recent progress, the core-periphery model, major conclusions, and related implications in policy-making process.

The third chapter investigates the direction of changes of China's regional disparities over a long period between the late 1970s and the present. The main

concern of selecting such period is due to the fact that this period is characterized by drastic changes in landscape of Chinese economy: accelerated industrial agglomeration in eastern regions, rapid integration to outside world, extensive urbanization, as well as growing regional disparities at a variety of spatial dimensions. At the same time, a brief review of regional economic disparities in pre-reform China is included. To depict the evolution of China's regional economic disparities in post-reform period, the *Theil Index* is calculated. The approach of the Theil index decomposition is adopted to demonstrate the development disparities between and within China's three major economic belts. The statistical results show that interior-coastal differentials in economic performance appear huge and it could be one of the most, if not only, striking features of China's uneven geographical growth. In this chapter, it also argues that there is plenty of empirical evidence that reveals a growing tendency of east-west disparities, and despite many other contributing factors, the unevenly developed industries might be the most important forces generating those disparities.

In the same chapter, the key factors driving the evolution of regional disparities are discussed based on the review of literature. The analysis discovers that the evolution of China's east-west disparities fits into the core-periphery diagram. Accordingly, the main conclusion for this chapter is that since China introduced opening-up policy, China's economic gravity has gradually shifted from inland to coastal provinces. Its regional disparities emerged and reinforced as the coastal regions have transformed themselves into the important manufacturing centers. At the same time, interior China has turned into the periphery side which is dominated by low-productive agricultural and mineral industries.

A final remark is made in the last chapter with a focus on related policy implications. It suggests that the growing trend of China's regional disparities is difficult to reverse in short-run since Chinese economy is currently at its early stage of development and regional disparities are by-product of growth. It also argues that effective policy intervention to reduce regional disparities should be able to promote industrial agglomeration in eastern regions where a sound industrial foundation already established and also able to induce the traditional industries to gradually shift to middle and eastern regions. In this process, the backward regions are beneficiary from the spillover effect of eastern regions and then a catching-up process would take place to alleviate the regional disparities.

1.5 Limitations

There are evident limitations in this research which might bias the result of investigation. First, as a matter of fact that new economic geography is a new way of spatial thinking. It is needed to mention that the theoretical foundation of the new economic geographies undoubtedly at its early stage of development. It has been criticized by both economist and geographers, and undoubtedly there are spaces for improvement in conceptual foundations. Moreover, due to the enormous volume and breath of the writing in the new economic geography, this paper therefore would inevitably undergo the risk of oversimplification to skate across its growing body of theories. As a consequence, this paper might fail to accord some of them the full attention that they deserve. Besides, the number of related empirical studies based on different geographical, cultural, and institutional settings is still limited. The second limitation is methodological selection: in this paper, a statistical analysis method is adopted and technique limitations have ruled out the way of empirical analysis by using econometric measurement and adequate data sources.

2. Literature Review

2.1 Geography Determinism

The issue of uneven distribution of human's economic activities and settlements has long been debated among economists and geographers. As a matter of fact, this central question is not only academically intriguing, but also extremely important when viewed in light of efficiency and equality. The growing interest in regional development studies are now been investigated not only by economists and geographers, but also by many researchers from other disciplines. However, there is lack of a general consensus in literature on what are the main causes of differences in economic activities across spaces.

Yet after decades of neglect, geography has being re-discovered in recent years. The archive of studies of why economic activity intends to establish themselves in a limited number of human settlements is expanding rapidly. Among them, one of the most popular theories in explaining uneven development is geographic determinism, in which it delivers a simple rule-of-thumb explanation for the varying fates of spatial units: the geography. The theory places its focus on the 'first-nature'

geographical factors - climate, natural resources endowment, and ecosystem– in determining economic success of a particular region. Central to the argument of geographic determinism is that all aspects of physical geography can directly influence on the quality of natural resources, the productivity of land, the public health environment, and the extent to which a region can become integrated with larger markets (Jaramillo & Sancak, 2007).

Henry Thomas Buckle (1821-1862) was probably one of the earliest social scientists and historians who attempted to discover the general laws that governed the progress of human societies from an aspect of natural environment. Although his book *History of civilization in England* has been left unfinished, many of his important ideas have passed into academic writing and have developed by following researchers on social sciences. In recent years, the wave of geographic renaissance has witnessed a growing number of new ideas being added into the common literature stock. Jared Diamond, a professor of geography and physiology, in his two well-known books *Guns, Germs, and Steel (1997): A short history of everybody for the last 13,000 years* and *Collapse (2006): How societies choose to fail or succeed,* probes an investigation on the question of why only some human settlements succeeded in developing advanced agricultural system, and became specialized and urbanized, and dominant on a global scale. Diamond points out origins of uneven regional development dates back to the primitive societies or even earlier period. The central argument of Diamond's geographically-based historical theories is that geographical factors had a decisive influence on the disproportionate distributions of power and achievements between human societies. In his books, he asserts that in early human history, the prosperity of some human settlements was not due to any form of their intellectual, cultural, moral, or inherent genetic superiority. On the contrary, persistent differences in agricultural, economic and political growth through the entire human history originate in geographical differences. Diamond's view is apparently a 'geographic determinism'. In his book *Guns, Germs, and steel,* he establishes a connection between environmental and climatic factors and societal development. It can be referred from his arguments that the social, political, economic, and intelligent elements of a society, and the human habits and characteristics of a particular culture have formed by all aspects of geographical and environmental conditions. In addition, Diamond suggests that in early human history, technological advantages were built on the availability of certain plants, animal, and geographies.

In a similar vein to Diamond, Landes (1998) in his path-breaking work "*The Wealth and Poverty of Nations*" poses that a proper interpretation of present inequities in growth and welfare should seek for geographical explanation. He argues that the

differences in physical environment have accumulative impacts on regional development through the entire transformation of human civilization from the poor primitive societies to the modern industrial societies. For example, Africa is a victim from bad geography. In Landes's theory, 'history matters' is taken into the account. He stresses that a growth pattern once established, it tends to exhibit a high degree of persistence or "inertia" which can operate either to foster regional growth or to jeopardize it.

Although much of this work from Diamond and Landes take us back rather than foreword, it lays a foundation for an interpretation of critical factors contributing to spatially uneven evolution of political and economic structure of some regions in modern times. However, it is worth to note that geography is unable to explain some important findings about uneven regional growth in modern societies. Some places with less geographical advantage might grow faster; regions with similar geographical conditions might exhibit growth divergence. In this case, policy intervention might be one of the explanations for such kind of observation. For example, in one chapter of *Collapse*, Diamond exemplifies the case of Hispaniola to support his argument. Hispaniola is the second largest island in the Caribbean and divided by two sovereign states of the Dominican Republic and Haiti. When Hispaniola was discovered by the European colonists in the end of 15th century, the two sides of Hispaniola were broadly homogenous in terms of geography and historical institutions. However, it is paradoxically that the growth performance of the two states has remarkably diverged since the 1960s. At present, Haiti and the Dominican Republic locate at opposite ends of the spectrum within Latin America and the Caribbean in terms of growth in per capita income (Jaramillo & Sancak, 2007). Although Diamond's argument focused on environmental policy decisions, we can infer from his argument that Haiti is the poorest country in the western hemisphere because of the interplay between its higher population density, more rapid deforestation, and the destruction of soil fertility. Therefore, they created adverse consequences for agricultural production and growth performance on the Haitian side of Hispaniola. In China case, policy intervention is also an important factor causing uneven regional development. For example, Guangxi province and Guangdong province are neighboring and geographically similar, but Guangdong is one of the richest provinces in China while Guangxi is among the poorest. Plus, compare with Fujian province, Zhejiang province is lack of natural resources, but its growth is much faster than Fujian. Therefore, geography plays a crucial role in determining economic location, but other factor should also be taken into account within contexts of specific cases.

