Abstract: The concept of economic convergence is nowadays both a challenge and an ambitious objective. In this concept one may find equality in growth through a dynamic “catching up” relationship. A gigantic economy such as China came back on the global scene through a miraculous growth trip that occurred during the last thirty years. Regionalism though, which was a distinct trait of this economy seems to have persisted. This paper investigates the labour market of the Chinese economy through the level of integration or convergence on average wages of staff and workers in eight industries. The results indicate that the labour market in China is not unified while in many cases, regionally integrated clubs exist. This stratification or segmentation of the Chinese labour market has severe implications to social welfare and as a result the Chinese government will soon have to pay more and special attention to it.

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I. INTRODUCTION

1.1 Aim and Justification
Nowadays, the concept of economic convergence is both a challenge and an ambitious objective globally. In that concept, one may find equality in growth and in distribution of income as well as a catching up and dynamic relationship between initially poorer countries and initially richer ones in a rather “flat” from the free trade and competition perspective environment (Friedman, 2005).

A simple explanation for this phenomenon is that nobody wants to be poor. Basic needs must be fulfilled and as Maslow (1943) suggests all the humanity is trying to go up to the hierarchy of needs. A more complicated answer may be mimesis and jealousy as Deng Xiaoping noted “let someone get rich first” or the chance to consume more and better economic goods. The present international economic system hails the linkage between consumption and better life or welfare.

To be more specific, scientific research nowadays maintains that the speed of the catching up process globally is from two to three percent (Barro and Sala I Martin, 1995: p.413). From a macroeconomic perspective output indeed converges by that enigmatic 2% per year but wages seem not to obey that rule. In an ideal world output growth should be aligned to income growth or wage growth and thus the output produced would be distributed evenly inside the economy.

This is not the case though. Recent empirical studies pay special attention to poverty traps and wage gaps (Barret et. al., 2008). These traps and gaps threaten social welfare and as a result governments have to put these issues into their agendas. Therefore, the challenge nowadays is not only to achieve growth but also to distribute this growth inside the society equally or through a fair adjusting mechanism. For this reason, the concept of convergence takes a whole new meaning.

An initially poor economy -such as China 30 years ago- has indeed converged to an admirable level with western economies in terms of total output (rank 2) and in per capita output (rank 88) (IMF- World Economic Outlook, 2011). This essay will employ the case of the Chinese miraculous economy (Rodrik, 1994 and Weiss, 2005) and investigate that trip to global integration through the terms of its own domestic market integration. To be more specific the Chinese labor market will be examined through the level of equalization and convergence on its
average real wages. It is expected that growth for wages would not be equal in an economy such as China, where growth came unevenly among regions. Still, on the other hand the Chinese government is a powerful political party that claims to guide the whole nation with absolute power over the last 30 years. Distributive mechanisms for income equality are in place while the same government had and still has the task for equalizing the miraculous growth that came and guaranteeing prosperity and welfare.

1.2 Contribution
China is a vast area with a tremendous size of population and labor force. It is a fact but also a result of common sense, that growth in such a vast area could not come equally. The reasons behind such notion lie on geographical but also on political aspects (Zhao and Zhang, 1999). From the first perspective, some regions could perform trade easier than others since the rivers as a distribution channel or access to sea supported trade. On the other hand, from the political perspective, the dogma of the first reformer Deng Xiaoping “let some people get rich first” and the development of the special economic zones favored uneven spatial growth (Zhao, 1996). Consequently, in terms of output there was a huge difference among regions back in mid 90’s. Nevertheless, there is plenty of literature that maintains that in terms of total output convergence is taking place.

Yao and Lei (2009) pose that in terms of output or production the special economic zones of Hong Kong and Macau are converging with coastal China, coastal China is converging with mainland and mainland is converging with western. In addition, the Chinese government has made it its own bet, to make an equal growth spillover in the Chinese state. A recent example is the enormous amount of capital injected in mainland regions such as Chengdu and Chongqing. The government is following an east to west pattern of equalization for growth, while the people are still migrating from western to eastern regions in order to find a better future (China daily, 2011).

Under these contrasting forces, migration from the one hand and the attempts of the state for growth in mainland and western regions on the other, one could expect that there must be a converging process in place for the wages of the staff and workers and not only for output or income per capita.
This essay’s ambition is to contribute to this aspect and attempt to verify that convergence is also taking place among the wages of the labor force in China. As a result, the level of convergence on average real wages of staff and workers broken down by the industrial sector and the geographic or regional aspect will be examined.

Furthermore, are there any clubs or clusters in China that show a converging nature (converge to their own steady states) although in a national level convergence is not taking place? In other words, are there any clubs in China with similar behavior in terms of labor market integration?

Moreover, the rate of synchronization will be measured: to which regions changes on wages adjust the other regions. One could expect that the coastal areas are the synchronization leaders or perhaps one of the special economic zones has this role. In addition, the political center of China; Beijing or the economic center; Shanghai, could also possibly be the leaders of change. Is this the case or there is no such thing as leading to change county that causes shocks to wages while other regions respond to these shocks by adjusting to them.

All these previous aspects compose the level of labor market integration in China as well as the speed of adjustment of this process, which is the main testing subject of this paper. Alternatively, two hypotheses can be formulated.

\[ \text{H}_0: \text{The national labor market in China is integrated.} \]
\[ \text{H}_1: \text{The national labor market in China is not integrated.} \]

A fail to reject the null hypothesis implies equal prices for the factor of production: labor force all over China or at least declining differences on their prices, while the alternative hypothesis maintains that the national labor market in China is segmented. If the analysis of this paper fails to reject the null hypothesis, alternative hypotheses arise. These new hypotheses are as following.

\[ \text{H}_0: \text{The labor market in China is segmented into convergence clubs} \]
\[ \text{H}_1: \text{The labor market in China is not even integrated into clubs: there are no signs of convergence even at a smaller scale.} \]
The second group of hypotheses implies the existence of a smaller scale convergence mechanism in place for China. This mechanism of “catching up” process is only limited to a smaller group of regions. Spillover effects in the context of neighboring provinces may have taken place, while this hypothesis aims to investigate this issue.

Both hypotheses aim to capture the level of economic integration and equality on wages. Their explicit assumptions are the totalitarian versus the segmentation approach as Wei (1999) described them.

Furthermore, for the second group of hypotheses, regional clusters in China that are already converging in output will be tested for their labor market integration leading to the formulation of an explanatory hypothesis.

| H0: | Convergence in output is an absolute condition for labor market integration |
| H1: | Convergence in output is not an absolute condition for labor market integration |

This final group of hypotheses aims to assess whether clusters in China that have integrated markets in terms of output show the same level of unification in their labor market.

1.3 Scope and Limitation

Although this essay aims to investigate the level of labor market integration of the Chinese state with the main focus on the average real wages of staff and workers through their diverging or converging behavior, there are certain limitations that make the understanding of the phenomenon obscured.

To begin with, the source of the data is the Chinese Bureau of statistics. There is a respectable amount of researchers who claim this source unreliable and the data that are distributed manipulated, while Chow (2005) after a detailed analysis of this issue maintains the opposite. Nevertheless, the accuracy of the data, as well as the impressions that may serve has been a conflicting topic and this may lead to potential biases that could not be avoided in this essay.

Secondly, the data are segmented to industrial sectors but the sectors change over time. In a 24 year time series it is not expected for the industrial sectors to be absolute fixed. For example, the
industrial sector of education changed to the industrial sector of education and culture. Sectors may change on the name (formalities) or may there be an actual alteration in their synthesis. The sectors that their names were wholly changed are not included in the analysis. Consequently, eight sectors were included in total: Agriculture, Manufacturing, Construction, Excavation, Real Estate, Education, Government Administration and Financial Insurance or Banking sector.

Thirdly, regarding the methodology that will be followed there are many ways of measuring market integration as well as economic convergence. The method employed in this essay will be that of sigma convergence. A possible limitation lies in the aspect that alternative approaches, such as conditional beta convergence may better capture the catching up process of wages. For example, convergence on average real wages may be conditional to investments foreign or domestic and as a result, the effect may be better captured.

Additionally, some limitations derive from the software that will be used for the analysis to be conducted, since an agglomerative hierarchical clustering will be applied in order to identify the convergence clubs. Data mining in general and this method in particular comes with limitations related to the criteria of the segmentation or clustering. In this case, the criterion will be the least variance inside the group and the highest distance between the homogenous groups, while the case of convergence maintains a declining variance. In that respect, the analysis for club convergence will focus on the least variance and not on the declining variance (homogeneity versus tension for homogeneity).

Furthermore, aspects or parameters that are determining on the level of wages, which should be taken into serious consideration, will not be included in the analysis. These parameters are the ownership of the company of a worker; state owned versus private owned unit, the level of education of the employee, years of experience and other personal characteristics of the labor force. Unfortunately, the data come with this limitation since available information for the synthesis of the wage beneficiaries was not accessible in the first place.

Moreover, the productivity of the workers will not be taken into consideration, while as Fleisher and Yang (2006) pose labor productivity is greatly different among different type of workers. It is assumed that the labor force productivity, as well as the total factor productivity is equal among its units.
Finally, the aspect of rural and urban residency will not be taken into consideration. Meng et.al. (2006) pose that there are great differences between urban and rural units as they describe the level and nature of urban poverty in China.

1.4 Outline
The primary objective of this paper is to investigate the nature as well as the level of Labor market integration in China over the last decades; from 1985 to 2008. In order to properly investigate this issue, one should think about two different things that are strongly connected. The first is the labor market as a mechanism and all the relevant previous experience of labor markets, their evolution and their behavior after certain changes. The second is the miraculous growth that took place in China over the last thirty years and more specifically the conditions that existed and the reforms that opened the way for this growth. As a result, this paper will be broken down into five distinct and major sectors: Theoretical background of the labor Market mechanism, historical background of the labor Market in China and its distinct traits, Methodology and Data Analysis, Results and Discussion and Epilogue.

