The impact of education on earnings in China

-A cross-provincial time series analysis of knowledge capital divergence-

Master Thesis in International Economics

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Abstract

The impact of education on earnings in China is primarily a quantitive analysis describing how divergence between Chinese provinces has grown in the period 1994 to 2004.

The thesis is constructed around Mincerian thoughts on returns to schooling and endogenous growth theory emphasizing the crucial importance of government expenditure on knowledge capital for sustained growth. It further aims to analyze what influence Chinese gradual reform strategy has had on wage-levels and the evolution of tertiary education.

Data has been gathered from different statistical yearbooks and worked through in order to make just calculations, taken into account CPI and provincial population rates. Empirical results are presented in elaborate timelines and comparative means charts and analyzed through year-by-year regressions together with panel data analysis displaying the impact of time, geography, rural population and educational attainment on growth rates for the provinces.

Results are discussed in the light of economic theory, reform implementation, deepening contacts with the outside world and China-specific social structures. The purpose of the thesis is to provide explanations to why disparities have gotten so wide and with the help of theory give some insight to what measures could be taken by the Chinese government in order to reverse the negative trend.

Keywords: China, human capital, endogenous growth, Mincer, education, returns to schooling, reform

Map over the Chinese Provinces:

Classification into Geographic Zones:

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

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1. Introduction

During the years since reforms started in China 1978, the country has witnessed remarkable economic growth. However growth has struck differently across this great nation. Coastal provinces has benefited from heading onto the reform path in an earlier stage, making inland-provinces lag behind. In this thesis the notion that differences in funding and access to higher education has had an impact on the great within country income disparities will further be explored. Moreover, the thesis will investigate if there has been any income convergence, resulting from deepening and widening reform. The aim is to provide an elaborate picture of changes, causes and effects during an era of drastic reforms and an opening up to the outside world.

1.1 Background

Before commencing to analyze the evolution between 1994 and 2003, a brief summary of another similar study describing the development of education and growth, stretching from the start of reform 1978 and onwards will be presented. This is done in order to portray a better view of the expected evolution and an indication of the rather problematic situation that existed in China up until the early nineties.

Yang (2005) investigates cross-sectional dispersions and over-time changes in wages and returns to education for different Chinese cities across the country in the years of 1988 and 1995. His findings display an increase in returns to education at the city level from 3.5% to 5.4% during the researched period. The most crucial findings in Yang's (2005, p.16) study was the following:

- Wage structures became more diverse during the researched years as returns to human capital variables increased.
- Across cities, dispersions in basic earnings and rates of return to education widened substantially.
- By the mid-nineties the large differentials in wages and returns to education hade given no signs of factor price equalization between the cities.

- No statistically significant wage pattern of wage convergence across Chinese cities between 1988 and 1995 was found.
- There were no strong signs of spatial wage equalization across workers of all skill levels.
- The speed of wage convergence in China was found to be quicker for the unskilled labour force than for workers with higher levels of education.

His study is in many ways similar to this one, but concerns an earlier period. Results presented here should nevertheless give a good indication of what results we will expect. My hypotheses are based on a development of these findings.

1.1.1 Educational structure and development

Education begins with kindergarten (ages 3-6) and continues with primary (ages 6-12) and secondary education (ages 12-18), which includes junior and senior secondary schools, specialized secondary schools, vocational schools and technical training schools. Higher education, which includes universities and colleges as well as postgraduate programs, require 4-5 years for a B.A. degree, 7-8 years for a Masters degree, and 10-11 for a Ph.D. (Wan et al 2001, p.8).

Wan et al 2001 performed detailed research of problems related to schooling in China during the years prior to my research. Their findings are both positive and negative. On the one hand coverage at the primary level was found to be extensive across the country and partly due to the mandatory provision of primary schooling by local governments, partly due to a decline in birth rates resulting in slower growth rates at this level. The percentage of persons without any schooling declined from 51.8% in 1964 to 16% in 1995 (Wan et al 2001). On the other hand they discovered China lagging behind other Asian countries in terms of completion of tertiary levels of schooling.

Rather disturbing notions concerning cross-provincial disparities in completion rates were also uncovered; "…completion rates are particularly low amongst poor regions and female students at the secondary levels, many families lack the incentive to send their children in school, due largely to both economic and cultural factors. "(Wan et al 2001, p. 9)

A question approached and answered by Fleischer et al (2004) is whether there exists a college premium in China (2004) for the period leading up to the time of my time-series. He noted a sharp acceleration in the college premium rates starting in the early nineties, indicating a ratio of the income of college graduates to those with no more than elementary

schooling equal to approximately 2.0 in 1994 (Fleischer et al 2004, p.3). If their view on the evolution is true we should expect to see a continued increase in the rates of returns to schooling in the years between 1995 and 2003. As the premium increases, so should the output levels of university graduates.

1.1.2 Labour market structure

The labour market structure in China has ever since the Maoist era been characterized by communist plan economic values working as a counter force to market set, competence based wage systems. Prior to the start of reforms in 1978 arrangements such as the "iron rice bowl"[1] strained wages and put heavy burdens on individual firms. Even though wage levels did previously adjust slightly for higher educated workers, wage levels increased more with the age of the worker rather than with his individual productivity and human capital (Yang 2005, p.5). It was not until the early eighties that state policy first started to push enterprises to link monetary compensation directly to the individual skills and performance, bonuses and piece rates were introduced. This type of incentive pay percentage of the total wage has continued to rise since. In 1984 the government launched the "Resolution on Economic Institutional Reform" replacing the formerly rigid wage quota system with a more flexible one in which the total wage allocation of a company reflected the profitability of it (Yang 2005, pp. 5-6). Thus the background for our time-lines is presented. If we look at the evolution in the nineties it will become clear what makes the analysis interesting.

The late nineties saw the arrival of even more aggressive reforms, following in the footsteps of the process started in 1984. These reforms included a massive one-time urban lay off (xiagang)[2] program, the standardization of unemployment and further relaxation of the "hukou"[3] registration. Measures that resulted in an easing up of former obstacles hindering labour mobility (Yang 2005, p.7). The analysis will further reflect on whether or not these drastic reforms have had any real effect on convergence between provinces and growth rates of the individual provinces.

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[1] *The Iron Rice Bowl* is a common name for the system was people were hired by companies on a life time basis. Not only was the company responsible for the employee for life, it was also responsible for providing housing, day care etc. to every member of staff (news.bbc.co.uk).
[2] *Xiagang* is a Chinese term for lay-off. This occurs when a worker is laid off but still retained by his firm with partial or no pay. The company is still providing social benefits for the employee (http://rigas.ouvaton.org)
[3] *Hukou* refers to the Chinese household registration/ residency permit system, identifying individuals as residents in a certain area. Historically the hukou restricted people from living and working in other areas than that of their origin the hukou also was also a type of meal ticket, before reforms, giving the owners access to food and necessities for his family(www.wikipedia.org).

1.2 Problem Statement

Historically wage rates in China have been pretty much set, not allowing for any larger returns to education thus not creating financial incentives to invest in personal human capital. Public expenditure on education, is and has for decades been rather low, quality and access to education also differ greatly across regions. Regional differences lead to differing capacities to adapt to reform and abilities to make use of new technologies spurring income and human capital disparities. The vocal problem of this thesis is to determine the nature and state of divergence within China in terms of education and growth between the years of 1994 and 2004.

The thesis will further be based on the hypothesis that disparities has increased as a result of differences in quality and attainability of higher education. An analysis and answer of the problem will be sought through the construction of cross-provincial time-series on wage rates along with educational measures in the various provinces.

1.3 Purpose

Very few studies have examined the return to education in connection with economic transition in China. Existing studies such as Yang (2005), Fleischer et al (2004) and Li (2003), mainly approach changes seen in connection to the initial stages of reform executed in the early eighties. These studies largely rely on household data from 1984 and 1995.In the 1990s however, economic reform in China was deepening and the Chinese economy moved even more rapidly towards an ever more market-oriented system.

The key objective for the thesis is to look at the development of regional disparities within China and decide to what extent wage levels has diverged between 1994 and 2003 and if a divergence can be connected differences in the attainability of higher education. The answer will have important implications for the sustainability of economic growth for China as a whole (Haizheng 2003).

1.4 Structure

In the analysis we will look at relations between average years of schooling and average wage rates in different provinces. Due to the time-series structure we will be able to assess vital

changes over time. Focus will lie on the presence of post-secondary education as it, according to Kruger et al (2001), has a larger impact on growth than primary education.

Relevant theories used in the analysis will include human capital theory and macroeconomic growth theory. Economic theories will be seen through the light of labour market reforms primarily resulting in increasingly fluctuating wages and thus increased returns and increasing incentives for prolonged schooling. Moreover a quantitative analysis and description of the evolution of education and wages between different parts of China will be presented. This will be followed by a discussion concerning causes and effects stemming from found results. Rounding of the essay, there will be a summarizing conclusion followed by a brief reflection over possible policy implications in the light of the found results.

2. Methodology

Mincer is one of the most pronoun human capital theorists of our time. His work has reflected extensive ideas of how to calculate and analyze returns to schooling and post school investments. The model used in the analysis has its roots in Mincer's empirical wage functions, although the thesis will use aggregate data on a macro level, rather than micro household data, as no such data is available for the desired period. The basic notion of human capital theory is the concept of schooling as essentially improving the productivity of an individual and consequentially leading to higher incomes for the individual and greater societal productivity.

Parallels between human capital and growth are captured within the theory of endogenous growth with -the higher the human capital the higher the level of technology- as a vocal assumption (Fregert et al 2005, p.143). New growth theory emphasises the importance on government expenditure on building knowledge. Micro labour literature provides a number of estimates calculating monetary returns to schooling. Macro growth literature further investigates whether levels of schooling in cross-sections of areas are related to subsequent GDP growth rate.

In this thesis we will further investigate how levels of schooling across provinces within China have lead to various paces of growth in terms of enhancements of annual wage rates.

2.1 Mincerian views on effects of schooling in human capital theory

The Mincer model implies that change in a country's average level of schooling is the key determinant of income growth and is explained in detail by amongst others Kruger et al (2001, p.1102). Kruger states:

"Mincer (1974) showed that if the only cost of attending school an additional year is the opportunity cost of students' time, and if the proportional increase in earnings caused by this additional in earnings caused by this additional schooling is constant over the lifetime, then the log of earnings would be linearly related to individuals' year of schooling, and the slope of this relationship could be interpreted as the rate of return to investment in schooling."

The study explicitly explains the reasons and advantages of using Mincer equations[4] when doing research on the impact of human capital on wage rates. The most vital reason for using a schooling coefficient is to explore the real effect of differences in schooling on wages.