2.2 Neo-classical Economics

In traditional economics field, the important question concerned about spatially uneven development and its resulting regional differences has been hotly debated. Such questions have attracted more attention from both academics and policy makers particularly during the post-war period due to differences between and within regions expanded rapidly along with intensive processes of globalization, industrialization, and urbanization.

Neo-classical economists and trade theorists suggest that differences in underlying characteristics of natural resources endowment, factors of production, infrastructure, technology transfer, and policies make spaces themselves uneven. International trade theorists suggest that those exogenous variables are important in determining a place's comparative advantage and factor endowment. They are as the decisive driving forces of industrial localization, international trade, and economic growth.

It is always argued that the process of economic activity is geographical-related. That is, territorial location of productive factors, their mobility across adjacent regions and accessibility to spatially dispersed market for production units, interregional trade flows, and regional interrelationships, all together, would have far-reaching influence on industrial structural change and industrial agglomeration, which are particularly considered as the major forces influencing the formation of regional economic disparities.

Neo-classical growth theory suggests that regional differences are controllable if effective policy intervention is at work. Factor of returns, growth performance, and economic structure can conditionally converge when identical economic policies including the control over key variables, such as human capital, investment efficiency, government expenditures, degree of market openness, are implemented across regions. Therefore, the principle of policy making should promote economic integration and facilitate the movement of goods and productive factors within a larger territory. By doing so, regions are able to specialize based on their comparative advantage (Puga, 2002). Empirically, a great many of researches has proved that the existence of strong inter/intra-regional dynamics and ongoing convergence within the European Union (EU) during the period of 1950s to 1970s, reflecting the advent of Single European Market, Economic and Monetary Union were likely to play a significant role in reduction of regional economic disparities and income gaps.

Although such spatial-related issue has long been noticed by neo-classical theorists, they are not successful to depict and explain spatial concentration of economic activities. Neo-classical theories left the dynamics of such process in a black box. Therefore, traditional neo-classical theories are not sufficient to explain the processes of economic concentration and regional disparities in many real-world cases. For example, some locations have successfully transformed themselves into manufacturing centers or marketplace for economic activities without advantage in natural resource endowment and advanced transportation system. On the other hand, locations having similar initial conditions in production factors and policy instrument may take very different path of development.

Such weakness is the outcome of its static assumption of constant returns and agents' utility maximization hypothesis. Besides, Krugman (1991) argues that the isolation between 'space' and neo-classical theories is due to absence of scientific methods for mainstream economists. Therefore, the concepts such as distance, location, space, and transport costs for a long time had been ignored by the mainstream economic theorists and they were almost exclusively the remit of regional economists. In addition, regions and countries, with a few exceptions, are also defined in very simple and abstract manners in mainstream economics and regional science. The classical economics often treat geographical units (i.e. regions and countries) simply as dimensionless points in space in which location assumed being no important role in theoretical formulation (Brakman & Garretsen, 2003). Moreover, the analyses about spatial concentration can be conducted at a number of different scale-levels: at one extreme of the spectrum, it can apply to the phenomenon that restaurants, factories, theaters, or shops providing homogenous products/services often tend to locate themselves within the some neighborhood; at the other, it also can apply to wider geographical division, such as North-South, rich-poor, hinterland-coastline, and Eurasia-Africa (Surico, 2001). However, in the foregoing examples, the forces driving the location of firms and customers might not be the determinants of North-South divide. Therefore, they are all together making the theorization and empirical analysis of the geographical distribution of economic activity even more challenging.

Besides, in the light of the apparent tendency toward the growing economic disparities between and within many regions, a considerable controversy has been generated among theorists regarding the convergence hypothesis from neoclassical growth theory. As is well-know, neoclassical growth theory is useful in their place, but the range of questions which they can satisfactorily answer is rather narrow.

2.3 New Economic Geography

2.3.1 Background of New Economic Geography

Since August Lösch promoted space and location as important parts in theorizations of economic process, economic geography have attracted increasing concerns by economists over half a century (Martin, 1999). However, economic geography did not seriously take the highly mathematical, esoteric theory of abstract, and equilibrium analysis into account. On the contrary, they involved into an empirically-oriented subject dealing with expended concepts of Keynesian business cycle models, Myrdalian cumulative causation theory, and Marxian notions of uneven accumulation (Martin, 1999).

Since the late 1980s, the literature shock of economic geography has undergone a further expansion, involving the inclusion of Schumpeterian models of technological evolution, institutional economics, and even more recently, the inspirations of multi-disciplinary researches in economic sociology and cultural methodologies (Martin, 1999). From the beginning of 1990s, a new movement of re-discovering 'geography' in terms of the recognition of the importance of regional spectrum in economic development, namely 'new economic geography' had surged by some prominent academics such as Paul Krugman, Michael Porter, Anthony Venables, Masahisa Fujita, and etc. The burgeoning body of literature in new economic geography focuses on investigating the major driving forces of economic agglomeration processes at different spatial scales, the formation of clusters, and systems of relationship between economic agents, and it also emphasizes on the questions of governance and development policy-making processes at regional level. The recent regeneration of economic geography has contributed to the explanation about the uneven geographical nature of development and it also developed our understanding about the wider consequences of current economic change for regional inequality and development.

Compared with neo-classical growth theories and traditional economic geography, a different method of modeling has been taken by new economic geographers. Their work relies heavily on D-S model of monopolistic competition developed by Dixit and Stiglitz (1977). On contrary with traditional economic theories, new economic geography gives no significant importance to comparative advantage in interpreting for spatial concentration of activity because it provides a weak explanation in the context of similar endowments. In new economic geography framework, increasing return to scale is taken into consideration. Model of trade with increasing returns and imperfect competition would provide an explanation about why locations

without significant comparative advantage with respect to each other are able to develop different production structure on the basis of their different market access (Puga, 2002). Therefore, the primary innovation of new economic geography is to include external scale economies and increasing returns into traditional international trade models (Dawkins, 2003).

According to the new geographical model, the integration of labor's inter-regional movement with increasing return and reduction of trade costs creates forces driving firms and workers to cluster together as the dynamic processes of regional integration. In this process, peripheral areas are left to be economically disadvantageous. One significant character of new economic geography is that transportation costs and labor mobility are two important factors in understanding the emergence of spatial agglomeration and economic disparities. At the same time, both of them act as important parameters to estimate regional market integration. While relevant for studying agglomeration within national boundaries, Puga (1998) stresses, in an international context, high barriers to migration may limit the role of labor mobility as a force driving agglomeration. However, new economic geography, in general, formulizes a dual-sector model which based on increasing returns and decreasing transportation costs, and provides us a new perspective to rethink the industrial agglomeration and regional disparities.