The theoretical background of this paper aims to provide the reader with an extensive analysis of the mechanism of a labor market, its components, its behavior in allocating the labor force and the concept of economic integration. The components that the labor market consists of are the wage setting, the institutions that guarantee its smooth function, the mobility of the labor force that is guaranteed by the labor market and the matching of the supply and demand for the factor of production labor, as an objective for the labor market construct. In addition, the concept of economic convergence is strongly connected to the theory of growth that someone is considering. The neoclassical approach versus the newer economic geography approach and the endogenous growth theory will be compared in this part. What matters more, time and space, skills and other traits of the labor force or capital accumulation and technological progress? As a result, special attention will be paid to the concept of market integration and its important implications for economic growth.

Secondly, the historical background of the labor market in China will provide the reader with all the necessary knowledge regarding the initial conditions of the labor market in China, the institutions that lie behind, the reforms that were initiated in the recent past and the challenges that this labor market faces in the future. It is widely known that the Chinese economy is still in
transition from a planned to an open system. This economic transition is greatly affecting the labor market mechanism and shaping its function. Thus, for one to understand the Chinese labor market, the challenge is to understand what has happened so far and based on that, estimate what the future evolution will be.

In the third part of the paper, data from the Chinese statistical yearbooks will be employed and an analysis regarding the labor market integration in China over the last thirty years will be made (from 1985 to 2008). The data are the average real wages of staff and workers broken down by region in a provincial level and by industrial sector. This part aims to answer the questions of how the labor market in China looks like, what are the average wages and their progression through the last 30 years and if the average wages are converging among different regions or there is a spatial factor still important for the wage determination in the vast Chinese State. In a pragmatic sense, it is a conflict between the neoclassical growth theory on labor market function versus the new economic geography theory regarding the importance of the spatial factor and newer growth theories regarding endogenous growth processes.

Moreover, the next part of the paper – Results and Discussion- will present the results of economic convergence on average real wages. An attempt will be made to critically assess the information that is made from the analysis based on the theory regarding the labor market function as well as more modern theories regarding the Lewis turning point and the myth of the infinite supply of labor in the Chinese economy (Cai and Du, 2011).

In the final part of the paper; Epilogue, some concluding thoughts will be made while the major findings of this essay will be pointed out.
II. THEORETICAL BACKGROUND

2.1 The Labor Market Fundamentals

“A labor market is a mechanism for matching the supply and the demand for the factor of production labor, through the terms of contracts between buyers and sellers of labor” (Mazumdar, Kanbur and Horton, 1994: p.2). Consequently, when one is talking about the labor market and the labor force must keep in mind three important parameters. Firstly, there is a supply of labor as well as a demand of labor. The supply and the demand of the labor force create through an equilibrating mechanism a price for the labor force itself. This price can be described as the wage of an individual in a system that market plays the fundamental role of allocating the factors of production. In addition, the wage of a worker is defined as the marginal product that this worker produces. The ceiling in the wage of that worker is the equalization of his wage and a marginal unit of the product that he makes – a simple cost approach of hiring another worker to the contribution of that worker to the total output. On the other hand, there are alternative approaches to wages like this of Marx (1976) who sees wages as a tenure for the worker; the wage in this case is the rent for the workers time rather than the workers effort, while employers of workers tent to see wages as a reward for the produced output not always strongly connected to monetary incentives but also to intangible benefits or social bonuses such as health insurance (Bryson and Forth, 2012).

The second parameter that derives from the previous definition of the labor market is the institutionalized degree of justification through contracts between buyers and sellers of labor. This aspect is very important in the sense that firstly institutions are developed over time to protect both sides of the supply and the demand and secondly the agreement for a unit of labor is protected by a national institution in most countries globally. Over the last 30 years there was a swift from the macroeconomic policy as a cure to problems of the real economy, such as high unemployment and declining growth on GDP to the institutions that the economy has developed. Suddenly, the center of attention became the institutions that an economy had developed and more specifically the effect of the institutions on the growth of the economy on inflation, on unemployment and on other economic outcomes (Freeman, 2012).
The third parameter that can be derived from the last definition is that the labor force is not freely or spasmodically mobile inside space but there is a mechanism or a “market” that allocates the labor force. Ranging from fully competitive to monopolistic with various differentiations the labor market, either belonging to a planned or a free system (neoliberalism or socialism), has a dynamic relationship with economic outcomes, with political priorities and social prosperity.

2.2 The wage setting
As previously posed, the wage can be defined as a monetary outcome for the effort of the factor of production labor for its contribution in the production process. Still, this definition as posed by Bryson and Forth (2008) is encompassed with some weaknesses. These weaknesses derive from the fact that social norms, the government and institutional factors shape the level of wages. In other words, the wage of an individual cannot be estimated just by the effort put in his or her work. Although the effort of the worker is an individual procedure, one can say that there is neither such thing as a fair effort nor as a result a fair wage. At this point, social norms affect the wage level in terms of the socially approved fairness of the transaction between the employer and the employee. Moreover, a relatively new concept, this of social responsibility suggests that employers who are often judged by the wages they pay are in that sense responsible for the social prosperity and many times get plaudit if the wages they pay are relatively high, or higher than what the market approves. Furthermore, in many cases one’s social status is strongly connected with the wage he receives. Thus, the wage level is not only considered as a mean to buy goods and services but as Brown et.al. (2005) maintain, its relative comparison with the wage of colleagues or friends affects the social status and the perception of the individual by others.

On the other hand, in many cases there is not a single negotiation between the employer and the employee for the returns to effort from the occupation. Powerful labor unions take up the responsibility to negotiate the wage level of its members on the same time that the effort put varies greatly among them.

In addition, governments through taxation or their strategic plan for growth (see China; special economic zones) affect the wage level in an equalizing mode. Depending on the nature and the legitimacy of the government, its public acceptance and its economic objectives, wages through a tax sharing system or subsides are greatly affected (Montinolla et. al., 1995).
For the previous reasons, it is imposed that although the wage level is supposed to be strongly connected to the effort of the employee and the output produced, there are many factors that affect it with great influence, deriving from its social aspect and its contribution to social prosperity and thus, it is not a simple price of a factor of production. Moreover, it is widely acknowledged that even more factors affect the wage level of an individual such as: education, gender, demographic traits and other personal characteristics of the labor force (Green and Dickerson, 2004).

2.3 Institutions and Wages
It is a common belief that there is no such thing as a rigid definition for Institutions. Douglass North (1991) describes them as the rules of the game (economic), while Freeman (2012) in a humorous way maintains that economists know institutions when they see them and they see them everywhere. Labor market institutions include labor Unions, national ministries of employment, formal laws regarding working regulations, minimum wage and other similar policies, as well as social norms.

During the last years and more specifically the mid 80’s and onwards, there were many attempts in the developed countries to make the labor markets more flexible as a result of the high unemployment that was taking place, mainly in Europe. Freeman as well as OECD (1994) studies viewed this attempt for higher flexibility as an actual deregulation of the labor markets, while institutions that were regulating the labor market were perceived as peripheral to economic performance. Consequently, this deregulation brought back to the surface the importance of these institutions. Moreover, economic performance between countries that were initiating the same macroeconomic policies seemed to vary greatly leading to the increased role of the institutions that lied behind (Freeman, 2008).

2.4 The effect of the labor market institutions
The positive association between wages of the employees and profitability of the firm has been verified in many cases, (Blanchflower et al., 1996; Hildreth and Oswald, 1997) while one factor that leads to that positive association is the trade unions pressure. In many countries there are wage premiums due to the existence of trade unions but also benefits to workers that are not
monetary (Blanchflower and Bryson, 2003) while the size of these premiums is strongly connected to the power of the union to monopolize the supply of labor (Bryson and Forth, 2008). Furthermore, Rosen (1969) maintains that the unionization of the workforce enhances wage equality. On the one hand, unions push employers for higher wages and on the other the fear of unionized workers, if unions are not developed yet, forces the employers to increase the wage of the employees. Moreover, Bryson and Forth (2008) pose that there is also variation in the union premium deriving from traits of the workforce such as gender and skill level or education. For example, women tend to achieve higher union premium than men as well as less skilled workers. On the other hand, laws and regulations affect the mechanism of the labor market as well as the level of wages. Firms as well as employees are behaving in accordance with these laws inside a society (Bryson and Forth, 2008). For example, Falk et. al. (2006) pose that laws regarding minimum wage, force firms to increase wages above that minimum, while the society adopts a different perception about the fair and minimum wage. Lastly, pay is also affected by social norms in the sense that workers compare their working conditions as well as their wage with other workers, while this effect is not predicted or assumed by the traditional strict economic approach of the labor market; supply and demand of labor (Bryson and Forth, 2008).

2.5 The Market Mechanism and the labor force Mobility

The labor force is not moving unrestrictedly or spasmodically in space. On the contrary, there is a mechanism that organizes or adjusts the movements of the labor force inside the economy. This mechanism is the labor market. The neoclassical approach sees the labor market as a function that equalizes the supply and the demand of labor. In this case, the aspects of price and quantity of labor are the most significant, while at a certain point they create a market clearing point or equilibrium. Under that point, the supply as well as the demand for labor crossbreed and the prices of the labor force are fixed or stable. The market will continue to work at this point until a shock comes to the system. That shock will either affect the supply of labor or / and the demand and will cause the price of labor to change. The basic implication of this approach is that market is the fundamental force that allocates the factors of production while the nature of the market is of great importance. The nature of the market is defined by many factors such as the number of
sellers and buyers, symmetry of information, the boundaries of exit or entry, the mobility of factors of production and others, and leads to the formation several market regimes; from perfect competition to monopoly. As a result, the labor market obeys the rules or the nature of the market and adjusts the supply and the demand of labor according to these rules (Nantz, 2010).

2.6 The case of economic Convergence
The source of the concept of economic convergence can be found in the neoclassical model of growth that was firstly described by Solow (1956) and Swan (1956). Accordingly, lower and diminishing returns to investment in richer countries (more developed and capital abundant) lead to a spillover and spread on investments to new and less capital abundant countries where the returns are higher. Since this capital investment in poor countries takes place, the prices of factors of production as well as the standard of living tends to increase and equalize with the rich countries. The core idea of this model is that diminishing returns to capital and not trade is the equalizing force (Vojinović et.al., 2010). In addition, it does not take into account the growth in total factor productivity that can sustain growth in the long term, rather than capital accumulation (Vojinović et.al., 2010). For these reasons, this model has been rejected by newer growth perspectives such as endogenous growth theory. According to the latter, economic growth is a result of endogenous factors and not exogenous. Innovation, investments to education as well as to human capital promote growth and lead to an endogenously caused economic development. As a result, more investments to human capital, which require physical capital, can yield steady or even higher growth for the economy making the basic assumption of the neoclassical model (decreasing returns to capital) of no use.