Nonetheless it is not completely clear how one should interpret changes in the education coefficient, what it actually reflects. Does it reflect unobserved ability and other characteristics that are correlated with education, or the true reward that the labour market places on education? Is the social return to education higher or lower than the coefficient on education in the Mincerian wage equation (Kruger et al 2001, p.1104)? Personally I find it to be a good indication on how education is valued by the employer.

Lemieux (2000, ch.11) found the Mincer method to hold and be a valid measure for research in labour economics and the economics of earnings even today, more than thirty years after its introduction. Thus we have a strong scientific base for using this approach.

We will now further investigate private returns to investment in schooling. In regards to social returns, they are strongly connected to macroeconomic growth theory and will therefore be discussed chapter 2.2.

2.1.1 Private returns to investments in schooling

Fleischer and Wang (2004, pp.11,17-18) emphasizes economic and labour-market reform as a vital channel for improving returns to schooling through increased labour mobility resulting in enhanced prospects for high-skilled workers to find well paying jobs. Their study showed that the marginal rate of return to a year of college was 4, 5% in 1990, a slight improvement from earlier estimates. Yang (2005, p.16) found average rates of returns to education rising from 3.2% and in 1984 to 6.1% and in 1995 indicating the potential for increasing incentives for school attendance.

Private returns to schooling are primarily seen in increasing wage levels for people with higher education. It estimates what you get back in monetary terms when deciding to devote an extra year to school. According to Haizheng (2003) we should expect to find returns to schooling to be higher in the less developed provinces of the west and central regions than in the more advanced coastal provinces. Education is indeed an essential factor in preventing the

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[4] E.g. a Mincer equation takes the following form; $\ln w = \beta_1 + \beta_2 \exp + \beta_3 schooling + e$. Making logged wage rates correlate with the individual's human capital stock. In our model we lack data on experience and thus exclude that variable from our analysis.

poorer provinces from lagging behind the richer. Increased educational funding in these parts creates greater relative gains for an initially poor province than it does for a wealthier one.

2.2 New growth theory and the importance of knowledge capital

In the case of China, prior to the reforms, effects of government investment were in large restrained by many policy and institutional barriers. The reforms have helped to reduce these barriers, making it possible for governmental investments in education to generate enormous effects on economic growth and poverty reduction. Shengen et al (2000, p.2) claims that government expenditures on schooling reduces poverty by increasing both mean income and improving the distribution of income. It is not clear if this is true for China: As we will see mean incomes have indeed increased constantly the past fifteen years, but income disparities within the population have also gotten wider. It is also important to determine whether or not this has been a natural development of the transition to increased usage of market based wages.

Moreover evidence brought forward suggests that compression of wage differentials and low returns to schooling in China did not disappear during the first decade of transition to a market economy. Fleisher et al (2001) believe that skill-wage compression and low returns to schooling in China should be understood in terms of restrictions on worker mobility along with unexploited economies of scale in production. Their results signal on the one hand immense labour-market disequilibrium and on the other hand a great potential for sustained economic growth stemming largely from reallocating resources towards on-the-job and in-school education. When these skilled workers start to get paid their actual value, incentives to acquire further education will be greatly enhanced, and those with lower levels of schooling should perceive much greater incentives to advance themselves by remaining in school longer whenever economically feasible. Thus they argue that social rates of return would be substantial in the long run, even though it initially might produce larger income disparities (Fleisher et al 2001, pp.11-12). Socio-politic forces leading to a division of output lurk under the surface. Nonetheless, exploitation of labour would be impossible if there were not any restrictions on worker mobility (Fleisher et al 2001, p. 9).

One of the vocal points in endogenous growth theory is to portray the value of human capital when working with high technology physical capital. Currently one focuses on physical capital investments, without making complementing investments in human capital. Leading to

a great supply of high technology but only a limited number of workers who can operate it (Heckman 2003, p. 802).

2.2.1 Social returns to investment in schooling

Knowledge capital is in new growth theory modelled as equally accessible to all users in not only the current time period, but also future time periods as well as to additional users. The theory assumes that knowledge does not depreciate and gives indefinite income growth. Concepts such as increasing returns, learning, and non-depreciating knowledge capital are introduced into dynamic models of growth and trade. Markusen et al (1995, p.417) declare: "The creation of knowledge is thus an externality in that its benefits cannot be captured by one individual"

There are two main assumptions in endogenous growth theory (Kruger et al 2001, p.1108):

1. Sustained growth is due to accumulation of human capital over time
2. Growth correlates with the existing stock of human capital, which generates innovations or improves abilities to imitate and adapt new technology leading to technological progress and sustained growth.

Social returns can be higher due to externalities e.g. if it spurs technological progress in society as a whole or if it leads to increased welfare and a lowering of crime rates. The micro literature is in some ways inadequate as it only emphasizes private economic returns of education (Kruger et al 2001, p.1107). Estimating relationships with aggregate data such as thiss can capture these social, external returns to human capital investments that are missed in the micro econometric literature.

Heckman (2003) discusses further the problems concerning physical capital versus human capital expenditures in China. He states that investments in schooling only account for 2.5 % of GDP whereas physical capital investments account for 30% (p.795). The author also provides evidence indicating that true rates of return to education are very high, and comparisons of public expenditures give false signals; "…it is analytically useful to think of human capital as a distinct and very valuable kind of capital"… "The human capital concept recognizes that human beings are as important as, if not more important than, physical capital in creating wealth and generating a successful economy. It is an appropriate concept for a people's republic." (Heckman 2003, p.796)

Thus he gives mixed indications as to the level of importance of expenditures on schooling. I will however continue to follow the notion that public expenditures on a provincial level are

indeed a prerequisite for sustained growth, and a must for poorer provinces trying to catch up with richer ones.

2.2 Institutional Reforms

Prior to the starting of reforms in 1978, the central government carried out vertical division of labour amongst the provinces: the coastal areas developed the manufacturing industries while the inland areas provided low-priced raw materials. In the initial period of economic reforms, the central government gave priority to the coastal areas making inland areas lag behind in a number of vital areas such as FDI. It is sometimes suggested therefore, that the income growth of the privileged coastal areas was based on slower growth of the less privileged rural, inland areas. Nowadays, with the deepening of economic reform and an increasingly open economy, preferential government policies and strategies have stretched out to reach even inland areas. And even here one has now started to develop downstream manufacturing like in the east (Weir et al 2001, p.162). An evolution further strengthening the need of adequate human capital in inland provinces in order to make proper use of the evolution and really start catching up again.

People with better educations and better skills are better adapted to change. An improvement in labour market mobility as a result of labour market reforms has affected the possibilities for these people to find a job that give them a wage that is relatable to their competencies in a positive way. Mobility has been enhanced both between occupations and across regions (Yang 2005, Heckman 2003).

2.2.1 Labour market reforms

Yang (2005, p.4) summarizes the gradual introduction of dramatic labour market reform in the following way: "Through a gradualist approach, the Chinese government has implemented a set of reform policies and institutional changes, aiming to improve work incentives and labour market flexibility. The package of reforms has affected the distribution of wages at enterprise and city levels as well as across labour markets." There have been improvements in labour mobility, both geographically and across occupations. Wan et al (2001, p.7) refer to Labour Force of Society data which indicates a substantial movement of labour out of the agricultural sector to the industrial and service sectors of the economy. Expediting the flow of labour and the market

determination of wage rates is one of the important aspects of the market-oriented reforms of China as a whole (www.china.org.cn).

Yang et al (2005, pp. 7-8) expects wage disparities and returns to schooling to increase during the continuous process of reform, as the Chinese governments gradual approach to reforms hits diverse cities and provinces on different times. Increased labour mobility as a result of easing up on hukou rules and similar steps towards a more internally open China is expected to result in labour flowing to provinces were wages are higher. In their perspective this will in the long run lead to market forces creating convergence in wages in line with the rules for labour supply and demand, equalizations of returns to education between regions will also be a long-term consequence.

Reforms of stiff wage structures have come gradually; years to remember in the wage reform evolution are 1985, 1992 and 1994. In addition a set of reform was put into practice between 1996 and 2005. Firstly one allowed state-owned and collectively owned enterprises to allow a small amount of wages to be profit based. Profit or economic performance was partly determined by an indicator connected to the state of the province of the firm. This indicator was constructed around local economic conditions and varied therefore between provinces. Secondly (in 1992) enterprises were further allowed to set internal wages given they stuck to the overall wage budgets given them by the government (Yueh 2004, pp.151-152).

Subsequently, in 1994 loosening of the wage was put into action. Publicly listed firms were then given the possibility to set their own wages according to two standards. On the one hand growth rate of total wages had to be lower than that of after-tax profitability, on the other hand per capita wage growth had to be lower than the labour productivity (ibid p.152). In a sense this indicated that people were still not allowed to get full financial credit for their work. In 1999, China launched a labour market wage rate guidance policy, which was put into trial in 88 cities. China will in the future proceed with the establishment of this labour market wage rate guidance system. It is going to be announced at multiple levels with the central cities as the base for reference to cover a wide range of areas. This will set a trend for the development of market determined wage rates in China (www.china.org.cn).

2.2.2   Educational reforms

Just as most other parts of the Chinese Economy, the Chinese Education System has been subject to a row of reforms in line with the strive towards creating a Social Market Economy.

Reforms have been characterized by decentralization, gradualization and divergence of funding. Law (1995) explicitly describes the evolution of higher education institutions during the eighties and early nineties. Introducing market forces into the "socialist" economy of mainland China has allowed a shift in higher education from a reliance on financial state support to funding from different strata of the economy and has alleviated the state from taking the full financial burden of higher education. Through market forces, these measures have helped to relieve the state of full responsibility for higher education (Law 1995, pp. 323,332,335).

Reforms in China's higher education systems have been shaped by four main interrelated forces (Law 1995, p.355):

1. The international context is marked by a reorientation of economic, military, political, and ideological dimensions and by the struggles of many countries to redefine their national identities during such global realignment.

2. Newly emerging domestic non-state factors such as market forces are promoting wider participation in decision-making process that were formerly exclusive to the states' performance and accountability to the public

3. The Chinese states are still under the command of the founding ruling parties which face problems of political legitimacy, but have become increasingly "sensitive" and "responsive" to the international environment and domestic social demands.

4. Higher education is gaining increasing institutional autonomy with the support of the new domestic non-state actors (including university academics from within and other forces from without) but is subject to new versions of administrative and political constraints imposed by the ruling parties.

One of the biggest problems stemming from these reforms is that it creates incentives for further income disparities between the provinces as poorer provinces don't have the same possibilities as richer ones to provide non-governmental funding. A major problem with the introduction of high tuition fees is its prevention of children from rural areas from accessing universities and become more effective contributors to the growth of their regions.