According to new economic geography hypothesis (Krugman & Venables, 1990), the location of production strictly depends on the contrast between centripetal and centrifugal forces, which in turn determines whether a country/region could experience industrial agglomeration. Centripetal forces normally refer to pecuniary externalities which depend on market interactions rather than on physical proximity. Centrifugal forces, on the other side, resist agglomeration since the immobility of production factors including land, natural resources, and even people in an international setting. Moreover, the lack of international labor migration would force some producers to locate close to workers, and, at the same time, spatially dispersed factors create dispersed markets encouraging firms to establish the production near their customers. More preciously, the new economic geographical model starts by assuming that there are two regions - a large 'core' region and a 'peripheral' region, at the same time, there are two production factors which are mobile across sectors but immobile cross across regions. Furthermore, there is no comparative advantage in either region even if the 'core' regions has larger factor endowment than the 'peripheral' region, that is, both regions have relatively similar factor endowment. Besides, there are two production sectors in which one of them is perfectly competitive and producing a freely tradable homogenous commodity (i.e. agricultural products) under constant return to scale,

while the other one is imperfectly competitive and has firms which producing differentiated manufactures under increasing returns to scale.

The interesting finding is that, the level of transportation or trade costs of products plays as a key parameter indicating that for very high transport costs, regions have to provide their own products, while for very low transport costs location does not matter. For an intermediate level of transport costs, however, the model provides more interesting outcomes in that both fall and partial agglomeration is possible.

Moreover, one major contribution of new geographical economics is to bring together, in a common analytical framework, both convergence and divergence forces which in turn shape the core-periphery structure. The advantage of modeling such forces in a common framework, as noted by Puga (2002), is that it provides a close analysis on the trade-off between the economic advantages of the agglomeration of economic activity and the inequities that it may bring. Thus, the new location theories would assist us to interpret the evolution of regional inequities during a process of market integration as well as to think about the role of regional policy in such an environment.

2.3.2 Core-Periphery Model

The core-periphery model is central in new economic geography framework. The major questions concerned by core-periphery model is 1) why manufacturing industries have the tendency to concentrate in economically developed regions rather than in backward regions based on the assumptions of identical endowments in two regions and effects of increasing rate of returns, labor movement, and variation of transportation costs. 2) When such process took place. The model assumes that there are two regions and two economic sectors within a close economy. The initial conditions (preference and technology) in those two regions are identical. The two sectors are manufacturing and agricultural. The agricultural sector has constant of return and is in perfect competition. The intensively employed production factor is land which cannot be moved. Therefore, the spatial distribution of agricultural sector heavily relies on distribution of land. Manufacturing sector has increasing rate of return and is monopolistic competition; land is rarely used in manufacturing sector.

Due to the effects of economies of scale, manufacturing production is encouraged to locate in the areas where the demand is large. Manufacturers are able to benefit from the proximity to marketplace due to transport cost reduction. In this process,

other areas would gradually transfer into periphery to provide resources and services for manufacturing clusters.

Agricultural production will create demand for manufactual products. However, if the demands for manufacturing production all come from agricultural sector, the distribution of manufacturing production will be determined by the distribution of land. But the demand for manufacturing production is not only comes from agricultural sector but also comes from manufacturing production itself.

If manufacturing sector only occupies a small proportion of population, the demand for manufacturing production will be small as well. If the effects of economies of scale is weak and transport costs are high, the industries providing products and services for agricultural sector will locate close to agricultural production. Such circumstances happened before the first industrial revolution and the introduction of railways: massive population remains in agricultural sector, manufacturing sector and commercial sector are relatively small in scale. The effects of economies of scale are weak and transport costs are high, the unfulfilled demand from agricultural products can only be consumed by the small towns near local marketplace. As income level began to increase, more non-agricultural products and services are consumed, along with large-scale production and inexpensive ways of transportation break the land-dependent pattern of production. The areas having a large number of non-agricultural labors begin to develop manufacturing production. Such changes are mainly due to the fact that the expanding local market is able to offer diversified products and services based on the division of labor. Then this area will attract more labor from other areas with less intensive manufacturing production. Since the effects of accumulative causation and self-reinforcement, this process will continue to attract all non-agricultural labor to agglomerate in this area.

2.3.3 The Core conclusion of New Economic Geography

New economic geography studies the space distribution of economic activities, discussing the factors affect the location decision-making of firms and households from the basis of micro basis, explaining concentrate phenomenon exists in all kinds of economic activities in reality. Although new economic geography contains a lot of models and all the definition of these models are not the same. New economic geography is non-linear model (Baldwin *et al*., 2003). So they have some collective characters, Baldwin *at al*. (2003) concludes as following aspects. The first one is the scale of economies of local market. The scale effect of local market means that if some concussions from outside change the original demand distribution, expanding the demand of certain area, thus lots of enterprise change original location,

centralizes to this area. If we define centralization as economic centralize in space enhance the trendy of economic centralization, it could be found that domestic market scale effect is one of the convergence power.

The second implication of new economics of geography is the accumulative causation. Most new economic geography models include accumulative causation tradition. The spatial distribution of economic activities is the result of agglomeration and dispersion force. Agglomeration forces include domestic market effects and price index effects, while dispersion force mainly indicates the competition between enterprises which results in a kind of centrifugal force. The accumulative causation indicates domestic effect and price index effect become causality. Caused by sort of shaking leads to labor or enterprise centralize to certain area, extend the scale of this area and the supply capacity of this area. And doe those enterprises whose goal is maximizing the profit will choose bigger market scale as manufacture location. On the other hand, once one place attracts lots of enterprises, the quantities and varieties of local products will increase, so quantities and varieties products from outside will decrease. Since products from outside need to pay transaction cost, so with the decrease of the quantities and varieties products from outside, an increase of quantities and varieties of domestic products means the market price is relatively low in this area. It also means at the same salary level, the salary level is higher in this area. This is the price effects. Thus, domestic market effect and price index effect become causality. This accumulative causation will cause stronger effects than its beginning level of effects on the economic system. Centralization force caused by domestic market effect and price index effect and dispersion force caused by market crowd effect determines the final model of economic space distribution.

3. The Evolution of China's Regional Disparities

3.1   The Selection of Indicators and Disparities Measurement

There are many indicators can be applied to measure a region's level of social and economic development. The most commonly used ones are annual income per person, consumption per capita, consumer price index, urbanization, literacy rate, life expectancy, infant mortality, health care, and human development index (HDI). In this paper, GDP per capita is adopted as the major economic measurement. It is

able to calculate the market value of goods and services produced per person in a country in a given period. Such measurement can reflect the regional differences in productivity as well as in income. Therefore, GDP per capita is a comprehensive indicator in the calculation of regional disparities.

Various indicators are available to analyze regional disparities. Generally speaking, there are two approaches: absolute regional disparities indicators and relative regional disparities indicators. Although there is no agreement in literature on which measurement is the most preferable, appropriate indicators should be selected in a consideration of data availability, complexity of calculation, and specific purpose for which the measure the measure is calculated (Reuter, 2004). The focus of this paper is to access regional disparities between and within regions. Thus, it is important that the measurement should be decomposable and comparable. In this paper, the Theil index is adopted. This statistic is brought up by Theil Henri in 1967. Theoretically, a Theil index of zero refers to absolutely equal distribution of total income. On the other hand, a Theil index of one means that total income is occupied by one region. The basic formula is shown as follow:

$$T = \sum_{r=1}^{N} \left(\frac{Yi}{Y}\right) * \log \left(\frac{Yi/Y}{Pi/P}\right)$$

Where T is the Theil index; N stands for total number of regions; Y and P indicate gross national product and total population; Yi and Pi are GDP and population in i region. Yi/Y and Pi/P stand for regional shares of GDP and population to national total GDP and population, respectively.