Nevertheless, the consequences for the concept of economic convergence are heavily dependent on the concept of growth theory that one believes in. In the first case of the neoclassical model, economic convergence is an underlying implication or an explicit aspect. Rich or developed countries are doomed to suffer the consequences of the declining returns to investments and thus declining growth rates. On the contrary, this theory maintains a de facto increase in growth rates due to capital investments, for counties that were initially poor. As a result, the economic convergence is a phenomenon that takes place after an economy reaches the critical point of decreasing returns to investment for capital abundant countries. On the other hand, according to the endogenous growth theory the concept of economic convergence is not a realistic one.
Increasing returns to investments and more specifically to innovation and human capital endowment imply that rich countries can become richer and enjoy high growth rates after investing domestically in these sectors; rather a divergent pattern is taking effect (Romer, 1986). The first empirical analysis regarding economic convergence starts from the mid 1980’s with Baumol (1986) suggesting that homogeneous groups of countries tend to converge steadily while heterogeneous groups follow a diverging pattern. A few years later Barro and Sala I Martin (1995) in their book “Economic Growth” apotheosized the concept of economic convergence. In the chapter eleven of their book (Economic Growth, 1995) they analyzed the convergence of all major economies from mid 60’s onwards. United States, Japan Germany, Scandinavian countries as well as the rest of the Europe were subject to convergence analysis. From the methodological perspective in their book they use two basic concepts; beta convergence and sigma convergence. The first either as conditional or as absolute is about a regression of the initial level of GDP per capita of a country with its growth rate. If the beta coefficient of the growth rate is significant and negative, then beta convergence is verified. Absolute or unconditional beta convergence is a regression with only the initial level of output and its growth rates, while conditional beta convergence is the same regression with more independent variables that make a condition for the changes of the initial output, such as investments or labor force. In other words, conditional convergence is more specialized and captures the effect of another variable or condition. On the other hand, it is a necessary but not sufficient condition for sigma convergence (Barro and Sala I Martin, 1995: p.385). Sigma convergence captures the variation of output over the long run. With the use of coefficient of variation, a declining trend indicates that convergence is taking place. Output is equalizing, and this can be viewed by a macroscopic perspective. It is a method that measures the dispersion over time and thus a sufficient condition for beta convergence.

2.7 The foundations of club convergence

While the role of the initial conditions of an economy, in terms of poorness or richness, was previously delineated, there is a decent part of previous research that compares countries with similar structural characteristics that exerted the same trade policies and yet failed to converge while their initial conditions were different. In other words, countries converged to different steady state equilibriums in the long term, although their initial conditions were different and supposed to converge according to the neoclassical growth model (Bartkowska and Rield, 2012).
Galor (1996) maintains that in a group of similar economies, convergence in the long run is not expected while some of these countries may indeed converge to their own steady state. These countries compose their own steady state growth club that can be called convergence club. The problem that is following this hypothesis is that it is hard to assess which factors led to the multiple steady state equilibriums – clubs. For example, if structural traits of the economy are indeed responsible for the formation of a convergence club, then discrimination or separation of conditional beta convergence and club convergence is a hard task (Bartkowska and Riedl, 2012). In other words, the real causes of club convergence cannot be easily identified, while the same causes may derive from conditional beta convergence. Moreover, there also exists the concept of regional convergence. If the clubs of the countries or regions that converge belong to the same geographical block, then signs of regional convergence are in place. Still geographical factors are rarely the causal force of convergence, while initial conditions in terms of human capital and per capita income are more possible causal forces (Bartkowska and Riedl, 2012).

2.7 New economic Geography

During the last twenty years special attention was paid to the uneven spatial distribution of economic growth. The traditional or first – nature geography which considers natural resource endowments, climate and topology could partially explain this variation, while a new explanatory theory for that phenomenon emerged (Bartkowska and Riedl, 2012). This new theoretical framework is called new economic geography and its theoretical foundation lies on the greater importance of second nature geography, which can be described as the relative distance or location among economic agents (Krugman, 1980).

According to Redding (2010), the empirical models that attempt to describe the pecuniary externalities deriving from the choice of an agent to locate in an area are based on three assumptions. The first is increasing returns to scale, the second is decreasing transportation costs and the third is a love of variety assumption; a concept that was firstly introduced by Krugman, (1980) who maintains that each country specializes its production into a number of varieties that are analogous to its market size, capacity and potentials. As a result from these forces, production tends to agglomerate into specific locations, generating the home market effect. Consequently, the concept of regional economic convergence can be also explained by these agglomerative forces versus the dispersion forces: for example immobile factors of production.
Hanson (2005) has verified the existence of home market effects when the country is large, exports from this country are high and industries face relatively high transportation costs.

After these contrasting effects, the term market access which is the core of New Economic Geography gains increased importance. The segmentation of a greater space into core and peripheral depending on the market access is an explicit imposition of new economic geography theory.

In addition, the labor force also follows the “movement” of production, leading to the creation of powerful local labor markets. Many researchers (Hanson, 2005 and Breinlich, 2006) maintain that there is a significant and positive association between the access to the core market and nominal wages in industries with relatively high transport costs.

On the other hand, Redding (2010) maintains that although the models of new economic geography are decently accurate they cannot separate the effects of institutions and other spatial fundamentals on nominal wages and sees these effects on wages as a presumptuous transgression.
III. HISTORICAL BACKGROUND

3.1 Regionalism in China: a ghost of the past

Many people believe that income inequalities and uneven spatial growth is a recent phenomenon in the Chinese state, mainly due to the miraculous growth (Rodrik, 1994 and Weiss, 2005) that occurred during the last decades. This assumption is in the wrong direction since from the beginning of the formal Chinese State in 1949, there is hard evidence for an opposite argument. It was Lakshmanan and Hua (1987) who posed that China is fated to be segmented and unequal and they may not be wrong. This segmentation can be described as regionalism and its main characteristic is the clustering of the Chinese state into smaller regional groups with distinct growth and wealth regimes.

To begin with, during the Maoist era, China had adopted a socialist type system for planning the economy. This system is encompassed with many problems that according to Wei (1999) enhanced regional inequalities.

The main problem with this system was that vertically integrated economic units were not able to communicate effectively. As a result, high and unreasonable inputs of factors of production, such as raw materials were wasted while the physical capital was circulating ineffectively inside the economy (Lakshmanan and Hua, 1987).

On the other hand, Zhao and Zhang (1999) argue that under the planned system the central mechanism of prioritizing capital was effective, while the main problem was the mobility of the capital since it was hindered by local initiatives. Special attention is paid on the level of the corruption and how it was preserved in the absence of a market allocating mechanism. An example of that misallocation of resources combined with local interests was the case of Baoshan Steel Plant (Zhao and Zhang, 1999).

“…Baoshan Steel Plant, built in the late 1970s and early 1980s, was at that time the largest and most modern steel plant in China. Its original site was to be Tanshan, Hubei province, located on one of the three national richest iron ore mines. Instead, it was located in a suburb of Shanghai, far
from any iron ore base, in contrast to most feasibility studies and as a result of pressure imposed by Shanghai elite, who occupied all key decision-making position [sic]" (Zhao and Zhang, 1999)

Moreover, regionalism was also greatly affected by specific Maoist policies. The first was the decentralization policy and the second was the creation of the national defense system under the fear of imperialist attacks. The results from these policies were similar and negative to the equality among provinces. According to the national defense plan, both the resources and the investments flowing towards poorer regions were limited (Wei, 1999).

In addition, the decentralization policies exerted in the period 1950 to 1970, enhanced the phenomenon of localism, making coastal regions more able to affect central command to their interests than poorer regions (Wei, 1999).

Furthermore, industrialization during the Maoist period was mainly focused on eastern regions, mainly due to the colonial heritage that these regions had adopted from previous regimes (Wei, 1999) for example the Manchurian iron industry.

Nevertheless, the views on the Maoist era and its contribution to interprovincial inequality are contradicting. The biggest debate regarding inequality in China during the pre-reform period (1949-1978) is known as the Lardy–Donnithorne debate. It is named after the vertically opposite conclusions of two researchers, Lardy and Donnithorne. The first maintained that during the Maoist era cross regional resource transfers as well as the central control of fiscal flows and investments had a declining effect on the differences among provinces (Lardy, 1975, 1978 and 1980), while the second posed that specific decentralization policies that were exerted during that era created a polarized economy in which the provinces were separated into autonomous and autarkical from the one hand and to supporting and peripheral from the other, resulting in increasing inequalities among them (Donnithorne, 1972 and 1976). As Wei (1999) concludes though this debate is deeper in the sense that represents two wholly different perspectives: the totalitarian approach and the fragmentation approach. Still, the majority of previous research sees Maoist era as an era of increasing inequalities, with some regions marching ahead while others falling to a great extent behind (Wei, 1999).
After Mao’s death, a new era began for China. This era is famous for the beginning of the transformation of the economy and its results, which were fascinating growth and astonishing poverty reduction.

Still, the phenomenon of regionalism and income inequality persisted during this post reform period. To the very start, the challenge was to feed more than one billion people while Mao’s previous plans were at strain (Great Famine). In order to solve this problem, the household responsibility system was initiated. Households were then allotted a plot of land and were responsible to farm it and give a certain quota of crops to the state. Lakshmanan and Hua (1987) though maintain that the agricultural reform enhanced the spatial inequality issue: regionalism. Initially better areas in terms of climate and soil conditions were yielding higher payoffs. Only for fertile regions, the quota was easily surpassed while the excess production was contributing to household income. This was the first spatial inequality catalyst in the post reform period. In addition, Rothenberg (1987) notes the importance of transportation investments and the past of self sufficient provinces in that respect. Given the lack of decent transportation infrastructure, growth was higher for regions with a natural transportation endowment such as rivers or canals (Shanghai) while the absence of transportation and other basic infrastructure indeed impeded growth for mainland and western regions (Lakshmanan and Hua, 1987).