Law (1995, p.329) describe how "the socialist market" economy has put its mark on higher education. Apart from financing by the government higher education is paid for by both students (referred to as immediate users) and the labour market (referred to as end users). Supply and demand for skilled staff on the labour market determine how enrolment and curricula in different provinces are constituted.

3. Analysis

The hypothesis I want to base my analysis on is that in terms of wages and human capital stock of the individual provinces, reforms have created divergence within China. Some provinces have grown at such immense speeds that it will be near impossible for the others to catch up. My hypothesis is based on a study made by Yang (2005, pp.7-8), providing expectations of widening dispersions of wages and returns to schooling during the process of reforms. Increasing dispersions is mainly based on various economic environments facing the different provinces. Yang (2005) continues to present a dream of convergence beyond the reform period, as he sees how improvements in labour mobility together with people moving to where the pay is better, will result in an eventual equalization of wages and returns to education.

3.1 Data

Previous studies reviewed on returns to education in China have been done using data from household surveys performed in 1984 and 1995. Yet, the road towards a market-oriented economy did not reach full speed until the late nineties. Labour market reforms in terms of the gradual removal of life-time contracts and the introduction of a more skill based wage structure, was not fully implemented on a nation wide level until the mid nineties (Yueh 2004, p. 150).

As there is no available household data for the desired period of 1994-2003, aggregated data from the different provinces is used here. The data stems from the China Statistical Yearbook along with the China Labour Statistical yearbook covering the years in question. When doing research on China, the statistical yearbook is essential as it covers all areas of the Chinese economy and information in the yearbooks can not be found elsewhere. Prices and wages have all been converted into 1993 levels in order to create just comparisons. In line with Mincer these converted wage levels have then been logged in order to provide a just picture of percentual changes. Provincial economic growth is measured by growth in average wage rates. In line with the Wan et al (2001) study, average years of schooling in the different provinces will be used as an approximation of the quality change of the labour force. As some of the data I desired was lacking from the earlier yearbooks, some of the timelines, charts and regression do not cover the entire period from 1994 to 2003. Dummy variables used in the

models are based on the geographical placement of the province and on the percentage of the labour stock being rural workers.

Regions Tibet and Chongqing has been excluded from the datasets. Tibet due to its specific nature in terms of financial distress and differing culture and Chongqing because data was lacking for the first years included in the analysis. Classification of regions into geographical zones coastal, central and western have been made in accordance with Cheung et al (2004, p. 31).

As wages in China historically has grown with seniority rather than individual productivity a variable covering should optimally have been included. However this would require consistent household data which is not available for the desired period.

3.2 Model

The primary source of analysis is the creation and interpretation of time series created from data collected from the statistical yearbooks. This is a simple but efficient way to see trends, and evolutions of the areas of concern. Another efficient method to retrieve desired results is to create comparative means charts covering the different geographical zones.

In line with Kruger et al (2001, pp. 1101-1103) we will relate the standard Mincerian wage equation to an empirical growth model. In these types of models growth is often shown to be a function of the initial level of education. They further suggest that both changes and initial levels have impacts on growth. According to their theories (ibid p. 112) we could expect schooling to change the steady-state growth rate by enabling the work force to develop, implement and adopt new technologies. Thus we will make linear regressions for all the years in question, and from the results try and draw conclusions about the impact of education and geographical zones on growth. The regressions made in the end as a means to display the impact of educational and geographical variables on wage levels at various points in time are based on macro versions of Mincerian equations presented by Kruger et al (2001) and Heckman et al (1997). Kruger et al (2001) brings forward the following equation for country j at time t: $\ln W_{ijt} = \beta_{0jt} + \beta_{1jt} S_{ijt} + \varepsilon_{ijt}$

Where S stands for schooling and ln W for the logged wage.

A similar approach is the Macro- Mincer model presented by Heckman et al in 1997(Heckman et al 1997): $\ln Y^g_{ijt} = \beta_{0jt} + \beta_{1jt} S_{ijt} + \varepsilon_{ijt}$

It can differenced between year t and t-1: $\Delta \ln Y^g_{ijt} = \beta'_0 + \beta_{1jt} S_{ijt} - {}_1 S_{jt} + \Delta \varepsilon'_{ijt}$

If the return to schooling is constant over time we have a formulation like the one below, allowing for time-invariant return to schooling to vary across countries;

$$\Delta \ln Y^g_{ijt} = \beta'_0 + \beta_{1j} \Delta S_j + \Delta \varepsilon'_{ijt}$$

The nature of the regressions I use here is built on these notions. However I wanted to see how coefficients change from year to year, therefore annual regressions are made according to the following formula (for all years data on average schooling is not available, and is thus excluded for those years in particular):

$$\ln W_t = \beta_{0t} + \beta_{1t} S + \beta_{2t} grad + \beta_3 central + \beta_4 western + \beta_5 rural + e$$

Where S is a variable for average years of schooling in the province, grad is a variable measuring number of graduates of higher institutions per 10 000 people, then two variables are locational dummies representing central and western regions followed by a dummy indicating more than 60% of workers belonging to rural enterprises. Results can be seen in figure 12 of chapter 3.3.3.

For the panel data analysis (figure 9 in chapter 3.3.2, figures 13 and 14 in chapter 3.3.3) all of the data has been restructured in SPSS and dummy variables for each year and each province have been imputed to control for the time and province factor for the entire data set. The statistical program used has automatically excluded variables hindering optimal results.

3.3 Cross-Provincial Time Series

In China there is significant heterogeneity across regional economies and it may be useful at this point to examine some of the reasons for these differences. Growth patterns vary due to various reasons such as resource endowment, location, culture, stage of economic development and government policies. The execution of both wage and education reform in China has been characterized by gradual implementations where the coastal provinces and the special economic zones in the south east have been the first to been able to draw benefit.

With reform has come greater worker mobility and more skill based wages, but have reforms been fruitful for the whole country to the same extent? Have wage disparities and disparities in educational funding and outcome increased or decreased as the new wage system has been increasingly implemented? Are adequate investments in human capital being made in all parts of China? What are the regional disparities in this aspect? Have they converged or gotten wider between 1994 and 2003?

3.3.1 The nature of educational expenditures

In terms of expenditure, the government has spent about 2 percent of total national GDP on education, which is much lower than many developed countries. However, total expenditure on education is much higher than can really be captured in the yearbook data, since rural education is largely supported by rural communities, and their expenses on education are not counted in the formal government budget (Shengen et al 2000, p.16). Therefore some underestimates are apparent in the following charts. Charts do not capture the impact of private funding either but is merely a display of expenses for central governments.

Figures 1 through 4 review the rather disturbing evolution during the researched period. It is clear that educational expenditures differ greatly across regions. The gap between the richer and poorer provinces has more than doubled (see figure 2) and only a lucky few provinces have witnessed dramatic increases in educational expenditures during the first years of the second millennium (see figure 1). The only provinces succeeding in approaching the richer provinces is Guangdong and Jiangsu (see figure 1).

Judging from the bars showing the gap between the most and least generous province, the gap seems to have been pretty much constant for the late nineties. A clear diverging trend is visible from 2000 and onwards. In the years directly following the Asian financial crisis in 1998 and 1999 expenditure rates were rather constant. Evidently this creates problems in terms of quality and quantity of schooling produced. It is also clear that richer provinces have better financial foundations for focusing on human capital creation.

Figure 1, Government expenditures on operating expenses for education per capita [5](Yuan, 1993 prices)
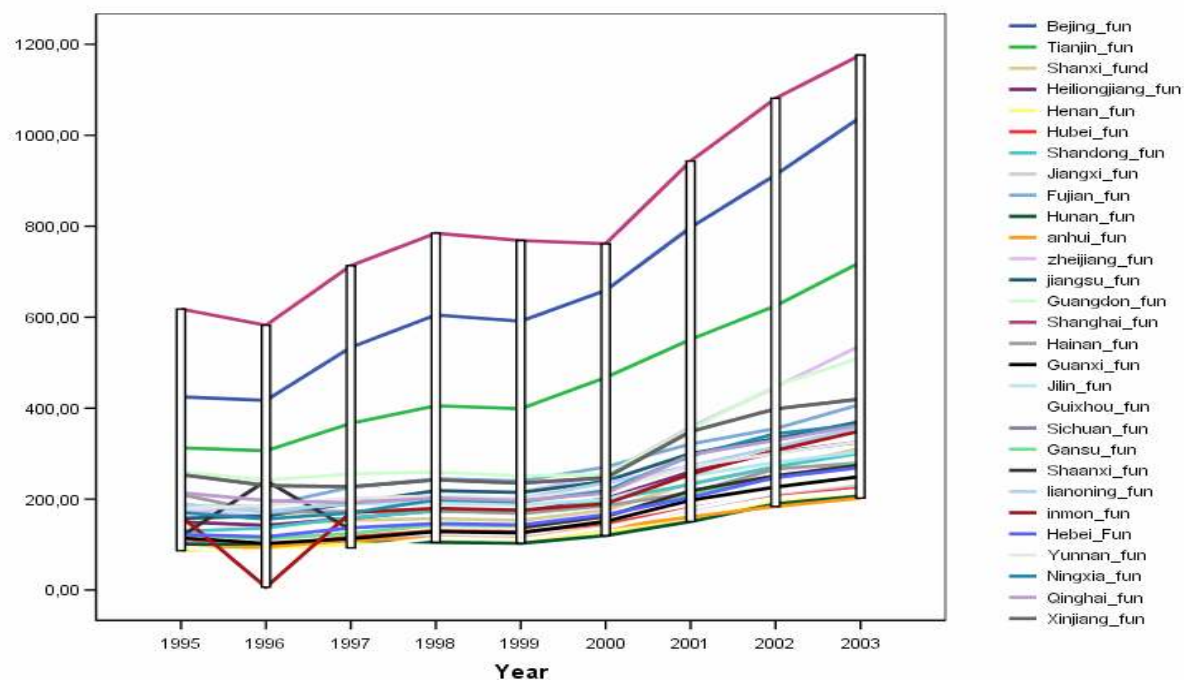
Figure 2, Government expenditures on operating expenses for education per capita (Yuan, 1993 prices), comparative means chart.