The decomposability of the Theil index allows us to analyze regional disparities at a sub-group level. Therefore, the formula (1) can be divided into two parts:

$$T_{total} = T_{inter} + T_{intra} = T_{inter} + \sum (Yi/Y) T_{intra(i)}$$

$$T_{inter} = \sum_{i} (Yi/Y) \ln \left(\frac{Yi/Y}{Pi/P}\right)$$

$$T_{intra} = \sum_{j} \left(\frac{Y_{ij}}{Y_i}\right) \ln \left(\frac{Yij/Yi}{Pij/Pi}\right)$$

Where T_{total} is the Theil index; T_{inter} measures regional disparities among regions and T_{intra} indicates regional disparities within i region. Y and P refer to national GDP and population. Yi and Pi are GDP and population in i group of region. Y_{ij} and P_{ij} are GDP and population of j region within i group of region.

3.2 Regionalization and Selection of Period

At present, the mainland China consists of thirty-one first-level administrative subdivisions: twenty-two provincial units, four direct-controlled municipalities, and five autonomous regions. The four direct-controlled municipalities are Beijing, Tianjin, Shanghai, and Chongqing. The five autonomous regions include Guangxi, Inner Mongolia, Ningxia, Tibet, and Xinjiang. The two special administrative regions (Hong Kong and Macau) will be excluded from the analysis. Three of the centrally administrated municipalities – Beijing, Tianjin, and Shanghai – have very limited rural economies, undermining meaningful relevant comparisons. On the contrary, a province such as Hebei, without both Beijing and Tianjin, it has no real urban area comparable to those of other provinces.

In this paper, a meaningful analysis of China's regional disparities demands a level of over-provincial aggregation. While there are many possible ways of regional breakdowns, one of the most frequent methods is to divide China into three major economic belts. But this method has been used based on the national development strategy which has explicit analytical shortcomings. One important weaknesses of using such method of regionalization is the neglect of intra-provincial disparities. But in this paper such weakness is acceptable since regional disparities within regions are not considered.

Moreover, as in 1997 Chongqing separated from Sichuan as a direct-controlled municipality Chongqing's data between 1978 and 1997 is absent. The solution of this problem is to combine Chongqing into Sichuan as a single geographical unit. Such adjustment does not bias analysis results and discussion as Sichuan and Chongqing both belong to western region. Therefore, the method of regionalization in this paper is to divide China into three parts, as illustrated in the following table.

Table 1. Regional Breakdown

West Region	Central Region	East Region
Guizhou	Heilongjiang	Beijing
Yunnan	Jilin	Tianjin
Tibet	Inner Mongolia	Hebei
Shaanxi	Anhui	Liaoning
Gansu	Jiangxi	Shanghai
Qinghai	Henan	Jiangsu
Ningxia	Hunan	Zhejiang

Xinjiang	Hubei	Fujian
Sichuan (Chongqing included)	Shanxi	Shandong
		Guangxi
		Hainan
9 Provinces	**9 Provinces**	**12 Provinces**

Analysis results might be variable because of the selection of different time frame. This paper places its focus on the period between 1978 and 2010. Still, the paper also carries out a brief investigation about regional disparities in the post-reform era.

3.3   The Review of Regional Disparities in Pre-reform China[1]

Regional disparities have always existed in China's history, and the Central Plain is one of the earliest developed regions. An Lushan Rebellion (755-763) ended the history of Chang'an for more than 100 years as the country's central area. From that moment, China's economic, political, and cultural centers began to move from midland to East and Southeast. In this process, the middle and lower reaches of Yangtze River gradually turned into the country's most populous and richest region with highly developed agricultural systems. At the same period, the country's political center also had an eastward movement. Since Yuan Dynasty (1271-1368), Beijing had become the country's political center. The development of agricultural production in the middle and lower reaches of Yangtze River in turn promoted the handicraft industry in that area. The pattern of southeast-biased economic gravity did not change before China developed into modern society.

China's capitalist economy began to grow after the first and the second Sino-British Opium Wars (1840-1842 and 1856-1860). In that period, Western powers controlled concessions, banks, and factories were mainly located in coastal areas. China's own national industries were also close to seaport cities. In the late of the 19th century, Shanghai, Guangzhou, and Wuhan accounted for roughly two-third of country's total number of factories. Despite some slight changes of industrial structure before the breakout of World War I, Southeast area was still the Country's industrial center. Before World War II, heavy in Northeastern China began to develop rapidly. Tianjin and Qingdao, as the new centers of large industrial areas were gradually formed. However, the most dynamic economies were still on the coast. During WWII, national industries and coastal economies were heavily hit. In

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[1] Note: the numbers in this section are based on 李善同, 侯永杰, 冯杰等: <我国的地区差距的历史, 现状和未来>, <改革>, 2004<5>

the same period, as the central government moved westwards, modern industries were developed in middle and western regions, but they still lagged behind of coastal areas. In the early 1950s, more than 70 percent of national industries and transport facilities were concentrated in eastern and coastal areas where accounted for less than 12 percent of national territory.

In Mao's period, national investment was middle/west biased because of adverse domestic and international environment. In the first 'Five-Year Plan', nearly half of the state's capital investment was concentrated in middle/western provinces (Liaoning, Heilongjiang, Jilin, Beijing, Shanxi, Hebei, Henan, Hubei, Sichuan, Shanxi, and Gansu), whereas eastern/coastal areas only accounted for one-third of national total capital investment. In the second 'Five-Year Plan', the state continued to increase capital investment in middle/western provinces. Among them, capital investment was doubled in Henan, Sichuan, Hubei, Hunan, Guizhou, and Yunnan. In this period, Liaoning was the most invested province, but its proportion of the country's total capital investment slightly declined to about 7.0 percent. During the period of economic adjustment (1963-1965), regional differences in capital investment continued to decrease. Sichuan became one of the most important investment destinations, followed by Heilongjiang and Liaoning. Because of the violate international situation, in the third 'Five-Year Plan' the central government decided to adopt 'Third Front' development strategy and concentrated national resources on the construction of industrial complex in southwestern interior. Southeastern provinces such as Sichuan, Guizhou, Yunnan, Gansu, Shanxi, and Shaanxi attracted more than half of state's total investment. The weight of investment in other regions declined significantly. In the fourth 'Five-Year Plan', the central government called for the improvement of self-sufficiency of industrial production at regional and increased the investment on the construction of oil fields in eastern/ coastal regions. Accordingly, the proportion of investment in eastern/coastal regions started to grow again. From the mid-1970s, national industrial distribution was adjusted: massive national investment flowed into eastern/coastal regions with particular focuses on Liaoning, Beijing-Tianjin-Tangshan region, the lower reaches of Yangtze River, and Yangtze River Delta, and Shandong Peninsula. Southern/western provinces such as Guizhou, Gansu, Shanxi, and Shanxi only received a small proportion of national investment.

Overall, in the pre-reform period, the implementation of western biased economic policies significantly promoted the industrial development in interior. Between 1952 and 1978, the fixed assets owned by middle/western regions had increased from 28 percent to around 60 percent of the national total, and industrial production value had increased from 30 percent to over than 40 percent of nation's

gross output value of industry. Plus, there were a total of 2000 large-scale investment projects that constructed in middle/ western China and about thirty fast-growing industrial cities began to emerge in that areas.