Furthermore, the dogma of the first reformer Deng Xiaoping is accused of being a catalyst for interprovincial inequalities. That dogma of letting someone get rich first had the implicit assumption that the growth that occurred to certain regions could be trickled down to the rest in a context of healthy competition among provinces - tidu lilun (Yang, 1991). The results though were rather different. Localism, in terms of protecting local interests from provincial governments was the first priority, while the second was natural resources ensuring. As a result, coastal provinces and regions close to the special economic zones enjoyed higher growth rates and wealth, while western regions were seeing their population - labor force fleeing out of them. For example, Shandong and Fujian had a greater focus from the central command than areas such as Xinjiang or Sichuan (Wei and Ma, 1996).

Moreover, the basic ingredient of the Chinese growth during the post reform period was the foreign direct investment. As Ran et. al. (2007) maintain, this kind of investments followed a distinct and uneven spatial pattern, since the focus was on eastern regions while mainland and western regions lagged behind causing provincial disparities to increase.
On the other hand, Mitra (2004) maintains that the causal force for the increase of regional disparities; both coastal – mainland and rural – urban, is the central development policy exerted by the Chinese government. He claims that the control of flows in terms of investments both foreign and domestic could be controlled by the government but were not (Mitra, 2004).

What is more, change in prices can be characterized as slow, uneven and retarded in many cases while the central state had in mind this issue (Riefler, 1991). This instability enhanced interprovincial inequalities.

In such a gap creating environment the only solution to promote equal growth was either high taxation on land or free labor mobility, still the state was not able to implement such changes back then. The main problem was the lack of investments to infrastructure and especially urban housing that enhanced this issue. Lakshmanan and Hua (1987) maintain that even if an attempt was made to let the labor force move freely inside China during the beginning of the reforms, the quality of life in urban areas would fall sharply due to the deficit of decent housing. On the other hand from the taxation perspective, Zhao and Zhang (1999) pose that through the tax sharing system the tax flows towards poorer provinces were significantly lower than the flows to richer areas while the government was claiming to be trying to reduce interprovincial inequalities. For this issue, Chung (1994) maintains that the provinces felt betrayed by the central government while what Zhao and Zhang (1999) were seeing back in the beginning of the reforms was the development of a new system with old problems while history in a sense failed to refute them.

To conclude, the tripolar of post reform regional disparities consists of ineffective and selective state intervention, uneven investments and a mix of manipulating and in many cases corrupting local initiatives (Wei, 1999).

3.2 Low cost growth

Chinese growth in the post reform period is characterized as FDI driven and export led (Rodrik, 1994 and Weiss, 2005) accompanied by a smart currency manipulation by the Chinese government (McKinnon and Schnabl, 2008) but this is only the one side of the coin (Chan, 1998 and Garcia, 2009). On the other side there are low wages and shocking working conditions. Chan (1998) notes the importance of labor rights; that are strongly connected to human rights, and maintains that access to the growth pie for the majority of the non state workers in China was limited. In addition, their labor rights were violated in many cases such as forced labor,
intimidation, lack of health and safety rights. Meng et. al. (2006) describes these jobs as 3D (disgraceful, dirty, and dangerous). Chan (1998) includes a letter in her article from a group of migrant workers that were kept like slaves in a factory in Shandong and their story is shocking. Under these circumstances, the low cost competitive advantage flourished. Garcia (2009) maintains that one of the implications of LCL (Labor Contract Law, 2008) for the companies that kept production in China was the increased labor costs while many of them threatened to leave to even cheaper regions like Vietnam.

On the other hand, growth in China was accompanied by the greatest poverty reduction ever happened in the world. In terms of per capita income which is not a reliable indicator of poverty, since it does not capture the real distribution of income inside the economy, Chinese statistics indicate a dramatic reduction in poverty from 31% of the rural population in 1978 earning less than one dollar per day to 3% in 2000 (Park and Wang, 2001). In terms of Gini coefficient the value was 29.1 back at the beginning of the reforms while during 2005 its value climbed at 42.5 and data for more recent years are not available (World Bank Indicators). Xu and Zou, (2000) maintain that the income inequality is increasing across provinces. The reasons for the increasing disparities according to Demurger et. al. (2002) include geographical traits and favorable policies from the central command. Finally, Quibria (2002) concludes that income distribution in terms of equality deteriorated while China was following this FDI driven export oriented growth model. As a result, the government was obliged to put equality of growth in its agenda since disparities were increasing over time (Kanbur and Zhang, 2001).

3.3 Regionalism Chinese style in terms of Output

Jian et al. (1996) pose that there are significant signs of national output convergence in China after the reforms were initiated, while Chen and Fleisher (1996) consider the effects of access to sea, capital investments and employment and maintain that conditional to these terms economic integration is taking place in China. In line with that aspect, Li et al. (1998), include more region specific effects than Chen and Fleisher and end up on the same conclusion. Yao and Lei (2009) pose that in terms of output or production, the special economic zones of Hong Kong and Macau are converging with coastal China, coastal China is converging with mainland and mainland is converging with western.
In contrast, Dayal-Gulati and Husain (2002) note that there are fixed growth rates that specific regions converge to, in other words there are signs of convergence for groups with their own speed and rates.

On the other hand, nationwide divergence is a conclusion for both Weeks and Yao (2003) and Pedroni and Yao (2006), while the first managed to form regional convergence clubs. Following Maasumi and Wang (2008), previous empirical research seems to be inconclusive regarding the convergence clubs in China in terms of production. The reasons behind such notion are the same as Wei (1999) posed; data availability and methodological inefficiencies regarding the formulation of geographical clubs (Maasumi and Wang, 2008).

3.4 The Labor institutions in China

In the case of China, the role of institutions is even more important in coordinating and adjusting the supply and the demand of labor since its size is enormous. A typical migration move in China consists of hundreds of millions of people. For that reason, the Chinese government has the institution of Hukou in place. During the Qin Dynasty, thousands of years ago, the emperor had to develop a registration system in order to recruit soldiers and collect taxes. This system is the sprout of today’s Hukou system and accordingly each Chinese citizen is allocated a registration number to the city that was born (Bai and Li, 2008). That number allows the individual to live and work in an urban area. While the migration is not illegal, under the Hukou regime once an individual does not have a local registration number is not able to exploit urban social services such as schooling for his children. As a result, the Hukou system can be described as a stasis mechanism to the migration flows in the sense that limits the time line of the migrants into an urban area. For that reason, it is perceived (mainly from academia) as an obstacle for the free migration of labor force inside China. Under that labor stasis mechanism or the “guest” worker system, labor market integration is very difficult to occur since the essence of economic integration is the equal price of the factors of production, that are subject to free migration or allocation without boundaries.

In addition, with the beginning of the reforms, changes were institutionalized as laws and regulations regarding the labor conditions in China. The institutions that guaranteed safety in job and wages were literally absent while as Däubler and Wang (2009) maintain the labor legal norms are not that disciplined in a Chinese context.

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3.5 The labor laws in post reform China

In the early beginning of the reforms in 1982 the constitutional right of Chinese workers to strike was revoked (Däubler and Wang, 2009). During these years as well as three previous decades the labor force was allocated to white and blue collar jobs. Through a socialist type - bureaucratic system labor mobility was severely restricted, while the state was monopolizing the supply of the labor force. The ministry of labor had the blue collar occupations over its control, while the Ministry of personnel had the control of managerial positions inside the economy (Josephs, 1995). In 1986, the Contract Employment Regulations committee gave the authority to employers to hire workers for their needs rather than accepting assigned workers. Under fixed term contracts these workers gained the right to change jobs or at least gained some mobility that was not optional during the previous regime. The state on the other hand initiated this policy in order to make state owned companies more productive while cutting down the subsidies towards them. The deeper motivation according to Josephs (1995) was to reduce the importance of the state enterprises in the economy while relaxing some of them from the overstaffing phenomenon. That attempt to make the state owned enterprises more responsible was only the sprout of labor law modernization in contemporary China. In 1994 the labor law was enacted. Accordingly, new terms were introduced into the Chinese labor market, such as the concept of minimum wage, labor unions that would protect the interests of the workers; although as Josephs (1995) poses unions would act in a context of governmental control, collective bargaining of wages as well as individual contracts and limits to the exploitation of workers from the firms (Garcia, 2009).

Nevertheless the effectiveness of the labor law of 1994 was rather poor. Josephs (1995) concluded that China was not ready to compromise to its industrial relations system and more specifically to the role that the labor Unions should play while he claims that labor unions gain increased importance in times of crises and political instability but China was not facing such problems at that period.

On the other hand Garcia (2009) identifies two reasons. The first reason had to do with the fact that local governments were the enforcers of this law and as a result there was not a unified but a differentiated implementation from province to province. Secondly, that law was perceived as voluntary by employers resulting in the weak enforcement; repeating violations.
For example as Garcia (2009) posed the forty hours per week that this law was “enforcing” were “translated” into twelve hours per day, six days per week occupation and only eight hours on Sunday. Late payments and permissions to resign were also unaffected.

More than a decade had passed while the labor law inefficiencies seemed to cause social unrest (Garcia, 2009). The Chinese government responded to this concern with the labor contract system, a law that was enacted in the beginning of 2008. The core idea behind the LCL (Labor Contract Law) is the concept of a harmonious society as posed by the Chinese Premier Hu Jintao (China Daily, 2006) and the increased importance of contracts as means to secure labor rights. Companies both foreign and domestic are now obliged to sign contracts with the employees. There are three kind of contracts; fixed-term, non-fixed term, and project-specific contracts. If a worker doesn’t sign a contract and works for a year then he automatically gains a non fixed term contract and gets reparations to the double size of his wage for the time that was working without contract. The previous regime (Labor Law, 1994) allowed employers to form fixed term contracts repeatedly with the same worker guaranteeing labor flexibility. Now, after two consecutive fixed term contracts, the worker gains a non fixed term contract if he wishes to remain in the company, while double the money are paid from the day the contract was supposed to begin in the case that the worker did not signed one (Garcia, 2009).