Region		funding 95	funding 96	funding 97	funding 98	funding 99	funding 00	funding 01	funding 02	funding 03
Coastal	Mean	227,789	206,762	258,913	283,44	277,764	306,99	382,456	442,10	497,204
	Std. Deviation	152,515	156,737	185,519	208,49	204,082	207,04	249,642	284,49	316,870
	Minimum	91,44	6,38	109,11	114,72	112,15	136,71	160,83	183,73	202,13
	Maximum	618,01	582,23	713,51	784,70	768,46	761,49	943,19	1081,43	1176,48
	Median	168,861	162,721	190,488	197,82	194,219	218,48	266,555	311,13	353,946
Central	Mean	144,482	135,956	151,998	160,29	156,634	176,56	219,955	263,91	291,555
	Std. Deviation	59,5066	52,6174	56,7363	57,532	55,8279	54,836	72,0656	86,545	103,412
	Minimum	86,53	90,36	100,32	104,88	102,94	119,76	150,63	189,53	207,10
	Maximum	260,54	241,52	255,50	259,41	251,31	270,59	353,53	449,12	510,96
	Median	115,436	102,402	116,767	130,69	128,187	150,97	197,673	226,60	249,531
Western	Mean	155,932	161,808	153,958	150,85	164,091	175,69	246,648	283,01	307,278
	Std. Deviation	58,3092	61,6632	51,1893	78,627	49,3914	64,181	67,3086	73,054	74,8780
	Minimum	93,22	83,79	91,65	,00	96,91	46,32	150,57	178,52	191,79
	Maximum	253,85	240,63	227,25	242,30	235,27	246,87	348,61	398,46	420,12
	Median	145,953	171,171	150,890	171,01	167,045	187,86	244,989	276,03	303,121
Total	Mean	182,113	172,387	196,780	208,64	208,814	230,29	294,561	342,91	380,988
	Std. Deviation	112,005	111,165	133,862	153,86	146,105	151,76	181,262	206,20	231,979
	Minimum	86,53	6,38	91,65	,00	96,91	46,32	150,57	178,52	191,79
	Maximum	618,01	582,23	713,51	784,70	768,46	761,49	943,19	1081,43	1176,48
	Median	157,803	156,300	169,660	175,29	171,971	197,17	251,110	280,52	311,666

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[5] Calculations have been made by the author; dividing operating expenses for education with the total population of the province for each year.

Figure 2 provides a more detailed geographical display. One of the findings here worth mentioning, is that after 1999 the mean spending of western provinces surpassed that of the central ones. It is also striking to see the great disparities existing within the coastal provinces. In terms of operating expenses (derived from data from final financial statements for every province) the gap has doubled within the analysed period. Within-region gaps have grown slightly in the west and central regions, disparities being the greatest in the coastal region.

Wei et al (2001) did contrary to my findings indeed find evidence of regional convergence in China providing an empirical support of the endogenous innovation growth model in which regional per capita income can converge given technological progress. It is argued that "convergence only happens when economies share a long run common trend, either deterministic or stochastic" (Wei et al 2001, p.154). In this case we do see a common positive trend. However some provinces are far ahead of the majority.

The article by Wei et al (2001) is interesting to consider as we examine variations in educational funding between the regions. It emphasizes the vital importance of schooling for economic development, creating a vocal point of the emphasis of domestic physical investment and the labour force as potent dynamic powers in the growth process (Wei et al 2001, p.162). Wan et al (2001) acknowledges the notion that more resources towards higher education would create greater technological know how, providing firms with further incentives to innovate and create new technological growth spurring growth for the country in line with the endogenous growth theory. If a "leading edge economy innovates, and if innovations are effectively imitated, diffused and assimilated into production in follower economies at very low costs, then there can be a process of convergence between interdependent economies." (Wan et al 2001, p.14). By this they are pinpointing the current situation amongst Chinese provinces. Where coastal areas, especially Shanghai and Tianjin could be regarded as leading economies and central and western provinces as followers. More higher education in these areas would lead to this chain of commencing the path to recovered convergence

As explained earlier, education is not only sponsored by the state alone. Law (1995) declares that higher education seekers are often required to pay for it, creating difficulties for young people from rural areas to asses the education they want and need. Many higher education institutes in these areas also lack financial resources often up to one-third to one-half of their recurrent costs. In order to broaden the financing of higher education, the mainland government has adopted three major methods: the establishment of commercial enterprises within colleges and universities, the increase of student quotas supported by non-state sources

in state colleges and universities, and the creation of a private sector in higher education. Enterprises established by universities and colleges in the early 1990s conducted commercial activities in high technology exploration zones and agricultural experimental bases and cooperated with other enterprises to provide scientific and technological information services. These school-run enterprises even enjoyed tax exemption for selected products in some places as for instance, in Hunan province. (Law 1995, p. 330) It is a good way to relieve financially strained local governments and improving cash inflow, creating stronger bases of higher education particularly in poorer provinces. Another method for increasing income is charging students and their potential employers.

There are three groupings of students classified according to their financial support: the state, students' potential employing units, and students themselves and their families. In addition to the majority of students who are recruited according to the state's plans, a second grouping of students is under a contract-study form of scholarship with their potential or current employers. The third and most rapidly growing grouping is the privately financed group. The policy to pay tuition fees in public universities and colleges was included in the 1993 education reform plan and was to be implemented gradually (Law 1995, p.331). Figures 3 and 4 below display the cross-provincial development of educational funding by tuition fees per capita. The figure clearly displays the effect of gradual implementation of tuition fees. There appears to have been three waves of implementation; 1996, 1998 and 2001.

Figure 3. Tuition and miscellaneous fee funding per capita, Yuan 1993 prices
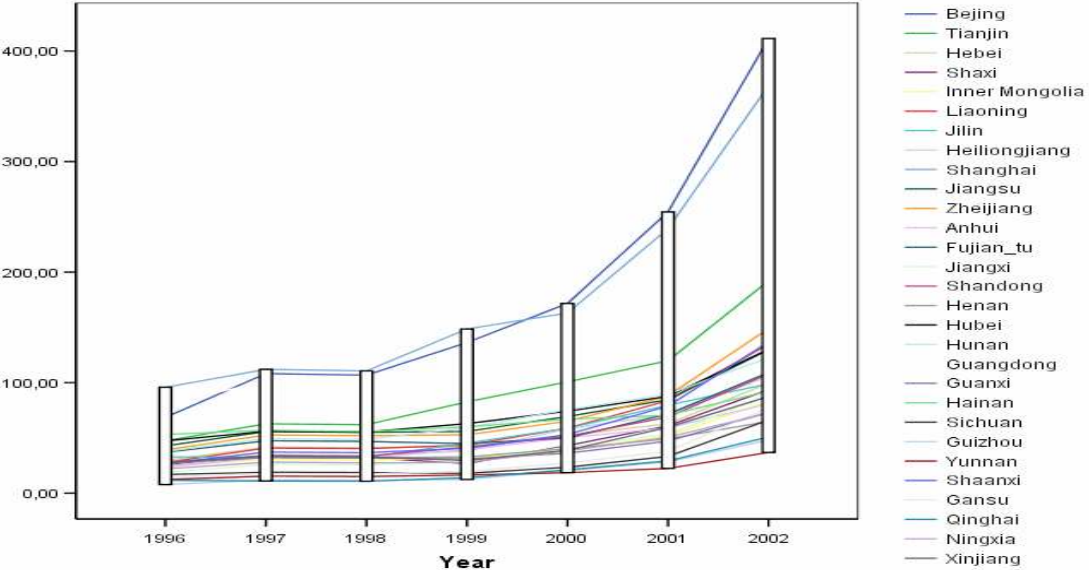
Figure 4. Tuitions and miscellaneous fees per capita (Yuan, 1993 prices)

Region		tuition 96	tuition 97	tuition 98	tuition 99	tuition 00	tuition 01	tuition 02
Coastal	Mean	40,1780	53,0923	52,373	61,9508	77,5122	104,63	162,30
	Std. Deviation	21,878	28,594	28,265	40,204	44,801	68,890	111,28
	Minimum	23,38	30,45	29,96	26,85	38,95	51,77	80,88
	Maximum	95,83	112,04	110,61	148,53	171,70	254,47	411,28
	Median	31,2789	41,2834	40,722	44,4863	58,7590	81,6903	117,84
Central	Mean	39,8789	48,3946	47,577	52,7026	60,4820	75,5219	109,31
	Std. Deviation	18,900	22,587	22,079	26,174	23,051	29,296	38,436
	Minimum	18,71	26,20	25,73	28,61	36,15	47,13	65,09
	Maximum	81,46	100,71	98,61	113,11	107,97	142,12	194,43
	Median	36,9993	47,4454	46,823	44,8285	51,4949	70,5679	108,07
Western	Mean	17,4787	21,7791	21,348	22,3417	30,1795	42,5115	72,0448
	Std. Deviation	7,27132	9,98067	9,7892	9,61613	12,099	19,137	31,030
	Minimum	7,81	11,05	10,81	12,42	18,61	22,44	36,86
	Maximum	27,59	37,20	36,64	40,62	53,12	78,79	136,74
	Median	15,7718	18,3553	18,051	18,8956	25,4168	35,5799	69,3793
Total	Mean	33,8233	42,9963	42,326	48,1540	59,1697	78,4588	120,96
	Std. Deviation	20,217	25,953	25,592	33,652	36,903	53,541	83,588
	Minimum	7,81	11,05	10,81	12,42	18,61	22,44	36,86
	Maximum	95,83	112,04	110,61	148,53	171,70	254,47	411,28
	Median	27,8002	33,9078	33,435	40,6243	51,4949	68,8551	98,9372

Source: China Statistical Yearbook 1997-2004

As apparent in figures 3 and 4, the use of tuition fees has been particularly rapid in the richer, coastal areas and cities working on their own as municipal districts. Moreover revealing the disparities in expenditures that exist within this field. The figure displays the staggering widening of gaps concerning this type of educational expenditure, showing the expensive nature of schooling in some of the provinces. Particularly expensive are universities in major cities Beijing and Shanghai. Tuition fees are higher and more prominent in private universities (Law 1995, p.332) which are primarily found in the coastal and independent municipal districts. Logically it is also where we find the people with the highest annual income (see figure 9, chapter 3.3.3)

It is clear that disparities in this aspect are great and increasing, showing large divergence in the application and level of tuition fees within the geographical zones as well as between them. These results have a two-folded meaning. On the one hand higher tuition fees lead to greater educational funding, giving universities opportunities to provide more qualitative education for a larger mass. Privately funded students are also free to choose their own jobs after graduation. In the other groups future employers are designated to the student in advance according to state plans (Law 1995, p. 229).

On the other hand however high tuition fees create great obstacles for poorer families to assess higher education and strain the economies of the families that indeed can afford to pay. Law (1995) also brings forward the problems stemming from segregated treatment of different student groups, allowing privately financed youngsters to get accepted into study programs with lower grades than the common standard. This might also be an explanatory factor for the skewed educational attainment composition we will analyse in the next part.

3.3.2 Educational attainment composition of the population

Educational attainment for the working population provides an annual measure of human capital stock for the labour force during the researched timeframe. As Wan et al (2001, p.2) demonstrate the human capital stock can be measured as the number of graduates at different schooling levels. Using data on educational attainment of the working population retrieved from China's statistical yearbook, I have created human capital stock series on average years of schooling for every Chinese province based on graduation data from the yearbooks[6].