Nevertheless, the growth differences between middle/west and coast appeared large. By 1978 national average per capita GDP amounted to 375 Yuan, while most middle/western regions were below this level. Guizhou's average GDP per person was 175 Yuan, ranking the lowest among middle/western provinces. On the other hand, most coastal provinces were higher than or approximated to national average. Shanghai, as the richest region, its average GDP per person was 2500 Yuan. The following table demonstrates the changes of share of GDP in western, middle, and eastern regions respectively. Between 1952 and 1978, both middle and eastern regions' share of GDP increased while western region's share declined.

**Table 2.** The Changes of GDP Share in West, Middle, and East, 1952-1978

	1952	1970	1978
Western Region	19.05	18.50	20.12
Middle Region	31.40	31.93	29.26
Eastern Region	49.55	49.57	50.62

Source: 李善同, 侯永杰, 冯杰等: <<我国的地区差距的历史，现状和未来>>, <<改革>>, 2004 <5>

3.4   An Overview of China's Economy in Post-reform China

The year 1979 was normally considered as the landmark for Chinese economy in terms of development strategy and the pattern and nature of growth. Although there was good subsequent growth during 1960s and 1970s, the top priority was given to production, capital construction, and heave industry. These imbalances were gradually adjusted in the post-reform era and the emphasis shifted to consumption, productivity growth, incentives, agricultural and light industries, people's livelihood, and distribution. Table 1. shows the annual percentage growth rate of gross domestic production (GDP) between 1961 and 2009. There has little doubt that the growth rate was substantially high after the introduction of the economic reform and open-door policy in 1979, as Table 1. A remarkable double-digit growth has been maintained for most of past three decades.

**Figure 1.** The Annual Growth Rate of GDP, 1961-2009
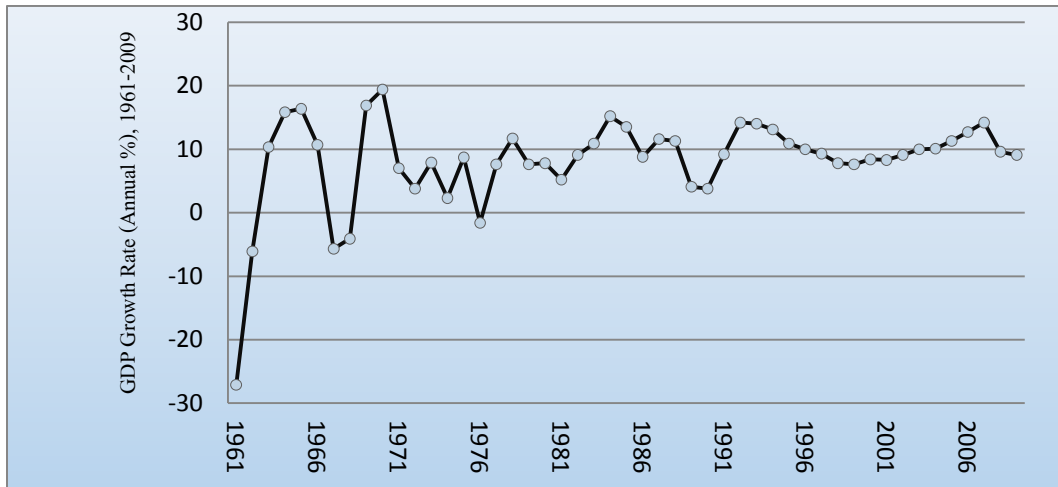
The calculation is based on constant 2000 U.S. dollars.

The average annual growth rate of GDP was 5.3 per cent between 1961 and 1979 and it went up to 10.3 per cent in the period of 1980-2009. Expect the early period of 1960s, when the Chinese economy quickly recovered from the crisis period in 1958 (Three Years of Natural Disasters and the failure of The Great Leap Forward) there was no time Chinese economy has grown as fast as in the post-reform period. By maintaining the rapid growth in the past thirty years, the GDP has dramatically risen from $61.4 billion in 1960 to $356.9 billion in 1990 and $1,324.8 billion in 2000. By 2009, Chinese economy accounted for around $4,985.5 billion and overtook Japan as the second largest economic unity behind the U.S. In the meantime, China's population growth rate started to rapidly decline after reaching upon its peak in the early 1960s, so that the growth of per capita GDP in post-reform period was even more remarkable. As shown in Figure 2., the differences between per capita GDP in pre-reform period and post-reform period were significant. Prior to the 1979 reforms, there almost has no clear increase of per capita GDP. The real increase started from the early 1980s, although a short-term slowdown took place between mid-1980s and 1990s due to the global economic crisis and unpredicted social and political unrest, the growth reinforced afterwards. GDP per capita grew annually at a rate of 4.3 per cent between 1961 and 1979 and it moved to 10.9 per cent in post-reform period. GDP per capita in 1960 was $92, and climbed to $193 in 1980, $949 in 2000, and $3744 in 2009.

**Figure 2.** The Growth of GDP Per Capita, 1960-2009
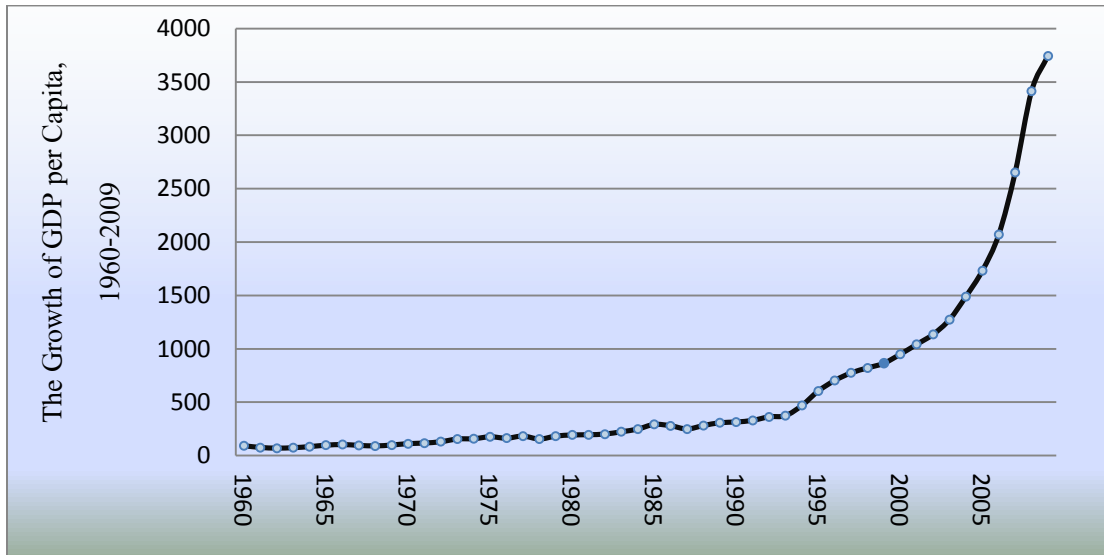
Source: World Bank national accounts data, and OECD National Accounts data files.

The GDP per capita is divided by the midyear population.

Another marked feature in the pre-reform period and post-reform period was the great reduction of death rate and infant mortality rate. The Figure 3. reveals that a sudden decline of crude death rate happened since the early 1960s right after the crisis period. From the mid-1960s to the late 1970s, it steadily declined and reached a very low level of below eight per thousand and maintained this level with slight rises and falls through the 1980s to 2009. At the same time, infant mortality rate has rapidly dropped from 95.4 per thousand in 1970 to 63.9 in 1990 and 43.2 in 2009. At present China's mortality level is one of the lowest among the developing counties. Life expectancy at birth has gradually grown through the pre-reform period and post-reform period from 46.6 years in 1960 to 73.3 in 2009. The indicators of mortality rate along with life expectancy are of great importance since they are closely related to people's life quality and mortality, reflecting a nation's development level in terms of health, educational, and socio-economic changes.