The basic implication of this law is that the labor force becomes more secure from the one side and less flexible from the other, while the costs of labor increase vertically. On the other hand, Garcia (2009) maintains that LCL shares some inefficiency in the enforcement aspects like the previous regime. As an example he poses the case of Guangdong, where the local government issued its own guiding principles regarding this law before the central government.

In Contrast, the labor Unions in China are being heavily dependent to the central government and cannot operate in the same way like in other countries. Even after the LCL their role seems peripheral although it is an obligation for a firm, of any registration status, to have its workers unionized. Däubler and Wang (2009) pose that the role of these unions (All China Federation Trade Unions – A.C.F.T.U.) remains a bit unclear. Liu (2011) concludes that although independent unions are not formidable yet there is great variation in the behavior of the members of ACFTU and sees the regional and industry based pattern of negotiation and unionization as the sprout of an independent movement in an absolute regime. In other words, he maintains that
there are signs of weaker governmental control to unions that will probably lead to the foundation of independent unions in the future.

3.6 The lewis Turning point and its Implications for China
An implicit assumption of the Chinese competitive advantage is the disposability of the Chinese workforce. In other words, the low cost production could be attributed to an infinite supply of cheap and relatively unskilled labor that was migrating from western regions to eastern production hubs. Nevertheless, the foundations of this competitive advantage seem to weaken. Firstly, the nature of Chinese production is changing. As China moves up to the value chain (Rodrik, 2006); away from low skill manufacturing and textiles, more skills are needed for the production of more complicated products. These more advanced skills are paid more and force the wages to increase vertically. In addition, according to economic demographers the infinite supply of labor in a Chinese context will stop to exist in a few years. The latter is even more important in this essay since it has a direct effect in the function of the labor market. The first theoretical approach on this phenomenon was done by Sir William Arthur Lewis (1915 —1991). Accordingly, the Lewis model implies the existence of two industrial sectors inside an economy a relatively old and traditional and a relatively new or modern. The labor force moves away from the traditional sector flowing towards the modern motivated by the higher returns. The wages in the new sector remain stable or increase slowly till a specific shock. This shock or lewis turning point occurs when the supply of labor from the traditional or old sector gets exhausted. At that point, wages will start to increase rapidly. Cai and Du (2011) conclude that the infinite supply of cheap labor turns to be a myth for contemporary China. The sectoral change turns to show signs of overcapacity (Appendix I: Figure 1) while there is a notion for the wage levels to increase dramatically for the Chinese standards as the wages of migrant and urban workers have already converged. This argument is further enhanced by Rosenberg et.al. (2010). As a final point, there is enough speculation about this subject (Appendix I: Figure 2) and fears from the side of investors of a relatively expensive “made in China” production.
IV. METHODOLOGY AND DATA ANALYSIS

4.1 Data and transformations
Through the national statistical bureau of China access was given to the statistical yearbooks on average nominal wages of staff and workers by industrial sector and region. There were two issues with these data. Firstly, an average increase on the general level of prices affects the purchasing power of the wage beneficiary. That is called inflation and its effect on wages should be isolated and removed. In order to do so, residents consumer price indexes were used. Starting from 1984 (base year) each year there was an average increase on the national level of prices of about 7% (Appendix I: Figure 3). This increase led to the increase of wages, in some cases smaller and in some cases bigger. No matter what exactly the case was, wages were deflated and this effect was removed. Here it is important to note that specific CPI’s were used for each region for each year and not the national average. This fact enhanced the accuracy of the analysis made. On the other hand, the value of money changes over time. As a result, one Yuan made back in 1985 has a totally different value than one Yuan, ten or twenty year afterwards. Thus the real wages should be converted into a fixed currency that takes into account the natural present value of capital. For this reason all wages were transformed into 2012 US dollars. Two charts follow that assisted with the previous transformation. The first chart shows the relationship or exchange rates between Chinese Renimbi and United States dollar (Appendix I: Figure 4) and the second the relationship between one Us dollar year over year with one Us dollar in 2012 (Appendix I: Figure 5). As a result, the average nominal wages were transformed into average real wages (prices of 1984) in 2012 U.S. dollars.

4.2 Methodology
To begin with, the first objective or challenge for this essays analysis is to verify the null hypothesis of a nationally integrated labor market in China. In order to properly investigate this issue, the sigma convergence of average real wages will be measured. Sigma convergence can be shown by a declining coefficient of variation over time. That means that for each year an average value of wages has been estimated as well as the variance from that value. The coefficient of variation is the result of division of the variance to the mean or average
value. The last step of the analysis is an ocular inspection of the coefficient of variation over time. A declining trend will verify the existence of sigma convergence while an increasing trend will imply a divergent pattern.

Steps of Sigma convergence analysis

1. Estimation of an average value of real wage among all provinces for a whole year
2. Measurement of the deviations from that average values squared
3. Estimation of the variance of average real wages for that specific year
4. Division of the variance of average real wages with the average value of average real wages for each year: Coefficient of Variation
5. Comparative analysis of the coefficients of variation over time.
6. Estimation of a linear trend line for the time series of coefficients of variation: a declining trend is an indication for sigma convergence

If the null hypothesis for each industrial sector will be rejected then a new set of hypotheses arise. In order to investigate these hypotheses two different approaches will be employed; a priori expectations and Data mining or clustering. According to the first approach, one could form clubs of regions that are consistent with previous research since there are reasons to behave similarly in their labor market function. This approach is encompassed with a priori expectations and the analysis following is nothing more than a test for these expectations. On the contrary the second approach for identifying convergence clubs is to let the data decide which regions belong to each club. The second approach can be described as a data mining procedure that divides the national dataset of real wages into clusters based on some criteria that the researcher sets beforehand. For example, these criteria may be the least distance between observations or the smallest variance among them.

Though, both of these methods are followed by some problems. In the first case there may be clubs that behave better than previous research has identified. In other words, the first approach of following previous research and setting a priori expectations as clubs criteria is dogmatic and perhaps an obstacle for new knowledge (Maasumi and Wang, 2008). On the other hand, data mining or clustering may lead to the formulation of clubs that is very hard or even impossible to motivate.
Nevertheless, both approaches will be used in this essay for the sake of clarification and in-depth research.

Starting from the second approach of data mining, the method that will be used in this essay is this of agglomerative hierarchical clustering (from this point onwards called AHC). With this method the data are clustered into groups with a bottom up approach, by two criteria. The first is the Euclidian distance and the second is wards method of least variance. The regions are clustered into groups starting from each region being its own cluster and then adding regions that show the smallest variance from that region’s mean. Euclidean distance is the line segment that connects two points \((p, q)\) in space given by the formula:

\[
d(p, q) = d(q, p) = \sqrt{(d - p)^2}
\]

The algorithm used in AHC method is using the Euclidean distance as a criterion to separate clusters while wages that their variance is similar are included in the same cluster. That means that after the clustering the groups obtained will be homogenous while having the biggest differences among them and the least variance inside them. The problem with this approach is that it does not create clusters with declining variance over time but with the least variance in total. As soon as, the clusters of regions are obtained the sigma convergence analysis as previously posed will be reapplied into these smaller groups trying to verify the existence of regional or in-cluster sigma club convergence.

On the other hand, in the second approach the convergence clubs will be formulated from previous literature. To be more specific the clubs as formulated by Maasumi and Wang will be tested for their labor market integration with the exception of agriculture where the clubs of Pääkkönen (2009) will be employed. Maasumi and Wang (2007), utilize a metric entropy measure for the growth rates in output of each Chinese province and subject this entropy indicators to agglomerative hierarchical clustering analysis based on the “complete linkage” algorithm with the farthest distance criterion. Their analysis is the most accurate and complete in terms of robustness and validity and thus the clubs formulated are in that sense the most reliable.
for this analysis. Though only for agriculture different a priori clubs will be tested, derived from Pääkkönen (2009). The main motivation behind their formulation is the share in agriculture versus the modern industrial sector as well as their convergence in output: the minimization of the distance of each observation of a club from the club average as proposed by Durlauf and Johnson (1995).

Table 2: Methodology Outline

<table>
<thead>
<tr>
<th>Sigma Convergence Analysis for the National Dataset for each Sector</th>
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<tr>
<td>Converging Pattern</td>
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- If the national market is not integrated then club convergence will be sought
- Agglomerative Hierarchical Clustering
- A priori formulation of clusters from previous research

The Cluster obtained will be again tested for sigma Convergence

- Are the clusters obtained from AHC integrated?
- Are the clusters obtained from "previous research" integrated?

The basic assumption that follows the a priori formulation of clusters following Maasumi and Wang (2008) is that output convergence is aligned to labor market convergence. Thus an implicit test of the equality of wages among integrated clusters will be examined. This part aims specifically to test the third hypothesis as formulated in the beginning of the essay.
Apart from the sigma convergence analysis, the average correlation coefficient of each province will be estimated. Correlation coefficient or “r” is a bridge between descriptive statistics and variable relationship modeling. It is a very interesting construct which enables comments about direction and magnitude of a relationship between two variables. Furthermore, it could be described as an indicator of integration while putting a relationship into a wider context (for example geographical). It is the product of a concept called covariance between two variables since it summarizes the product of the deviations among them while it describes the degree of their synchronization. In this case this method will be employed to verify the existence of a “leader” of change in a national level for the average real wages in China and support the findings of sigma convergence. The values of “r” are ranging from minus 1; indicating a negative relationship to plus 1; indicating a perfectly positive relationship while these values are followed by a statistical significance level. Thus “r” is not only indicating a positive or negative relationship but also its significance level; the chance of this relationship to be a random or lucky result or the real value of “r” to be zero. Significance levels for the values of “r” were obtained from Fisher and Yates (1963).
V. RESULTS AND DISCUSSION

5.1 Correlation Coefficient of average real wages

In this part of the paper the results will be discussed for each sector. In total eight sectors were analyzed.

**Figure 5.1:** Average correlation Coefficient of Average real wages for all sectors

---

Note: Two more detailed figures on correlation coefficient can be found in the appendix.
To begin with, the correlation coefficient (r) does not indicate a clear converging pattern. In other words, there are not specific regions or group of regions that seem to lie behind the changes of average real wages in a national level. On the other hand, it was expected that poor western and mainland regions would have lower “r” values. Most of the “r” values are strongly significant (99.9%) while values under 0.5 are not. Tibet’s and Chongqing’s values of “r” are not significant in many cases. A detailed analysis of the “r” values for each industrial sector can be found in the Appendix.