Figure 5, Average Years of schooling
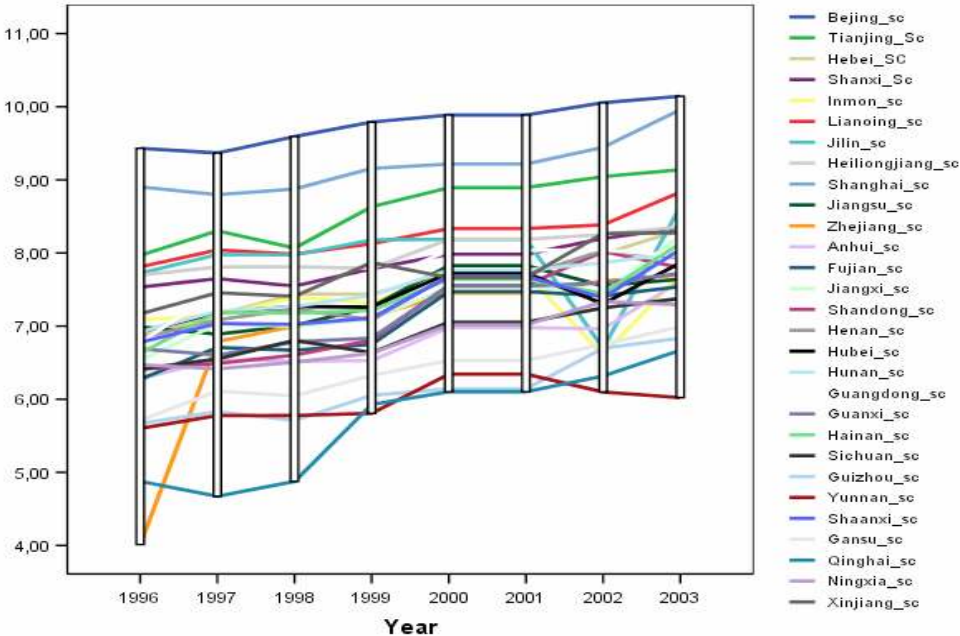
Source: China Statistical Yearbook 1997-2004

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[6] Average years of schooling have been calculated by dividing numbers of educational attainment composition of population aged 15-64 with the absolute number of people living in the province that year. Percentage rates have then been multiplied with completed years of schooling. Under and over estimates might appear as a result of varying classifications of school levels in the yearbooks.

Educational quality of the population seems to have improved slightly during the researched period, although improvements in general stagnated after 1999. Some degree of convergence is visible if one look at the bars in figure 5. One can also from a governmental perspective see that the striving towards universal primary education has been successful. Qinghai, Guizhou and Ningxia have done particularly well after 2001. Exceptions from the positive trend are Yunnan and Shandong. Beijing, Shanghai and Tianjin provinces have managed to reach almost total completion of junior secondary schooling (see figure 5).The effect of the initial level of education on growth has been widely interpreted as an indication of large externalities from the stock of a nation's human capital on growth. (Kruger et al 2001, p.1121). Changes in levels of schooling have also been proven by Kruger et al (2001) to be positively correlated with economic growth.

In accordance with Wan et al (2001, pp. 9-10) graduate rates rather than enrolment rates from higher education have been used as he claims this to provide a more fair picture of reality. In his words it is sensible to use educational attainment as a proxy for the component of the human capital stock obtained at school. A higher educational attainment indicates a higher quality of workers (Wan et al 2001).

Figure 6. Number of graduates of higher education per 10 000

27
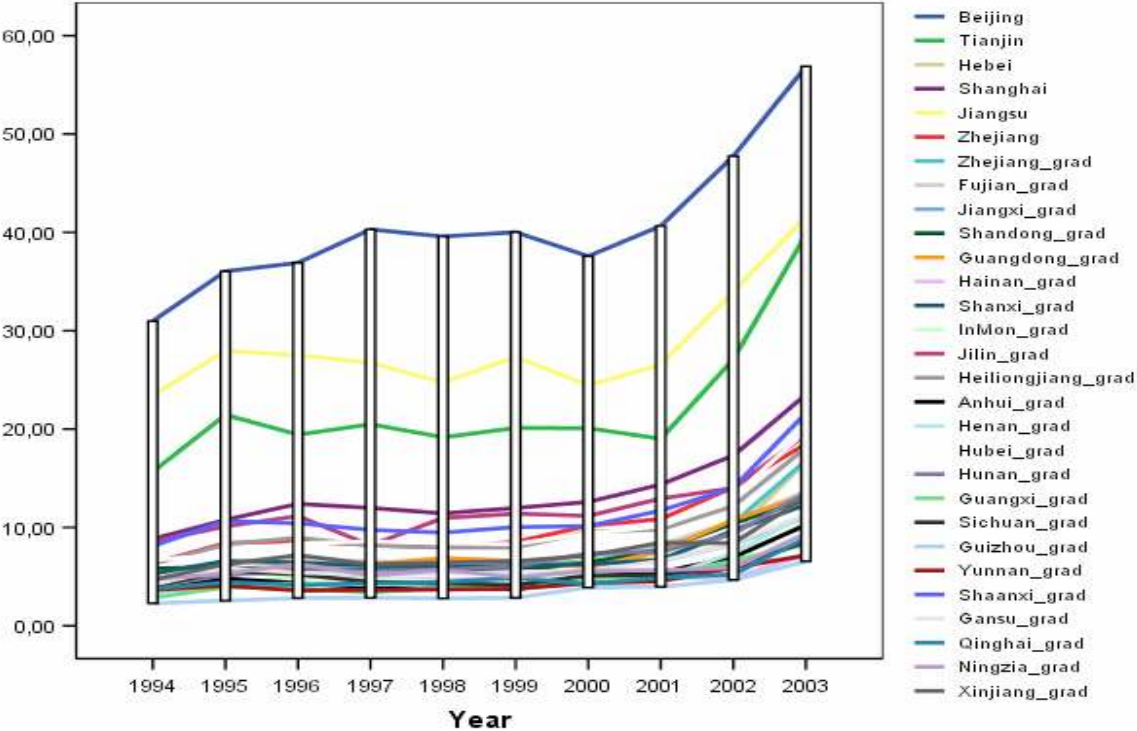
Figure 7. Graduates of higher education per 10 000, comparative means chart

Region		grad_1994	grad_1995	grad_1996	grad_1997	grad_1998	grad_1999	grad_2000	grad_2001	grad_2002	grad_2003
Coastal	Mean	702644	11,8838	12,1904	12,4458	11,9781	12,4303	12,4179	13,4446	7,0861	22,6602
	Std. Deviation	,97674	10,6248	10,4005	11,1230	10,7037	11,1211	10,0260	10,6096	12,7603	5,2129
	Minimum	3,3263	4,3439	4,7125	4,9650	4,6534	4,8556	5,1093	4,8492	4,9054	7,2127
	Maximum	30,9822	36,0464	36,9110	40,3008	39,5843	40,0215	37,5767	40,6515	47,7569	56,8717
	Median	560013	,140923	,647822	6,50049	,700877	,420286	,973431	8,17036	0,6936	6,7863
Central	Mean	993716	,243134	,404921	5,89994	,205696	,283194	,072903	7,49613	9,54746	3,7206
	Std. Deviation	,88443	2,04447	2,55303	1,99326	2,42378	2,54077	2,40998	2,86619	2,91589	,32955
	Minimum	2,8455	3,9146	3,8191	3,3732	3,8757	3,7039	4,8692	4,8268	6,5607	8,2722
	Maximum	8,5594	10,1177	11,1533	8,5851	10,9682	11,4052	11,1730	12,9350	14,0144	9,8474
	Median	289823	,975044	,665215	5,62738	,693633	,075934	,265393	6,70477	9,36763	2,3040
Western	Mean	489589	,595384	,696919	5,42980	,644261	,649130	,017575	6,70766	7,79901	1,4679
	Std. Deviation	,79516	2,55579	2,58149	2,11750	2,13219	2,19313	2,08886	2,56631	3,10947	,83596
	Minimum	2,2938	2,5584	2,8228	2,8380	2,7920	2,8485	3,8976	3,9726	4,6583	6,5541
	Maximum	8,1031	10,6665	10,4225	9,7588	9,4769	10,0409	10,1490	11,7201	14,0455	21,6249
	Median	189655	,296296	,396838	5,20130	,466642	,221802	,588056	6,12246	7,13050	0,3869
Total	Mean	885797	,498613	,707420	3,47889	,439413	,651927	,993521	9,74005	2,1846	6,7983
	Std. Deviation	6,38799	7,59307	7,54916	7,89932	7,55165	7,88247	7,14020	7,63822	9,31882	1,3142
	Minimum	2,2938	2,5584	2,8228	2,8380	2,7920	2,8485	3,8976	3,9726	4,6583	6,5541
	Maximum	30,9822	36,0464	36,9110	40,3008	39,5843	40,0215	37,5767	40,6515	47,7569	56,8717
	Median	510836	,917793	,207979	6,14358	,969420	,075934	,446174	7,55942	9,68610	3,2675

Figure 8. Number of institutions of higher education
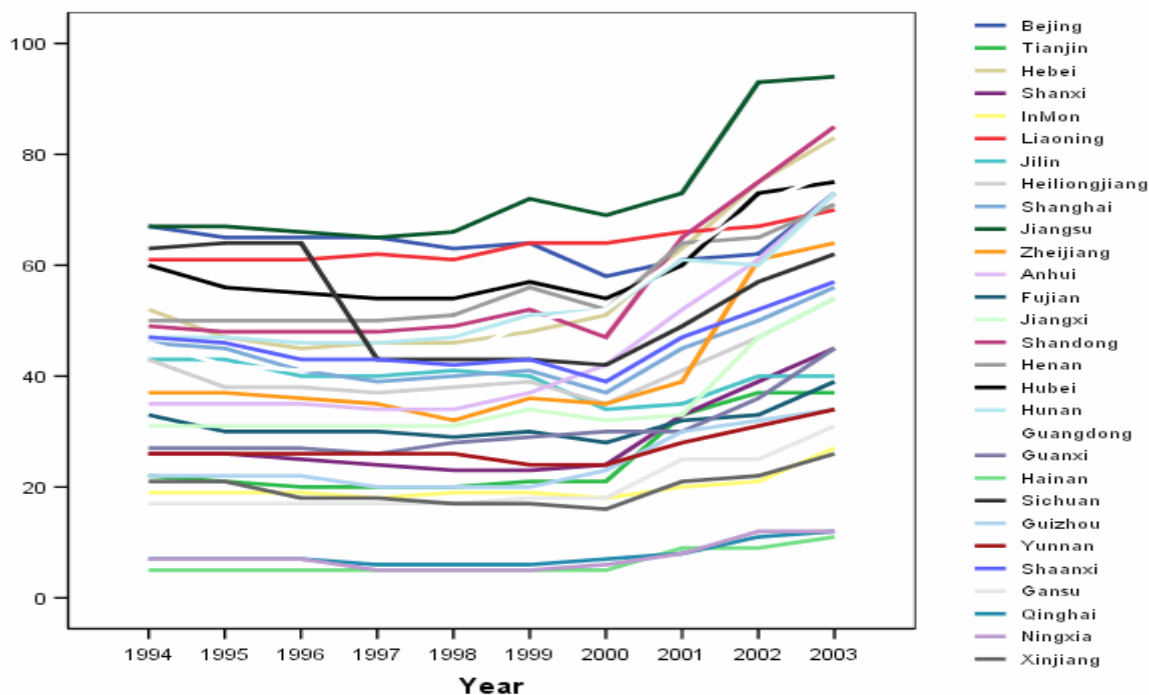
Drawing from figure 6 we get an idea of the overall development in terms of the relative production of university graduates. Between the years 1994 and 1997 there was a slight decline, followed by a stagnation period 1997 and 1999 to be followed by a diversely dramatic increase. Contrary to previous findings Hainan, Qinghai and Ningxia in western China seems to have lagged behind the positive evolution of others in this aspect.