Figure 3. Crude Death Rate in China, 1960-2009
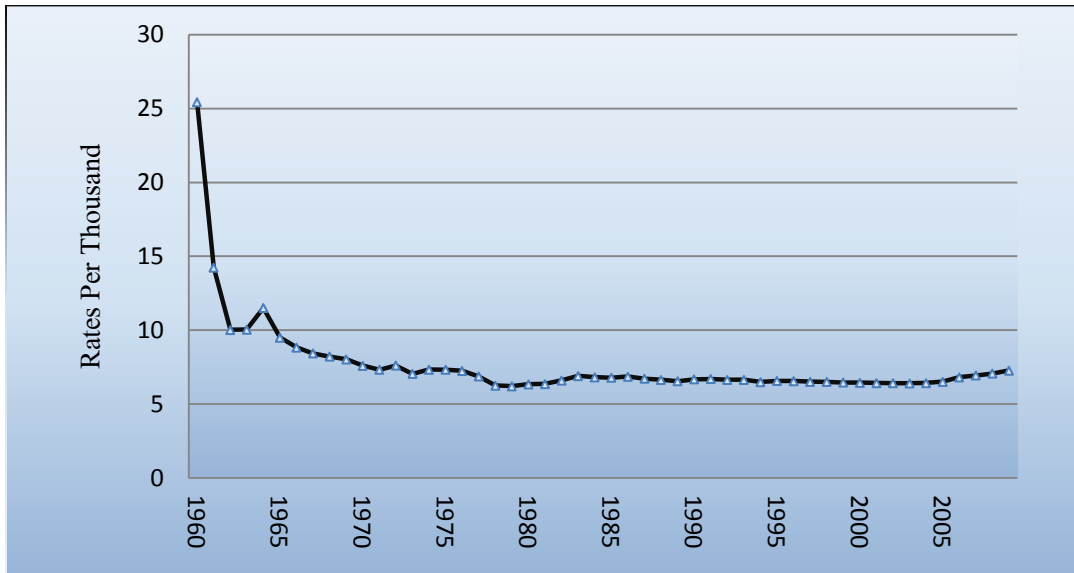
Source: World Bank national accounts data, and OECD National Accounts data files.

One of the key elements of China's 1979 reform was the encouragement of overseas capital investment (Fung & Lizaka & Tong, 2002). As the result of the active open-door policy, foreign capital inflow has increased rapidly since the early 1980s with fluctuations in the late 1990s and 2009 due to the worsening world economic situation. The net FDI inflow has grown from the baseline $4.3 billion in 1982 to $384 billion in 2000 and $1,478 billion in 2008, as Figure 4. shown. Since the early 1990s, China has been the second largest FDI destinations in the world and largest FDI destinations among developing countries. Although the causal relationship between FDI inflow and economic growth is difficult to decide, a great many empirical investigations have found that increasing FDI inflow has been a very important contributor of China's impressive growth in the post-reform era.

Figure 4. Foreign Direct Investment, Net Inflows (in Current US Dollar), 1982-2009
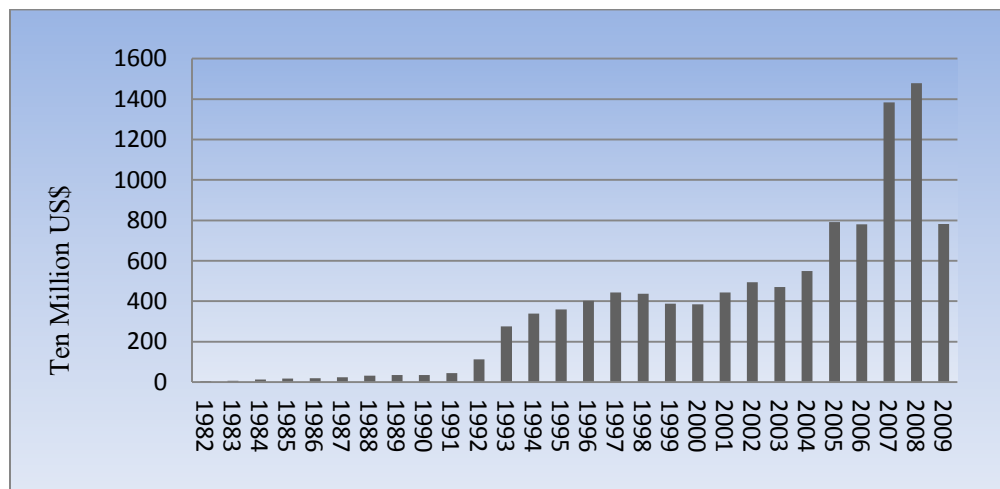

 Source: World Bank national accounts data, and OECD National Accounts data files.

3.5   The Evolution of Regional Disparities in Post-reform Period

3.5.1   The Trend of Regional Disparities

The calculation results of Theil Index between 1978 and 2009 are presented below. From the diagram, the dynamic change of regional disparities can be divided into three major phrases. Between 1978 and 1990, regional disparities show a downward trend. The Theil index decreased from 0.169 to 0.098. In the second period, regional disparities increased and arrived at a high level at 2004. The Theil index increased from 0.101 to 0.140. In the third period, regional disparities decreased. The Theil index declined from 0.126 to 1.105.

Figure 5. The Evolution of Regional Disparities between 1978 and 2009
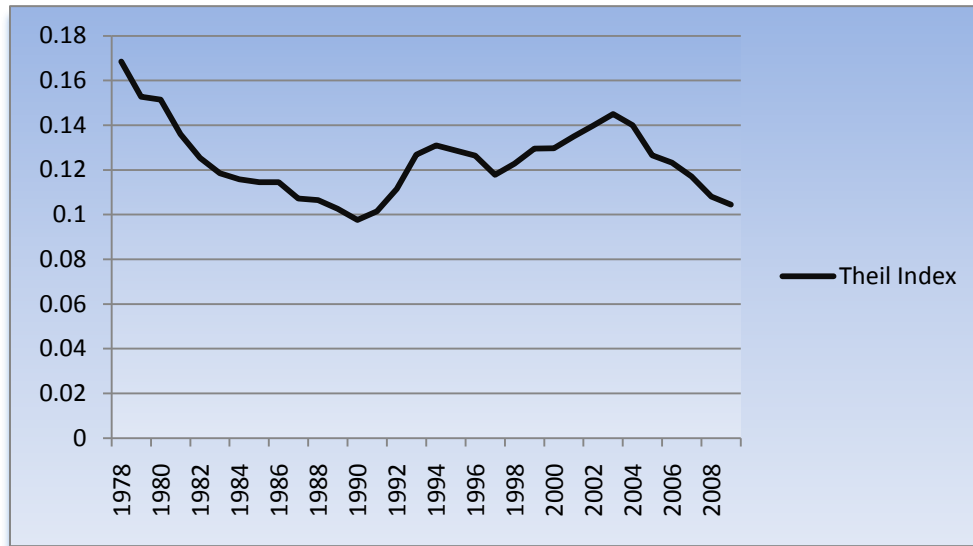
Sources: The data are from Comprehensive Statistical Data and Materials on 50 Years of New China (China National Bureau of Statistics, 2000) and various issues of the China Statistical Yearbook (China National Bureau of Statistics, various issues). The results are calculated by writer.