**Figure 5.2:** Dispersion of average real wages over time for all sectors

---

**Note:** Two more detailed figures on coefficient of variation can be found in the appendix.
5.2 Agriculture
The national labor market in agriculture is not integrated, since the coefficient of variation increases over time (Figure 5.2). This was expected since the fertility of land varies greatly among regions (Appendix II: G. Figure 1.1). An interesting finding is that there are signs of club convergence (Appendix II: Table 1.1). One of the clusters obtained is also an example of regional convergence. On the other hand, when testing Pääkkönen (2012) clusters of regions that take into consideration the share of agriculture of each province in its total output, as well as the total output convergence, integration on wages for these clubs cannot be verified (Appendix II, Figure 1.1). The industrial sector of agriculture has a segmented labor market according to the analysis made while Output convergence is not an absolute condition for labor integration in the case of Agriculture.

5.3 Manufacturing
There is weak evidence that the manufacturing labor market is unified. The coefficient of variation in a national level is very low while its annual increases are the lowest (Figure 5.2). One could argue that the labor market for the manufacturing workers is unified. That can be partially explained by the fundamentals of this sector in a Chinese context. Low skill and simple demands are the necessities of this sector. In addition, firms prefer to locate to regions with the lowest labor costs since this is a capital intensive sector thus spillover effects are easier. The analysis tends to verify the weak existence of a unified labor market in this case.

With the attempt to cluster regions a clearer conclusion is still absent. Most of the clubs obtained have declining dispersion over time while all of them have very low variation in total (Appendix II: Table 2.1). Regional clusters could not be obtained in this case (Appendix II: G. Figure 2.1). On the other hand, the clusters of Maasumi and Wang (2008) were also tested and convergence could not be found on them, with the exemption of the third club which is also a regional club (Appendix II: Figure 2.1). As a result, a regional labor market for Jiangsu, Zhejiang, Fujian and Guangdong can be verified. These regions belong to the coastal block and their integration can be attributed to the preferential development policy of the Chinese state and their early opening up to trade.
5.4 Excavation
While the national labor market in excavation is not integrated (Figure 5.2) there is a large cluster obtained from the AHC that has an integrated market. Without causality being examined it seems that the cluster obtained is strongly connected to the oil basins spread in China. To be more specific the counties that form the club are following the exact same pattern of oil basin distribution in China while the clusters obtained from Maasumi and Wang (2008) do not behave as integrated. Clusters that have integrated markets in terms of production do not have a unified labor market (Appendix II: Figure 2.1).
As interesting can be described the finding that the second club obtained in this case is exactly similar with the oil basin distribution in China (Appendix II: Maps 2.1 and 2.2).
A close inspection of the minerals map of China acquired from the China mining association (Chinamining.org), indicates a possible relationship between the distribution of oil wells and the labor market integration. In that respect, natural resource endowments lead to the stratification of the labor market while this assumption can be enhanced by an ocular inspection of these two maps.

5.5 Education
The wages of staff and workers for the industrial sector of Education are not equalizing at a national level (Figure 5.2). In addition, regional convergence clubs could not be obtained while some clusters converge to their own steady states. For example Beijing, Tianjin, Shanghai and Zhejiang form such a cluster. The clubs of Maasumi and Wang (2008) were also tested and converge was only found in their 3rd club: Jiangsu, Zhejiang, Fujian and Guangdong (Appendix II: Figure 4.1). A possible explanation may be the different level of education budget allocated to each province by the central government as well as the management of the local governments. Localism still is an important factor in the Chinese economy that may affect this sector.

5.6 Real estate
Wages do not converge into a national level (Figure 5.2) while the coastal regions seem to form regional convergence clubs. The labor market is integrated into specific segments while segment four is almost the same as Maasumi and Wang (2008) had identified (Appendix II: Map 4.1).
Weak regional convergence can be verified while the pattern is coastal, western, mainland and north and north-eastern (Appendix II: Map 5.1).

5.7 Construction
Convergence on a national level could not be found (Figure 6.2). Nevertheless, regions form clusters that have an integrated labor market. Following Maasumi and Wang (2008) coastal regions form a regional convergence club. The majority of construction firms in China are State owned and infrastructure development mainly took place in eastern regions. This could partially explain the differences on wages as well as their diverging evolution through time. Once again the condition of output convergence is not absolute for the wages to equalize (Appendix II: Section 6).

5.8 Government Administration and Financial Insurance
For the sector of government administration national level convergence as well as regional club convergence is absent with the exemption of Jiangsu, Zhejiang, Fujian and Guangdong (Maasumi and Wang, 2008) which form a regional club (Appendix II: Map 7.1, Figure 7.1). This conclusion was expected from the preferential policy exerted by the Chinese government and the uneven distribution of public income.
On the other hand, exactly the same apply for the sector of financial Insurance sector. National convergence is absent while only one regional club (the same) can be inspected (Appendix II: Map 8.1).

5.9 Policy implications
Policy wise the best execution requires an integrated market to exist while the development of an integrated market is supposed to happen after a series of best executions of policies (U.N., 2001). This dilemma seems hard to be answered while the interdependence of these two parameters is high. In addition, this dilemma is of great importance for China. An integrated labor market is absent while the policies exerted so far vary greatly on their results. Therefore, the policies that are needed must be innovative. In general these policies should focus on the labor market institutions alteration, the development of western and rural areas, and the austere state inspection of working conditions in China. Fortunately, in a sense, the Chinese problem can be
described as solely institutional since China has accumulated enormous amounts of capital through two decades of miraculous exports. Thus, the challenge is to find the best institutional recipe to cure the problems that this labor market faces at the moment.

To begin with, the Chinese state must prioritize and organize better the policies regarding the alteration of the labor institutions. The institutional framework of Hukou from the one hand aims to impede the migration flows from poor to rich regions while the Labor Contract Law that was implemented in 2008 made the workforce more secure in urban areas, giving incentives to people to migrate. These policies are highly contradicting and may cause problems. In the following years, the challenge for the Chinese government will be to alter the institutions that are preserved with innovative structures that organize the workforce in a more productive way. A courageous suggestion for the Chinese government would be to abolish the Hukou system for a short period of time, while this suggestion still includes many risks.

In addition, special care should be paid to the role of labor unions in protecting the labor force. Unions in China are still not in an influential position like in other countries while the sprout of independent unionization is on track. This transition from a controlled workforce to a more independent should be done under the guidance of the state since the implications for social unrest are severe. The state should gradually relax the control (even financial) over ACFTU and let the unions find their way in a more market oriented system.

Moreover, the term “Chinese working conditions” should be eliminated. The working conditions in China for non state workers are described as dirty dangerous and disgraceful. This triptych is inhuman and may be the source of social unrest and long scale conflicts.

To conclude, the Chinese government is well aware of the issue of regionalism as well as its implications for poverty, prosperity and social welfare. This can be viewed from the official growth and priority plans (both short term and long term) of the Chinese state. The five year plan of 2001-2005 saw regionalism as a first priority phenomenon. The longer term National Poverty Reduction Plan 2001-2010 specifically noted the importance of coordinating economic development with social development. Looking at the latest five year plan (12th FYP: 2011-2015), the priorities also follow this pattern: rebalance of the economy and adjustment of social inequalities.
5.10 Further Research

The subject of regional inequalities in terms of labor market inefficiencies is a very complicated issue. The labor market from the one hand is not a simple construct and cannot be easily described by just the forces of supply and demand of labor since social norms and other institutions play a decisive role. On the other hand, wages are not just a price of a factor of production but also the chance for an individual to maintain a certain degree of living standards. In a sense, the challenge for any kind of labor market constructs is to bring balance to these two aspects while more empirical research is needed towards this direction. In addition, specifically for China an independent and complete study about the nature of the labor market is still absent due to the data availability and the complexity of this economy. Unique institutional structures, preferential policies, uneven FDI and regional endowments all affect the unification of the labor market but what matters more still remains unanswered. Finally, and more importantly studies that investigate the effects of the “opening up” policy in terms of trade to the level of the market integration still remain inconclusive while economic convergence theory maintains that capital accumulation rather than trade leads to the catching up effect.
VI. EPILOGUE

The purpose of this paper was to delineate the fundamentals of the Chinese labor market while measuring the level of economic convergence on the average real wages of staff and workers. In the beginning of this essay three groups of hypotheses were posed.

The null hypothesis of an integrated national labor market was rejected. Almost in all sectors tested, convergence on wages could not be found in a national level. This finding as previous literature maintains could be attributed to the unique institutional infrastructures in China, such as the “guest worker” system or the Hukou regime, the still developing laws and legal institutions that are not yet enough to unify all regions into a large equal market, the uneven FDI distribution which was the catalyst behind Chinese growth and the preferential central command that aimed to the development of healthy competition among regions and trickle down effects while the consequences were rather different (Wei, 1999). In a sense, this finding was expected since the Chinese economy could be described as an infant in international trade as well as economic development. The time was simply not enough for the Chinese economy to become integrated while the objective for market integration would be an outrageous one in a thirty year growth trip that the focus was in the foreign markets (export led growth) and infrastructure development. Moreover, institutional alteration seemed peripheral to the growth rule and still is considered by many policymakers while needs time to take effect.

The results for the second hypothesis were contradicting in the logic that a clear answer could not be found. In some sectors there are regional clubs while in others there are clusters that converge to their own steady states. In an attempt to make a generalization, the Chinese labor market is stratified into clusters that are converging to their own steady states while some regional clubs could also be found. As a result, it is a more complicated issue to understand why certain regions that do not have any geographical connection seem to maintain an integrating labor market. Perhaps it is the mimesis of similar policies or the foundation of similar institutions that cause distant geographical markets to converge while any attempt to describe this phenomenon may be biased. On the other hand, the motivation for regional clubs is an easier task. First nature geography and / or spillover effects are usually the causal force. If regional clubs belong to eastern China then their motivation for their labor market integration becomes
even simpler. Nevertheless, the analysis exerted, brought to the surface many important findings. One important finding is the level of national integration of manufacturing sector which shows signs of convergence in a severely segmented environment. The reasons for this behavior for wages in manufacturing may be attributed to the specific characteristics of this sector. Thus, “low” skills that are translated into “flat” and “fixed” wages lead to the unification of the labor market. Therefore, a conclusion that can be made is that increasing returns to capital or the ”hunt” for lower labor costs acts like a catalyst for market integration while previous theory maintains that capital accumulation rather than trade acts so (Vojinović et.al., 2010).