Although all of the provinces have improved during the period, improvements have been of various nature. It is also disturbing to see the very low rate of university graduate output that has prevailed. The within region disparities (see figure 7) have increased greatly in absolute numbers and the mean number for the coastal regions is almost twice as high as the other regions. Again a sign of increasing divergence in educational assessment for the period.

In order to get a clear view on tertiary schooling prevalence and development, figure 8 captures number of institutions of higher education. The founding of new institutions has been particularly high in Zhejiang, Jiangxi and Shandong provinces. Guangdong and Jiangsu, has also gotten quite a few new institutions. These are also the provinces with the largest increases in government expenditures during this time. In provinces Hainan, Kingie and Qinghai nothing has really happened during the entire timeframe, which is rather alarming in my opinion.

Figure 9, is a panel-analysis over the explanatory variables for schooling for the entire period. The panel-analysis will help to determine whether funding, province, geographical zone or the time factor is the major determinant behind poor educational attainment levels.

From figure 9 it is clear that there have been statistically significant improvements in schooling for every single year of the analysis. Performing a panel data analysis provides a picture of the other explanatory variables behind the vast differences in schooling that exist within China today. Geography does indeed seem to be the major determinant behind educational attainment. Means of funding are insignificant. Living in Qinghai, Yunnan or Guizhou has the most negative influence on the overall achievements on the provincial population.

Figure 9. Panel data analysis over the explanatory variables for schooling, 1996-2003[7]

Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10,079	,580		17,369	,000
	Funding	,001	,001	,102	,786	,433
	Tuition	,000	,001	-,029	-,382	,703
	Rural Pop>60%	-,121	,172	-,054	-,703	,483
	grad	-,022	,014	-,199	-1,627	,105
	1996	-,278	,078	-,094	-3,591	,000
	1998	,051	,076	,018	,674	,501
	1999	,219	,076	,075	2,885	,004
	2000	,578	,077	,198	7,476	,000
	2001	,572	,088	,196	6,501	,000
	2002	,622	,103	,213	6,054	,000
	2003	1,019	,139	,349	7,334	,000
	Tianjin	-1,509	,285	-,285	-5,304	,000
	Hebei	-2,617	,544	-,495	-4,807	,000
	Shanxi	-2,194	,470	-,415	-4,668	,000
	Inner Mongolia	-2,446	,330	-,463	-7,412	,000
	Liaoning	-2,056	,454	-,389	-4,528	,000
	Jilin	-2,364	,492	-,447	-4,805	,000
	Hejliongjian	-2,325	,486	-,440	-4,784	,000
	Shanghai	-1,449	,521	-,274	-2,780	,006
	Jiangsu	-2,869	,541	-,543	-5,304	,000
	Zheijiang	-3,363	,528	-,636	-6,373	,000
	Anhui	-3,444	,582	-,651	-5,918	,000
	Fujian	-3,227	,530	-,610	-6,092	,000
	Jiangxi	-2,941	,571	-,556	-5,149	,000
	Shandong	-2,961	,492	-,560	-6,015	,000
	Henan	-2,682	,526	-,507	-5,102	,000
	Hubei	-2,824	,590	-,534	-4,789	,000
	Hunan	-2,692	,591	-,509	-4,557	,000
	Guangdong	-2,507	,513	-,474	-4,887	,000
	Guanxi	-3,040	,547	-,575	-5,557	,000
	Hainan	-2,893	,576	-,547	-5,022	,000
	Sichuan	-3,299	,550	-,585	-5,995	,000
	Guizhou	-4,156	,583	-,786	-7,125	,000
	Yunnan	-4,354	,555	-,823	-7,847	,000
	Shaanxi	-2,759	,508	-,522	-5,435	,000
	Gansu	-3,865	,550	-,731	-7,031	,000
	Qinghai	-4,624	,548	-,874	-8,438	,000
	Ningxia	-3,449	,544	-,652	-6,334	,000
	Xinjiang	-2,668	,470	-,505	-5,674	,000

a. Dependent Variable: Average Years of Schooling

R^2=0,927, Adjusted R^2= 0,912

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[7] Beijing and 1997 have been automatically excluded to serve as base years for this particular regression.

3.3.3 Impact of education on wages and growth rates

Before analyzing regressions made on the importance of schooling and geographical belonging on logged wages, the evolution of average wages rates will be displayed in order to determine whether incentives to schooling vary between provinces. Skill-based wages are implemented to a wider extent in some provinces than others, incentives should thus vary accordingly. As seen earlier human capital stocks vary a great deal (see figures 5 through 8) and disparities have grown over the ten-year period examined.

Figure 10. Average Wage of Staff (Yuan, 1993 prices)
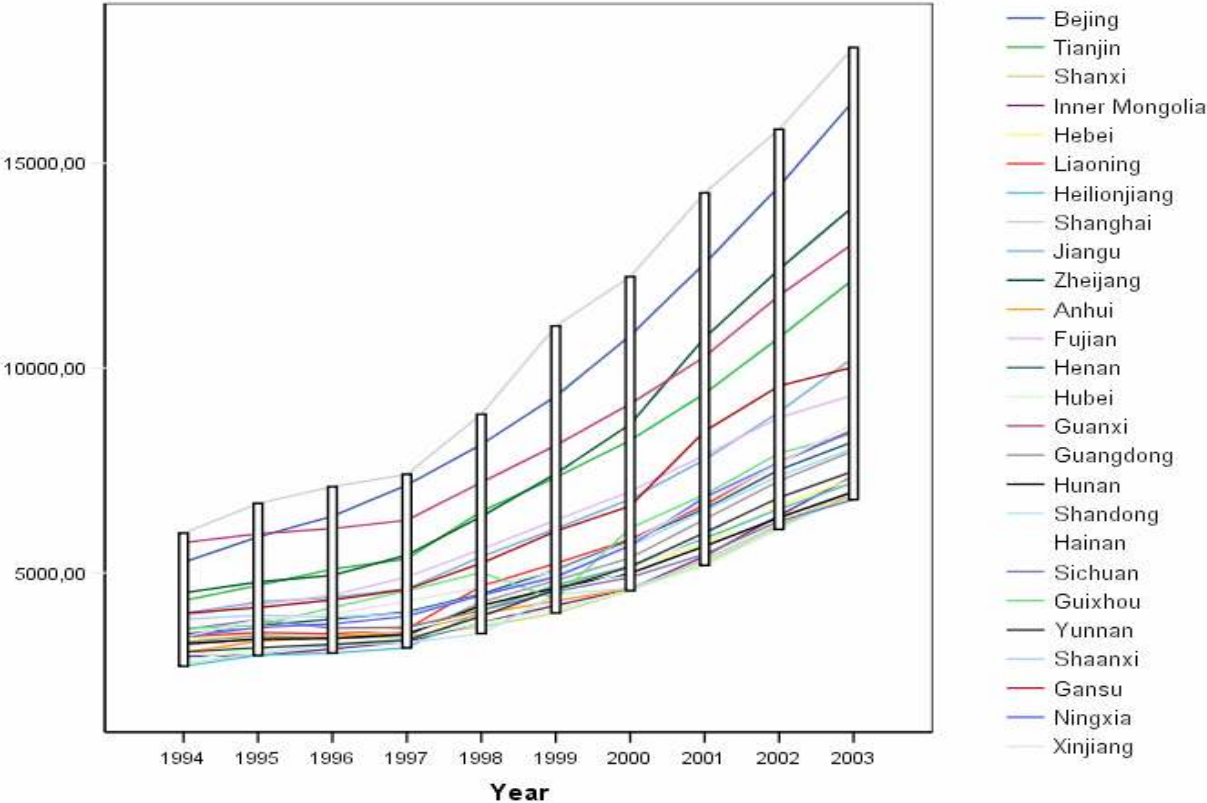
Source: China Statistical Yearbook 1995-2004