3.5.2 **Regional Decomposition of Disparities**

In order to make a further investigation about the dynamic changes of regional disparities among and within three greater regions, the regional decomposition method is adopted. Therefore, the Theil index is decomposed into regional disparities within east, within central, and within west, as well regional disparities among west, central, and west, respectively. If the Theil index is 100 percent, the contribution of four different kinds of regional disparities is presented below.

Table 2. The Contribution of Regional Disparities among and Within Three Greater Regions to the Overall Regional Disparities, 1978-2009

|	**Theil Index**	**East**	**Central**	**West**	**Inter-regional**
1978	0.168542928	69.05%	8.17%	3.21%	19.57%
1979	0.152663065	68.36%	7.03%	3.10%	21.50%
1980	0.151369844	66.42%	7.24%	2.93%	23.42%
1981	0.135995721	63.73%	6.50%	2.97%	26.80%
1982	0.125368064	61.24%	7.35%	2.59%	28.82%
1983	0.118436427	61.61%	6.94%	3.13%	28.32%
1984	0.115821532	58.26%	7.64%	3.01%	31.09%
1985	0.114489507	57.02%	5.61%	3.63%	33.74%
1986	0.114462496	53.95%	8.42%	4.11%	33.52%
1987	0.107217214	50.86%	5.69%	3.92%	39.52%
1988	0.106429022	45.51%	5.47%	4.29%	44.73%
1989	0.102644358	42.53%	5.51%	4.51%	47.45%
1990	0.097540162	43.43%	6.75%	3.86%	45.96%
1991	0.101461006	39.99%	7.08%	5.27%	47.65%
1992	0.111444048	37.45%	5.71%	4.86%	51.97%
1993	0.126815584	35.23%	4.34%	3.99%	56.44%
1994	0.131004265	32.29%	4.35%	3.63%	59.73%
1995	0.128635105	30.97%	3.37%	3.70%	61.96%
1996	0.126399389	31.49%	3.49%	3.49%	61.53%
1997	0.117770819	35.75%	3.70%	2.89%	57.65%
1998	0.122755195	36.87%	3.25%	2.71%	57.16%
1999	0.129480514	37.91%	2.79%	2.35%	56.95%
2000	0.129724115	37.12%	3.03%	2.50%	57.36%
2001	0.134897349	37.65%	2.75%	2.42%	57.18%
2002	0.139879286	37.59%	2.61%	2.28%	57.52%
2003	0.145029049	36.98%	2.80%	2.28%	57.94%
2004	0.1400361	36.79%	2.78%	2.34%	58.09%
2005	0.126468499	35.88%	3.03%	2.40%	58.69%
2006	0.123162374	35.25%	3.54%	2.59%	58.62%
2007	0.117122596	35.35%	4.28%	2.53%	57.84%
2008	0.108056599	34.20%	5.83%	3.03%	56.94%
2009	0.104513526	33.64%	6.39%	3.13%	56.84%

Sources: The results are calculated by author. The data are from Comprehensive Statistical Data and Materials on 50 Years of New China (China National Bureau of

Statistics, 2000) and various issues of the China Statistical Yearbook (China National Bureau of Statistics, various issues).

The results on Table 2. suggest that: First, disparities within eastern region contribute a significant proportion to the changes of aggregated disparities. But its shares dropped over time from more than 69 percent in 1978 to 33.64 percent in 2009. Second, regional disparities within both central and western areas occupied a small proportion of aggregated value. The contribution of central area decreased from 8.17 percent to less than 7 percent. There is only a slight variation in western shares. Third, the contribution of regional disparities among three areas is significant and presents an upward trend. It increases from 19.57 percent to 56.84 percent.

Therefore, we can identify the main reasons of the evolution of regional disparities in China. Between 1978 and 1990, the decline of national regional disparities is mainly due to the fact that regional disparities within eastern area considerable reduced. The widening regional disparities after 1990 are the result of increasing regional disparities among eastern, central, and western areas. It means that although there was a significant reduction of regional disparities within eastern areas, differences between east and inland increased. Figure 4. also illustrates the dynamic changes of regional disparities by showing the trend of GDP per capita in three regions. The growth rate of GDP per capita in eastern region is much faster than central and western regions particularly 1990 onwards. The growth rate of GDP per capita in western region is the slowest among three regions.

Figure 6. The Change of GDP per capita in Three Regions, 1978-2009
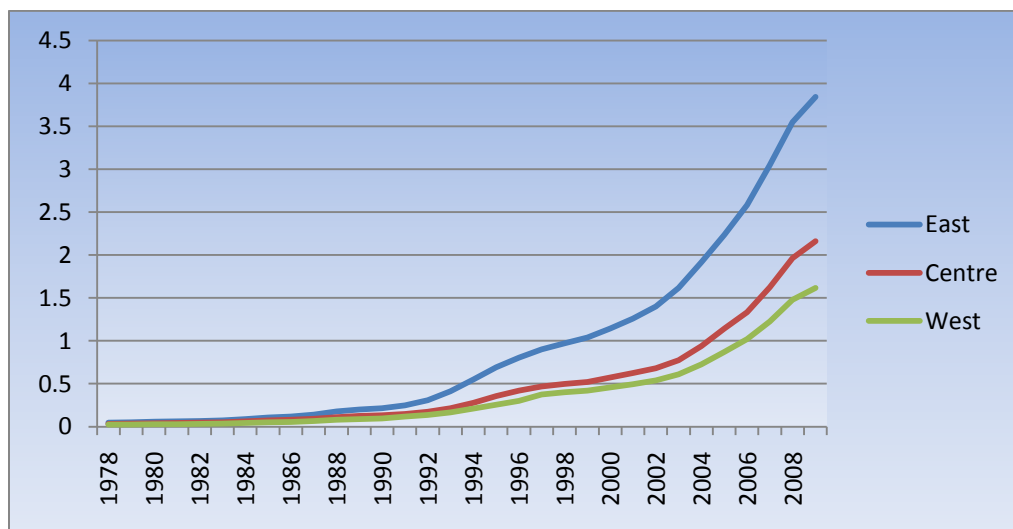
Sources: The results are calculated by author. The data are from Comprehensive Statistical Data and Materials on 50 Years of New China (China National Bureau of Statistics, 2000) and various issues of the China Statistical Yearbook (China National Bureau of Statistics, various issues).

3.6   The Causes of China's Regional Disparities

The dynamic changes of China's regional disparities are already investigated in 3.5. The results reveal that the interregional disparities have contributed the largest proportion to country's overall value. However, it still remains unclear that what is the main factor that created those disparities. In the framework of new economic geography, industrial agglomeration has strong effects on industrial clusters. However, industry can be divided into first industry, second industry, and third industry and different types of industry may have diverse influence on regional economic growth. Fan (2008) investigates China's regional disparities between 1978 and 2004 by using decomposed industrial Gini-Coefficient. His analysis shows that the second industry has contributed the largest share to China's regional disparities.

Extensive researches have been carried out adding to this emerging body of literature. They conclude that some rise in inequality was inevitable as China introduced a market system, but some inequality may have been exacerbated rather than mitigated by a number of policy features. Dollar (2007) postulated that the restrictions on rural-urban migration have limited opportunities for the relatively poor rural population and the inability to sell or mortgage rural land has further reduced their opportunities.