Furthermore, very attention-grabbing was the integrated cluster obtained in the industrial sector of Excavation which follows the same pattern as the oil basins spread in China. Areas that have oil bellow the ground also have an integrated labor market above. This could be attributed to the state owned companies that dominate the excavation sector and pay fixed wages in a national level.

Finally, and more importantly, it can be posed that output convergence is not an absolute condition for labor market integration since the clubs obtained from Maasumi and Wang (2008) do not have a unified labor market although in terms of production the same clusters are integrated. The only exemption in this concept was the case of the third group: Jiangsu, Zhejiang, Fujian and Guangdong that had almost in all cases an integrated labor market. This group is also regional and belongs to the eastern block of Chinese provinces that was favored in many and various ways.

To conclude, there is great space still left for the development of the quality of the labor market in China. The beginning which is the most important part of the work as Plato (424 -348 B.C.) posed, was done, as the miraculous growth came to the Chinese state. The new challenge will be to manage this growth and bring it to a more substantial and deeper level through innovative policies and transformations in the economy.


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ELECTRONIC SOURCES

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Bloomberg  Business week: http://www.businessweek.com/
All China Data online: http://Chinadataonline.org/
Chinese Government’s official site: http://www.gov.cn/english
FIGURE 1: Share of Employment by sector in China

Source: Rothenberg et. al (2010)
Figure 2: Minimum wages in China

Source: http://www.businessweek.com/articles/2012-03-07/China-boosts-the-minimum-wage

Figure 3: Inflation in Contemporary China

Source: Author’s Calculations, Chinese statistical Yearbooks, various years
Figure 4: Chinese Renminbi to U.S. Dollar ratio over time

Source: McKinnon et al. 2008

Figure 5: Natural Present value of United States Dollars

Note: This graph describes the relationship between the values of one United States Dollar for each year with a United States Dollar in 2012.

Source: www.dollartimes.com
**Figure 6:** Average correlation Coefficient of Average real wages for four sectors -I

Source: Author’s Calculations, Chinese statistical Yearbooks, various years
**Figure 7:** Average correlation Coefficient of Average real wages for four sectors -II

Source: Author’s Calculations, Chinese statistical Yearbooks, various years
Figure 8: Variation of average real wages over time in a National level for four sectors - I

Source: Author’s Calculations, Chinese statistical Yearbooks, various years

Figure 9: Variation of average real wages over time in a National level for four sectors - II

Source: Author’s Calculations, Chinese statistical Yearbooks, various years
## Appendix Part II

### 1. Agriculture

**Table 1.1: Results by Clusters – AHC in Agriculture**

<table>
<thead>
<tr>
<th>Class - Club</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>10</td>
<td>11</td>
<td>2</td>
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<td>Sum of weights</td>
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<td>10</td>
<td>11</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Within-class variance</td>
<td>35492,623</td>
<td>4256,545</td>
<td>9207,110</td>
<td>4737,842</td>
<td>0,000</td>
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<tr>
<td>Minimum distance to centroid</td>
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<td>31,423</td>
<td>48,246</td>
<td>41,953</td>
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<td>Average distance to centroid</td>
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<td>84,897</td>
<td>55,271</td>
<td>0,000</td>
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<td>89,544</td>
<td>178,418</td>
<td>66,668</td>
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</tr>
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</table>

<table>
<thead>
<tr>
<th>Beijing</th>
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<th>Shanxi</th>
<th>Liaoning</th>
<th>Tibet</th>
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<tbody>
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<td>Liaoning</td>
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<td>Inner</td>
<td>Fujian</td>
<td>Hubei</td>
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<td></td>
<td>Sichuan</td>
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</table>

Sigma Convergence within the club | Yes | Weak | Weak | No | -

*Source: Authors Calculations, Chinese statistical yearbooks, various years. Analysis conducted with XLSTAT*
Map 1.1: Clusters in Agriculture – AHC procedure

Source: Authors calculations, Map made with Smartdraw 2012
Table 1.2: Convergence Clusters in Agriculture

<table>
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<th>Club 1</th>
<th>Club 2</th>
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<td>Region</td>
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<td>I. Mongolia</td>
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</tr>
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<td>Zhejiang</td>
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<td>Anhui</td>
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<td>Fujian</td>
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<td>Jiangxi</td>
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<td>Henan</td>
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<td>Hubei</td>
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<td>Hunan</td>
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<td>Guangxi</td>
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<td>Hainan</td>
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<td>Sichuan</td>
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<td>Guizhou</td>
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<td>Yunnan</td>
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<td>Xinjiang</td>
<td>56.4</td>
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<td>Unweighted average</td>
<td>65.2</td>
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</table>

Source: Pääkkönen (2012)

Figure 1.1: Sigma convergence of the first cluster obtained from (Pääkkönen 2012) - Agriculture

Source: Author’s Calculations, Chinese statistical Yearbooks, various years
Map 1.2: Agricultural regions in China

Source: U.S. Central Intelligence Agency (www.zonu.com)

2. Manufacturing

Table 2.1: Results by clusters - AHC Manufacturing

<table>
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<tr>
<th>Class</th>
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<tr>
<td>Sum of weights</td>
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<td>6</td>
<td>10</td>
<td>6</td>
<td>1</td>
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<tr>
<td>Within-class variance</td>
<td>35492,623</td>
<td>6145,897</td>
<td>6339,445</td>
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<td>0,000</td>
</tr>
<tr>
<td>Minimum distance to centroid</td>
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<td>57,453</td>
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<td>Average distance to centroid</td>
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<td>103,454</td>
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</table>

Inner Mongolia, Tibet
Beijing, Hebei, Shanxi, Henan, Jiangsu, Zhejiang, Shanghai, Tianjin, Liaoning, Fujian, Jilin, Shandong, Hubei, Hunan, Guangxi, Guangdong, Anhui, Qinghai, Yunnan, Sichuan
Shaanxi
Gansu
Ningxia
Xinjiang

<table>
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<tr>
<th>Sigma Convergence within the club</th>
<th>Weak</th>
<th>Yes</th>
<th>Yes</th>
<th>Yes</th>
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*Source: Authors Calculations, Chinese statistical yearbooks, various years. Analysis conducted with Xlstat*

**Map 2.1**: Clusters in Manufacturing - AHC procedure

*Source: Authors calculations, Map made with Smartdraw 2012*
Figure 2.1: Convergence of clubs obtained from Maasumi and Wang (2008) - Manufacturing

Source: Authors Calculations, Chinese statistical yearbooks, various years.

Club 1: Beijing, Tianjing, Liaoning, Heilongjiang, Shanghai, Jiangxi, Hubei, Hunan, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Ningxia and Xinjiang.

Club 2: Shanxi, Jilin, Anhui, Shandong, Henan and Guangxi.

Club 3: Jiangsu, Zhejiang, Fujian and Guangdong.

Hebei, Mongolia and Qinghai are excluded since these regions do not belong to any club.

Tibet is excluded for outlying behavior.

Hainan and Chongqing are not included due to data availability limitations.
3. Excavation

Table 3.1: Results by clusters - AHC Excavation

<table>
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<th>Class</th>
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<tr>
<td>Sum of weights</td>
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<td>19</td>
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<tr>
<td>Within-class variance</td>
<td>13924,451</td>
<td>160093,026</td>
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<tr>
<td>Minimum distance to centroid</td>
<td>52,566</td>
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<td>Average distance to centroid</td>
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<td>Maximum distance to centroid</td>
<td>188,026</td>
<td>805,746</td>
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</table>

Sigma Convergence within the club

Yes
Yes
-

Source: Authors Calculations, Chinese statistical yearbooks, various years. Analysis conducted with XLSTAT
Map 3.1: Clusters in Excavation - AHC procedure

Source: Authors calculations, Map made with Smartdraw 2012

Map 3.2: Natural Resources in China

Source: China Mining Association
Figure 3.1: Sigma Convergence of clubs obtained from Maasumi and Wang (2008) - Excavation

Source: Authors Calculations, Chinese statistical yearbooks, various years.

Club 1: Beijing, Tianjing, Liaoning, Heilongjiang, Shanghai, Jiangxi, Hubei, Hunan, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Ningxia and Xinjiang.

Club 2: Shanxi, Jilin, Anhui, Shandong, Henan and Guangxi

Club 3: Jiangsu, Zhejiang, Fujian and Guangdong.

Hebei, Mongolia and Qinghai are excluded since these regions do not belong to any club.

Tibet is excluded for outlying behavior.

Hainan and Chongqing are not included due to data availability limitations.
4. Education

Table 4.1: Results by clusters Education

Results by class:

<table>
<thead>
<tr>
<th>Class</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objects</td>
<td>4</td>
<td>15</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Sum of weights</td>
<td>4</td>
<td>15</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Within-class variance</td>
<td>41903,072</td>
<td>33764,403</td>
<td>23236,302</td>
<td>0,000</td>
</tr>
<tr>
<td>Minimum distance to centroid</td>
<td>120,919</td>
<td>50,967</td>
<td>65,204</td>
<td>0,000</td>
</tr>
<tr>
<td>Average distance to centroid</td>
<td>170,640</td>
<td>164,764</td>
<td>126,881</td>
<td>0,000</td>
</tr>
<tr>
<td>Maximum distance to centroid</td>
<td>222,823</td>
<td>281,979</td>
<td>286,377</td>
<td>0,000</td>
</tr>
</tbody>
</table>

Beijing  Hebei  Liaoning  Tibet
Tianjin  Shanxi  Jilin  Heilongjiang
Shanghai  Inner Mongolia  Anhui  Jiangsu
Zhejiang  Jiangxi  Henan  Fujian

Sigma Convergence within the club

|                | Yes | Yes | Yes | - |

Source: Authors Calculations, Chinese statistical yearbooks, various years. Analysis conducted with XLSTAT
Map 4.1: Clusters in Education - AHC procedure

Source: Authors calculations, Map made with Smartdraw 2012
**Figure 4.1:** Sigma convergence from clubs obtained from Maasumi and Wang (2008) - Education

Source: Authors Calculations, Chinese statistical yearbooks, various years.