Figure 11. Average Wage of Staff (Yuan, 1993 prices), comparative means chart

Region		Average Wage of Staff 1994	Average Wage of Staff 1995	Average Wage of Staff 1996	Average Wage of Staff 1997	Average Wage of Staff 1998	Average Wage of Staff 1999	Average Wage of Staff 2000	Average Wage of Staff 2001	Average Wage of Staff 2002	Average Wage of Staff 2003
Coastal	Mean	3815,67	4104,09	4299,58	4532,56	5322,72	6084,22	6815,86	7878,96	9043,23	10183,72
	Std. Deviation	1018,96	1197,62	1326,41	1484,56	1765,81	2247,23	2597,87	3132,13	3473,00	3978,907
	Minimum	2719,58	2981,99	3039,86	3167,63	3684,33	4017,51	4564,28	5181,19	6139,70	6905,54
	Maximum	5966,96	6693,25	7102,11	7402,37	8869,57	11023,14	12226,19	14270,55	15824,13	17819,56
	Median	3406,12	3516,50	3548,72	3678,83	4477,89	4985,62	5520,62	6242,26	7163,10	7925,278
Central	Mean	3621,72	3825,79	3882,93	4013,08	4574,27	5169,36	5708,84	6499,64	7467,83	8222,916
	Std. Deviation	873,384	876,330	904,622	982,382	1141,25	1265,05	1477,87	1641,95	1834,02	1988,699
	Minimum	2780,02	3037,54	3231,68	3297,21	3516,48	4102,96	4572,20	5186,43	6059,13	6785,45
	Maximum	5734,89	5951,00	6079,05	6283,43	7205,39	8111,19	9119,99	10274,59	11765,56	13043,57
	Median	3495,57	3682,41	3594,68	3590,72	4203,58	4630,90	5047,90	5945,79	7115,87	7800,951
Western	Mean	3476,03	3637,14	3763,44	3971,93	4474,87	4924,02	5669,32	6728,49	7611,47	8297,281
	Std. Deviation	341,367	356,708	407,568	490,937	493,446	488,081	529,428	791,805	917,116	854,1793
	Minimum	3064,46	3170,98	3251,66	3358,76	3771,85	4368,59	4927,16	5890,75	6479,18	7203,14
	Maximum	4009,67	4149,83	4337,99	4594,33	5232,26	6015,33	6630,68	8455,80	9558,28	10021,87
	Median	3433,92	3688,90	3835,46	3970,07	4451,44	4849,16	5657,52	6626,20	7525,36	8259,428
Total	Mean	3661,79	3888,91	4022,38	4216,69	4856,55	5480,24	6156,01	7133,52	8159,34	9054,799
	Std. Deviation	821,884	924,085	1012,35	1129,17	1348,46	1666,29	1914,16	2279,30	2546,40	2909,394
	Minimum	2719,58	2981,99	3039,86	3167,63	3516,48	4017,51	4564,28	5181,19	6059,13	6785,45
	Maximum	5966,96	6693,25	7102,11	7402,37	8869,57	11023,14	12226,19	14270,55	15824,13	17819,56
	Median	3439,97	3663,65	3594,68	3669,76	4295,67	4801,80	5491,26	6508,59	7362,23	8031,984

Source: China Statistical Yearbook 1995-2004

Growth disparities have increased dramatically during the period. As visible in figure 9 the gap extended greatly for every year following 1997. None of the bottom provinces have managed to start catching up with the top. As witnessed in earlier charts a great number of provinces lie in this bottom group and witness similar evolutions. Judging from previously observed figures of human capital stock and expenditures, the evolution can be said to follow the same path. Provinces Tianjin and Zheijiang and to some extent Jiangsu has managed to reach steeper growth paths (see figure 9). Interestingly, total mean annual wages rose by almost a 1000 Yuan between 2000 and 2001 (see figure 11). In the discussion it will further be explored whether this is a positive indication of successful reforms or if it can be seen as a consequence of the WTO-accession in 2000. Not only was this rise seen in coastal areas but also in western areas, which is a positive finding, providing an ever so small hope of long run convergence. Disparities might also, be a reflection of the higher wages academics can attain in the richer provinces providing increased incentives to get a degree. Standard deviations in coastal and central areas have alarmingly sharpened during the period, indicating greater disparities between provinces lying in the same geographical streak. These results can be drawn to newer wage reforms creating more profit based wage systems.

What has then been the major determinant of wage rates in China? From our annual regressions some attention-grabbing empirical findings can be perceived.

Figure 12. Regression Analysis, coefficient chart

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Coefficient	8,227	8,338	9,53	9,672	9,787	9,862	10,573	9,731	10,911	9,826
Standard Error	0,076	0,115	0,189	0,389	0,565	0,657	0,732	0,884	0,545	0,819
Graduales per 10 000	0,013	0,014	0,019	0,017	0,023	0,022	0,029	0,024	0,022	0,016
Standard Error	0,005	0,004	0,003	0,004	0,005	0,005	0,006	0,007	0,005	0,004
significance	0,013	0,002	0,000	0,000	0,000	0,000	0,000	0,002	0	0,001
Av. years of schooling	*	*	-0,158	-0,161	-0,153	-0,157	-0,232	-0,119	-0,238	-0,099
Standard Error	*	*	0,026	0,048	0,071	0,08	0,089	0,106	0,066	0,092
significance	*	*	0,000	0,003	0,041	0,063	0,015	0,27	0,001	0,292
Western	-0,12	-0,115	-0,152	-0,195	-0,276	-0,239	-0,289	-0,213	-0,169	-0,205
Standard Error	0,077	0,076	0,048	0,082	0,106	0,101	0,107	0,135	0,108	0,131
significance	0,134	0,144	0,005	0,026	0,016	0,027	0,013	0,007	0,134	0,132
Central	-0,227	-0,216	-0,122	-0,151	-0,234	-0,233	-0,226	-0,296	-0,271	-0,3
Standard Error	0,076	0,075	0,047	0,07	0,082	0,083	0,085	0,100	0,108	0,106
significance	0,006	0,008	0,016	0,042	0,01	0,01	0,014	0,007	0,020	0,01
Rural Population>60%	0,049	-0,005	-0,280	-0,268	-0,187	-0,215	-0,236	-0,023	-0,312	-0,035
Standard Error	0,075	0,087	0,059	0,09	0,115	0,132	0,120	0,148	0,126	0,154
Significance	0,519	0,951	0,000	0,007	0,118	0,117	0,062	0,878	0,022	0,824
R-square	0,522	0,589	0,873	0,730	0,691	0,690	0,695	0,590	0,712	0,59
Adjusted R-squared	0,439	0,4961	0,837	0,669	0,621	0,619	0,629	0,501	0,65	0,501
Standard Error	0,1448	0,143	0,0855	0,130	0,1575	0,1579	0,1615	0,1992	0,2009	0,2112

As apparent in figure 12 above, the major explanatory variables for wage rates is the province of residence, and whether or not the labour stock predominantly consists of rural employees. The data on rural employees is gathered from statistical yearbooks, and a majority of the provinces with predominantly rural employees have around 85% of their labour force working in rural enterprises and agriculture. The dummy variable indicating large numbers of rural employees, have shown to have a greatly negative impact on wage levels. The large and significant negative impact of predominantly rural populations did not start to show until 1996. Well in line with the introduction of more flexible wage rates in urban areas. Educational quality measured in average years of schooling has significant negative impact in many of the years examined, a fact that is very tragic and surprising. University graduates do however increase the wages with around two percent, implying that university education is a lot more important than overall basic education in terms of determining wages, confirming the theory of Wan et al (2001, pp. 9-10). Wage reforms aiming at improving returns to schooling

seem to have had very little influence, even in 2002 and 2003. This in turn constitutes a great problem for a country striving to catch up with western developed nations.

Living in one of the central or western provinces decreases your potential wage rates dramatically however. Central provinces have overall consistently meant significant decreases in wages. The biggest decline is seen between 1997 and 1998, from a 15.1% decrease to a staggering 23.4% decrease. Dragging down wages with up to 38.8% in 2002. The western provinces have met various results; however the overall evolution has been positive. In 2001 living in the west even meant a 7.2% increase in wage rates. Reforms reaching to these inland regions seem to have been fruitful, more so than for the other group.

The R-squared shows the significance of the independent variables to the logged wage rates. This factor fluctuates in the time for or analysis, providing the largest explanatory measure in 1996 and 1997 to then decrease its impact again.

From figure 13 we see the clear total impact of the time factor along with the impact of each individual province on wage levels. For this analysis it is not possible to statistically determine (on a 5% level) the impact of all provinces. The three best provinces, wage wise are Beijing, Inner Mongolia and Jilin. Dummy variables for each year all show significant values and further prove the overall positive wage trend.

Figure 13, Panel data analysis 1994-2003[8]

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	8,282	,104		79,453	,000
	1994	-,467	,022	-,359	-20,852	,000
	1995	-,425	,022	-,327	-19,594	,000
	1996	-,391	,022	-,301	-17,976	,000
	1997	-,339	,022	-,261	-15,572	,000
	1998	-,122	,022	-,094	-5,599	,000
	1999	-,109	,022	-,084	-5,016	,000
	2001	,150	,022	,115	6,890	,000
	2002	,251	,023	,193	10,789	,000
	2003	,356	,032	,274	11,188	,000
	Central	,085	,089	,101	,948	,344
	grad	,005	,003	,112	1,930	,055
	rural	,151	,042	,165	3,645	,000
	western	,103	,137	,114	,752	,453
	Beijing	,764	,136	,364	5,614	,000
	Tianjin	,614	,112	,292	5,504	,000
	Hebei	,139	,095	,066	1,463	,145
	Shanxi	,206	,096	,098	2,143	,033
	Inner Mongolia	,816	,110	,389	7,388	,000
	Liaoning	,564	,105	,268	5,364	,000
	Jilin	,782	,102	,372	7,693	,000
	Heiliongjiang	,544	,105	,259	5,183	,000
	Shanghai	,184	,105	,088	1,754	,081
	Jiangsu	,274	,095	,130	2,888	,004
	Zhejiang	,688	,087	,328	7,924	,000
	Anhui	,068	,087	,032	,783	,434
	Fujian	-,013	,127	-,006	-,104	,917
	Jiangxi	-,037	,133	-,018	-,278	,781
	Shandong	,015	,132	,007	,114	,909
	Henan	-,103	,132	-,049	-,784	,434
	Hubei	,011	,133	,005	,086	,932
	Hunan	-,025	,134	-,012	-,185	,853
	Guangdong	,021	,132	,010	,157	,875
	Guanxi	,021	,133	,010	,161	,872
	Hainan	,049	,134	,023	,364	,716
	Sichuan	,076	,161	,023	,473	,636
	Guizhou	,026	,173	,012	,151	,880
	Yunnan	,112	,172	,053	,651	,516
	Shaanxi	-,010	,169	-,005	-,059	,953
	Gansu	,117	,170	,056	,684	,495
	Qinghai	,299	,172	,142	1,738	,084
	Ningxia	,136	,171	,065	,794	,428
	Xinjiang	,238	,178	,095	1,337	,182

a. Dependent Variable: lnw

Source: China Statistical Yearbook 1994-2004

R^2= 0,967 Adjusted R^2=0,957

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[8] Coastal and 2000 excluded automatically by SPSS, serving as base variables.