4. Final Remark and Discussion

Not surprisingly, the disparities are also extensive between rural and urban areas. It is true for disparities in household income or consumption, as well as for disparities in health status or educational outcomes (Dollar, 2007). In general, many rural households have very limited financial resources to access basic public services including education, health care and other social resources, comparing to the urban counterpart. Undoubtedly, balancing the long-term regional development has

become one of the most concerning issues on China's policy-making agenda. However, empirical evidence has pointed out that Chinese regional disparities are widening rapidly since the late 1990s.

In addition, the failure of the post 2003 mass relocation of people from the interior region of China to its prosperous coastal regions indicates that the rapid and concentrated urbanization program is clearly not the solution for balancing the long-term regional development and other developmental policy measures should be considered. According to Ramesh (2005), the proper alternative programs aiming to reduce the rural/urban and western/coastal income gap include: 1) to increase investment in rural economy (agricultural sector); 2) to motivate entrepreneurial behavior and commercial activity in China's non-coastal regions; 3) and to invest in soft infrastructure in Chinese interior hinterland to facilitate the process of knowledge creation and transfer aiming to strengthen the competence for physical and human capital.

On the other hand, a growing body of literature has highlighted the positive impact of hard infrastructure on economic growth, although the precise nature of linkage between economic growth and infrastructure network is still unclear. Man (1998) points out that the massive investment in physical infrastructure is one of the most effective methods to reduce the poverty in rural settings. He examines the trend of transportation investment and analyzes the effect of transportation investment on regional economic development in China. The results from cross-section analysis conclude that the non-coastal provinces that have invested less in transportation infrastructure would result in isolation and, thus, have less output and lower income and consumption levels. In addition, Demurger (2000)'s empirical study provides another concrete evidence on the close connectedness between infrastructure investment and economic growth in China. The estimation of a growth model shows that besides differences in terms of reforms and openness, geographical location and infrastructure endowment did account significantly for the observed differences in growth performance across provinces. The result indicates that transportation facilities are a key differentiating factor in explaining the regional growth gap. He suggests that the improvement of infrastructure endowment in China's interior hinterland would reduce its burden of isolation and this could enable the efficient flow of physical and human resources from the prosperous coastal regions to the less developed central and western regions.

One major change in the 1979 reform was to drop Mao Zedong's enduring 'Third Front' development[2] and switched to Deng Xiaoping and the new generation of

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Note: 'Third Front' refers to a massive construction of military-industrial complexes in China's south-

Chinese leaders' 'Coastal Development Strategy' and 'Get Rich First' principle (Zhao & Tong, 1997). The basic idea behind the new policy dimension is to revitalize the national economy by giving the top development priorities to the eastern/coastal provinces and regions. Their substantial historical and geographical advantages ensured that the industrialization and modernization would take place ahead of the rest of the country. As a matter of fact, at the early stage of the post-Mao reform, the introduction of western economic theory also had great influences on Chinese decision makers and scholars (Zhao & Tong, 2000). According to the neoclassical regional growth theory that emphasized, regional inequality is the nature of economic development and regional convergence will eventually occur at the very last stage when the development process become mature, so that there will be no polarization of rich and poor in the long-term. With the 'Coastal Development Strategy' and a range of preferential treatment, it was also expected by Chinese policy makers that the prioritized east/coastal regions will naturally subordinate their interests to lagging areas, leading to common wealth in the whole country (Golley, 2010).

As a result, the shift from Mao's long-implemented redistributed and egalitarian policy to Deng's uneven development had great impacts on China's economy in the spatial context. By the end of the 1990s, China had been divided into three major economic belts - coastal, central, and eastern/coastal regions. Each of them had specifically defined development roles, strategy, mission, and timing, relating closely to their own comparative advantages and regional endowments (Zhao & Tong, 2000). The eastern/coastal regions which are endowed with basic infrastructures, industrial activities, human capital, highly developed agricultural system, and more advanced technology, had developed ahead of the resource-abundant central and western inland regions. In the ten years since the implementation of the uneven development strategy, more than twenty special geographical units[3] in the eastern/coastal regions were rapidly set up and opened to the outside world. Compared to those central and western regions, the eastern/coastal provinces and regions enjoyed much more development priorities at both national and regional levels, such as foreign trade, national and local investments, and economic and financial management (Zhao & Tong, 2000). For most of the past three decades, under the uneven development strategy, the economic performance in the eastern/coastal regions are impressive, leaving the rest of the country far behind.

western interior, where it would be secure from the volatile international situation and the possible event of a war. But the geographical isolation of some interior provinces along with other factors made this program extremely inefficient. Between 1963 and 1975, two-thirds of China's investment was exhausted but only produced very limited output in real term (Zhao & Tong, 1997).

[3] Note: They are consists of fourteen coastal open port-cities, five special economic zones (four cities and one province), and six open economic regions.

Huang (2010) also stresses the significance of policy in creating the imbalance in regional development. By presenting the post reform era presents no clear evidence of stagnant growth in certain segments of society of regions, he argues that the widening inequality is the consequence of a deliberate 'unbalanced growth strategy' with a rapid and sustained growth in urban and coastal locations.

The analysis results suggest that since the late 1970s, the changes of China's regional disparities in general have revealed an explicit upward trend. From the spatial viewpoint, the most striking feature about China's regional disparities is the expanding differences in growth performance among east, middle, and west and particularly between coast and inland. From the perspective of economic structure, the imbalanced development of second industries was observed as one of the most important contributing factor in generating China's regional disparities. To combine the two perspectives, we can conclude that regional disparities exist for a long time and emerged at different spatial dimensions in China. However, the rapid-growing differences between coast and inland had become the most notable one during the post-reform period. Such disparities are still growing rapidly. The differences in industrial development between east and middle/west were considered as the major cause for the evolution of regional disparities.

The post-reform period has witnessed an eastward movement of economic gravity. In this period, eastern areas have transformed themselves into the key areas for manufacturing industry. On the other hand, middle and western areas have gradually become the periphery for low value added agricultural production and mining industry. Such industrial re-construction process is the leading cause for China's expanding regional disparities. The description of this pattern is shown as below:

First, compared with middle and western regions, coastal areas had many absolute advantages, such as a large population and proximity to global market, to develop manufacturing industry and export-oriented economy. Second, besides some geographical advantages, coastal areas had another critical advantage: preferential policies. These policies had at least two important impacts on the development of coastal areas: on one hand, the massive inflows of FDI directly encouraged the economic growth in coastal areas. On other hand, the sound exterior environment and larger national and global markets were created to promote the rapid expansion of private and individual economies, and township enterprises in coastal areas. Third, the backward linkage created by strong effects of scale economies in manufacturing industries in turn led to an eastward agglomeration of both physical capital and human capital. Fourth, as a significantly-sized manufacturing belt was established in coastal areas, the self-reinforcing form of circular causation intended

to accelerate the growth of industry cluster in those areas. The disparities between coast and interior continued to increase and eventually the core-periphery paradigm was formed. Moreover, China's regional disparities are expected to keep widening in near future due to further integration of national markets and lower trade barriers among regions.

Plus, among the continental countries, such as India, Russia, and the United States, China owns a relatively small segment of coastline compared with its extensive inland. Since the reform that began in the late 1970s, China has in recent years transformed itself into one of the world's most efficient assemblers and exporters of a wide range of manufactured goods. In this process, economic boom in coastal areas has increasingly depended on imports of resources and products to meet their basic needs. Therefore, despite preferential policies and skewed resource allocation by the government, the proximity to the sea enables the coastal areas to enjoy a transport-cost advantage compared with the vast interior of China. Thus, the geographical factors seem to be more preferable in explaining regional disparities in China than in other countries such as Brazil and Indonesia.

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