Club 1: Beijing, Tianjing, Liaoning, Heilongjiang, Shanghai, Jiangxi, Hubei, Hunan, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Ningxia and Xinjiang.

Club 2: Shanxi, Jilin, Anhui, Shandong, Henan and Guangxi.

Club 3: Jiangsu, Zhejiang, Fujian and Guangdong.

Hebei, Mongolia and Qinghai are excluded since these regions do not belong to any club.

Tibet is excluded for outlying behavior.

Hainan and Chongqing are not included due to data availability limitations.
5. Real estate

Table 5.1: Results by clusters AHC

Results by class:

<table>
<thead>
<tr>
<th>Class</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objects</td>
<td>5</td>
<td>15</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Sum of weights</td>
<td>5</td>
<td>15</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Within-class variance</td>
<td>87000,033</td>
<td>28746,768</td>
<td>12484,066</td>
<td>12552,151</td>
</tr>
<tr>
<td>Minimum distance to centroid</td>
<td>159,438</td>
<td>54,891</td>
<td>86,443</td>
<td>73,570</td>
</tr>
<tr>
<td>Average distance to centroid</td>
<td>256,609</td>
<td>150,902</td>
<td>101,317</td>
<td>90,413</td>
</tr>
<tr>
<td>Maximum distance to centroid</td>
<td>320,022</td>
<td>294,213</td>
<td>120,045</td>
<td>107,650</td>
</tr>
<tr>
<td>Sigma Convergence within the club</td>
<td>Yes</td>
<td>Weak</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: Authors Calculations, Chinese statistical yearbooks, various years. Analysis conducted with XLSTAT
Map 5.1: Clusters in Real Estate - AHC procedure

Source: Authors calculations, Map made with Smartdraw 2012
Figure 5.1: Variation in the clusters obtained from Maasumi and Wang (2008) – Real Estate

Source: Authors Calculations, Chinese statistical yearbooks, various years.

Club 1: Beijing, Tianjing, Liaoning, Heilongjiang, Shanghai, Jiangxi, Hubei, Hunan, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Ningxia and Xinjiang.

Club 2: Shanxi, Jilin, Anhui, Shandong, Henan and Guangxi

Club 3: Jiangsu, Zhejiang, Fujian and Guangdong.

Hebei, Mongolia and Qinghai are excluded since these regions do not belong to any club.

Tibet is excluded for outlying behavior.

Hainan and Chongqing are not included due to data availability limitations.
6. Construction

Table 6.1: Results by cluster AHC - Construction

<table>
<thead>
<tr>
<th>Class</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objects</td>
<td>6</td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Sum of weights</td>
<td>6</td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Within-class variance</td>
<td>35492,623</td>
<td>6145,897</td>
<td>6339,445</td>
<td>1631,105</td>
<td>0,000</td>
</tr>
<tr>
<td>Minimum distance to centroid</td>
<td>123,836</td>
<td>57,453</td>
<td>46,639</td>
<td>28,165</td>
<td>0,000</td>
</tr>
<tr>
<td>Average distance to centroid</td>
<td>167,515</td>
<td>70,204</td>
<td>73,143</td>
<td>36,462</td>
<td>0,000</td>
</tr>
<tr>
<td>Maximum distance to centroid</td>
<td>238,940</td>
<td>95,363</td>
<td>103,454</td>
<td>44,152</td>
<td>0,000</td>
</tr>
<tr>
<td>Beijing</td>
<td>Hebei</td>
<td>Shanxi</td>
<td>Inner Mongolia</td>
<td>Tibet</td>
<td></td>
</tr>
<tr>
<td>Tianjin</td>
<td>Liaoning</td>
<td>Fujian</td>
<td>Jilin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shanghai</td>
<td>Heilongjiang</td>
<td>Henan</td>
<td>Jiangsu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zhejiang</td>
<td>Jiangxi</td>
<td>Guangdong</td>
<td>Anhui</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shandong</td>
<td>Hubei</td>
<td>Guizhou</td>
<td>Guangxi</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qinghai</td>
<td>Hunan</td>
<td>Yunnan</td>
<td>Sichuan</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Shaanxi</td>
<td>Gansu</td>
<td>Ningxia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Xinjiang</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sigma Convergence within the club: Yes Yes Yes Yes -

Source: Authors Calculations, Chinese statistical yearbooks, various years. Analysis conducted with XLSTAT
Map 6.1: Clusters in Construction - AHC procedure

Source: Authors calculations, Map made with Smartdraw 2012
Figure 6.1: Sigma Convergence of the clubs obtained from Maasumi and Wang (2008) - Construction

Source: Authors Calculations, Chinese statistical yearbooks, various years.

Club 1: Beijing, Tianjing, Liaoning, Heilongjiang, Shanghai, Jiangxi, Hubei, Hunan, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Ningxia and Xinjiang.

Club 2: Shanxi, Jilin, Anhui, Shandong, Henan and Guangxi

Club 3: Jiangsu, Zhejiang, Fujian and Guangdong.

Hebei, Mongolia and Qinghai are excluded since these regions do not belong to any club.

Tibet is excluded for outlying behavior.

Hainan and Chongqing are not included due to data availability limitations.
7. Government Administration

**Table 7.1: Results By clusters Government Administration**

Results by class:

<table>
<thead>
<tr>
<th>Class</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objects</td>
<td>7</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Sum of weights</td>
<td>7</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Within-class variance</td>
<td>139,860,307</td>
<td>291,257,950</td>
<td>530,984,100</td>
</tr>
<tr>
<td>Minimum distance to centroid</td>
<td>187,920</td>
<td>73,283</td>
<td>42,879</td>
</tr>
<tr>
<td>Average distance to centroid</td>
<td>315,501</td>
<td>151,056</td>
<td>66,130</td>
</tr>
<tr>
<td>Maximum distance to centroid</td>
<td>632,615</td>
<td>289,307</td>
<td>90,110</td>
</tr>
</tbody>
</table>

Beijing | Hebei | Shanxi |
Tianjin | Inner Mongolia | Jiangxi |
Shanghai | Liaoning | Hunan |
Jiangsu | Jilin | Sichuan |
Zhejiang | Heilongjiang | Guizhou |
Guangdong | Anhui | Yunnan |
Tibet | Fujian | Shaanxi |
Shandong | Henan | Gansu |
Henan | Hubei | Ningxia |
Guangxi | Qinghai | Xinjiang |
Qinghai | Ningxia | Xinjiang |

Sigma Convergence within the club: Yes, Yes, Yes

*Source: Authors Calculations, Chinese statistical yearbooks, various years. Analysis conducted with XLSTAT*
Map 7.1: Clusters in Government Administration - AHC procedure

Source: Authors calculations, Map made with Smartdraw 2012
Figure 7.1: Sigma Convergence of average real wages of the clubs obtained by Maasumi and Wang (2008) – Government Administration

Source: Authors Calculations, Chinese statistical yearbooks, various years.

Club 1: Beijing, Tianjing, Liaoning, Heilongjiang, Shanghai, Jiangxi, Hubei, Hunan, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Ningxia and Xinjiang.

Club 2: Shanxi, Jilin, Anhui, Shandong, Henan and Guangxi

Club 3: Jiangsu, Zhejiang, Fujian and Guangdong.

Hebei, Mongolia and Qinghai are excluded since these regions do not belong to any club.

Tibet is excluded for outlying behavior.

Hainan and Chongqing are not included due to data availability limitations.
8. Financial Insurance

**Table 8.1:** Results by clusters - Financial Insurance AHC

Results by class:

<table>
<thead>
<tr>
<th>Class</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objects</td>
<td>1</td>
<td>4</td>
<td>8</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Sum of weights</td>
<td>1</td>
<td>4</td>
<td>8</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>Within-class variance</td>
<td>0,000</td>
<td>229724,024</td>
<td>44207,762</td>
<td>37844,892</td>
<td>117907,352</td>
</tr>
<tr>
<td>Minimum distance to centroid</td>
<td>0,000</td>
<td>215,700</td>
<td>128,174</td>
<td>68,903</td>
<td>114,107</td>
</tr>
<tr>
<td>Average distance to centroid</td>
<td>0,000</td>
<td>392,114</td>
<td>190,730</td>
<td>160,460</td>
<td>282,744</td>
</tr>
<tr>
<td>Maximum distance to centroid</td>
<td>0,000</td>
<td>598,473</td>
<td>283,738</td>
<td>408,089</td>
<td>516,491</td>
</tr>
</tbody>
</table>

Beijing  Tianjin  Hebei  Shanxi  Liaoning  Jiangsu  Zhejiang  Fujian  Shandong  Ningxia  Gansu  Qinghai  Xinjiang  Tibet  Guangdong  Heilongjiang  Henan  Guangxi  Anhui  Jiangxi  Hubei  Sichuan  Yunnan  Shaanxi  Sichuan  Hubei  Hainan  Shaanxi

Sigma Convergence within the club - Yes Yes Weak Weak

*Source: Authors Calculations, Chinese statistical yearbooks, various years. Analysis conducted with XLSTAT*
Map 8.1: Clusters in Financial Insurance - AHC procedure

China

Source: Authors calculations, Map made with Smartdraw 2012
Figure 8.1: Sigma convergence of the clubs obtained from Maasumi and Wang (2008) – Financial Insurance

Source: Authors Calculations, Chinese statistical yearbooks, various years

Club 1: Beijing, Tianjing, Liaoning, Heilongjiang, Shanghai, Jiangxi, Hubei, Hunan, Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Ningxia and Xinjiang.

Club 2: Shanxi, Jilin, Anhui, Shandong, Henan and Guangxi

Club 3: Jiangsu, Zhejiang, Fujian and Guangdong.

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Tibet is excluded for outlying behavior.

Hainan and Chongqing are not included due to data availability limitations.