Figure 14 Panel data analysis 1996-2003[9]

Coefficients ^a

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	9,280	,137		67,775	,000
	Funding	,000	,000	,122	2,154	,032
	Rural Pop>60%	,176	,043	,201	4,110	,000
	grad	,001	,003	,034	,433	,665
	1996	-,781	,043	-,683	-18,323	,000
	1997	-,724	,039	-,633	-18,442	,000
	1998	-,508	,039	-,445	-13,184	,000
	1999	-,487	,037	-,426	-13,271	,000
	2000	-,368	,033	-,327	-11,149	,000
	2001	-,234	,030	-,207	-7,728	,000
	2002	-,134	,025	-,119	-5,375	,000
	Bejing	,579	,157	,284	3,682	,000
	Tianjin	,345	,100	,169	3,453	,001
	Hebei	-,210	,053	-,103	-3,969	,000
	Shanxi	-,100	,066	-,049	-1,528	,128
	Inner Mongolia	,590	,099	,289	5,983	,000
	Liaoning	,282	,076	,138	3,722	,000
	Jilin	,508	,064	,249	7,873	,000
	Hejliongjian	,268	,071	,131	3,777	,000
	Shanghai	-,226	,106	-,111	-2,127	,035
	Jiangsu	-,085	,048	-,041	-1,749	,082
	Zheijiang	,301	,043	,148	6,937	,000
	Anhui	-,340	,043	-,167	-7,815	,000
	Fujian	-,340	,044	-,166	-7,634	,000
	Jiangxi	-,290	,048	-,142	-5,986	,000
	Shandong	-,251	,054	-,123	-4,673	,000
	Henan	-,345	,056	-,169	-6,179	,000
	Hubei	-,252	,049	-,123	-5,101	,000
	Hunan	-,275	,052	-,135	-5,336	,000
	Guangdong	-,262	,055	-,128	-4,745	,000
	Guanxi	-,247	,048	-,121	-5,128	,000
	Hainan	-,247	,048	-,121	-5,175	,000
	Sichuan	-,148	,056	-,052	-2,662	,008
	Guizhou	-,286	,039	-,140	-7,413	,000
	Yunnan	-,198	,036	-,097	-5,450	,000
	Shaanxi	-,253	,056	-,124	-4,507	,000
	Gansu	-,174	,040	-,085	-4,349	,000
	Ningxia	-,164	,042	-,081	-3,929	,000
	Xinjiang	,019	,067	,009	,279	,781
	Average Years of Schooling	-,043	,018	-,111	-2,378	,018

a. Dependent Variable: logged annual wage

R^2= 0,970, Adjusted R^2=0,963

Figure 14 provides a panel data analysis with safer results. It is again remarkable to see the variations between the provinces. Henan, Anhui and Fujian dragging down wages with 34%-35%, Beijing, Inner Mongolia pushing them up with more than 50%. The rural employee dummy provides positive influence on the wage in both figure 13 and 14, with a yes indicating a more than 15% wage increase. An average year of schooling again has a small yet significant negative (4.3%) impact and number of graduates of higher education seem to be insignificant when looking at the full data.

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[9] 2003 and Qinghai excluded by SPSS, serving as base variables.

4. Discussion

As China enters world markets it will have access to newer forms of technology and organizational arrangements. The need for a more skilled workforce will increase. (Heckman 2003, p.796) Investments to human capital play an important role in the creation of economic growth and social welfare.

In line with my findings and the findings of Wan et al (2001, p.17) one specific matter of concern should be highlighted, namely the decline in growth rate of human capital accumulation. In order to maintain its growth rates and create convergence between provinces China will have to create a more innovation-based knowledge economy rather than becoming the low-cost production country of the world. Educational funding in poorer regions show great flaws, which needs governmental correction in order to step onto the right track and bridge the great divide between them and the richer provinces.

International capitalist interests working in China has increased pressure to create a more flexible labour market. However, many obstacles still remain. Expediting the flow of labour and the market determination of wage rates is one of the important aspects of the market-oriented reforms of China as a whole (www.china.org.cn).

4.1 What conclusions can be drawn from the time-series analysis?

Some major findings can be drawn from the time-lines, charts and regressions presented in the previous chapter. Signs of convergence are practically non existent, instead disparities in wage-rates (figures 10 and 11) , school funding (figure 1 and 4) and availability of higher education(figures 6 and 8) have grown dramatically within the researched period. Success in your working life is rather an outcome of your place of birth than what type of educational success you have achieved. Large rural populations also have had a large and significant negative effect on wage rates (see figure 12) for almost the whole period investigated. Panel data analyses (figures 9, 13 and 14) have determined overall effects on schooling and wages. Again geography plays a dominant part of the explanation. The time factor is also shown to have contributed to continuous and statistically significant increases in both educational attainment and wage levels.

4.1.1. Mincer and the economics of education

One of the basic problems relating to education and growth goes hand in hand with the reasoning of Mincer. Although private returns to education have increased slightly, they have not increased to the same extent in all provinces. Distortions in this aspect are great, and overall returns are less than satisfactory, leaving individual labourers with very low incentives to invest in higher level schooling (Yang 2005, p.24). Mincer based appreciations of returns to schooling has been executed in articles made by Yang (2005), Fleischer et al (2004), Yueh (2004) and Heckman (2003). Fleicher et al (2004, p.1) describe the relative pay of highly educated to have persisted longer in China than in the transition economies of Eastern Europe. The compression of wages has also been seen in enterprises of all ownership types. Still, small overall positive improvements in returns have been scientifically determined. According to Yueh (2004, p.162) a year of education was associated with a 4% increase in income in 1995, rising to 5.5% in 2000. Good news she says, for an emerging labour market desiring wages further connected to human capital depicted in years of education attained.

In spite of low returns to schooling, an increasing number of young Chinese graduates from university is every year creating a stronger pool of workers. Hopefully aspirations of these graduates will put increased pressure on returns.

The troubling fact that labour market has consistently been so deformed, and wage structures so rigid, brings support of the assumption that human capital in relation to physical capital suffers from great under investment. This hypothesis is supported by my own findings as well as in the empirical findings of Heckman (2003, p.799)

4.1.2. Endogenous growth theory

As Ng et al (2001, p.1052) stress, technological progress is one of the major driving forces of the Chinese growth. Technological progress though, demands proper handling in order to be used optimally. Proper handling requires highly skilled staff and highly educated staff requires universities with sufficient funding in order to provide up to date, qualitative education for a growing number of students.

In order to create a creative environment for students, sufficient funding is not the only essential key. It has also, according to Law (1995, p.341) been vital for the government to let go of some of the political pressure it has put on institutions of higher education. Slow

progress has been made since the eighties, as a step towards institutionalizing market forces, universities and college have managed to get a little bit more of the institutional autonomy they so greatly need. More autonomy has partly been a result of the diversification of funding, partly as a reward for the important contribution to economic development that is made by institutions providing scientific and technological research.

Funding and educational attainment disparities have increased greatly during the past ten years, as witnessed in previous time-series. With respect to education finance, insufficient funding for education is a problem in China. In spite of considerable increase in fiscal spending between 1978 and 1999, Wan et al (2001, p.14) state that expenditures still make up for a very small proportion of GDP relative to the physical capital spending. Historically educational facilities have been strictly confided to governmental resources. During the nineties however financial sources diversified and private funding became increasingly common. However uneven distributions of private financing, makes spread even more skewed throughout the nation. (Wan et al 2001, p.17)

4.1.3 Results in the light of executed reforms

In the methodology chapter, I presented the waves of more market oriented wage reforms brought forward during the last twenty years. From the empirical findings it is clear that disparities have grown greatly during the time of my research. One major explanatory factor lies in the gradual approach to reform the Chinese government has. Coastal provinces saw market economy oriented reforms in an earlier stage; they also got the opportunity to draw benefits from opening up the market to the outside world at an earlier stage. This giving a few regions a great advance in the growth process. Ng et al (2001, p.1057) explain how one has tried to make room for regional variations in business environments through giving preferential treatments e.g. tax exemptions for international stages wanting to start business in provinces being in later stages of the reforms process.

Reforms targeting higher education seem to have had positive results in terms of increasing funding, and improving university graduate output (see figures 1 through 8). However increases in tuition fees and private funding only benefit richer regions and creates greater gaps between rich and poor. Allowing institutions to engage in private business is a positive development creating new opportunities for under funded institutions in inland China. In spite a mainly positive development Law (1995) describes that it has on the other hand sometimes

lead to desperate chases for cash inflows, pushing professors to achieve research at a very fast pace in order to sell it and give the money back to the school and not the professor in question.

4.2 Cross Provincial Disparities

Wan et al (2001) found that the accumulation of human capital in China (as measured by the average years of schooling for the population aged 15 to 64 was quite rapid and contributed significantly to growth and welfare. In the light of these findings, concerns were raised on thei indications of declining rates of human capital accumulation. They stress the fact that funding for basic education is unevenly distributed and insufficient in some poor regions. This further proofed in my analysis, stressing the increased divergence developing during the nineties. Wan et al (2001) investigated determinants of China's growth during the period of 1952-1999 using a simple growth accounting framework incorporating human capital stock. Yang (2005, p.24) also concluded the problematic circumstances connected to distortions between the different regions.

In his article Yang (2005) tries to explain distortions using economic theory, claiming that workers respond to regional differences in economic opportunities by moving to the locations with the highest pay. These labour flows would tend to result in convergence in wages for comparable labour and equalization of returns to education. Therefore, evidence on spatial dispersion and over-time changes in factor prices would shed light on the extent of labour market integration. Observed segmentation of regional labour markets would imply benefits of further policy reforms, which could in turn improve the efficiency of resource allocation and promote sustained economic growth (Yang 2005, p.2). However in China, labour mobility has historically been very low due to hukou restrictions and problematic institutional circumstances. Restrictions still exist today although to a lesser degree, hindering labour mobility to function in favour of wage convergence. Even though labour mobility has increased there has been divergence rather than convergence, arguably contradicting the findings of Yang (2005).

Law (1995, p. 339) shed further light on reasons behind human capital stock distortions. She argued that admission policy might have something to do with it, reinforcing social disparities between urban and rural and between coastal and inland areas in mainland China. Despite the introduction of grants and loans to needy students, it is quite difficult for young people from average rural families to afford high tuition fees in both public and private colleges and

universities. Poor students, whether in urban or rural areas, may acquire access to higher education mainly through state plans or schemes of contract-study-scholarship offered by rural enterprises. In contrast, children of senior staff members of large companies and high-ranking party cadres, even with lower grades, have a better chance of pursuing tertiary education by paying high tuition fees.

## 4.3 The Impact of Increasing Contact with the Outside World

Although to some extent autonomous, Chinese provinces still need to follow the directions of the Communist Party. Even though the party tries hard to keep a firm grip on all facets of the Chinese market, one has become more aware and attentive to the demands of the outside world as well as to domestic social demands. The international context is further characterized by a pushed restructuring of economic, political, and ideological elements (Law 1995; p.35).

A large part of disparities can also be connected to the step-by-step liberalization and welcoming of FDI and international forces. Where international forces started appearing in Fujian and Guangdong as early as 1980, whereas inland capital cities were not opened up until 1992 (Ng et al 2001, p.1058). Evidently this must have had a great impact on creating divergence. So it is not really until recently with the joining of WTO in 2000 that the Chinese market has really opened up. Coastal provinces and special economic zones opening up to FDI at an earlier stage leading to increased profits and in turns higher wages for the employees as profit-based systems were implemented.

With a continuously growing presence of international influence, pressure will grow even more on the Chinese government to remove the last remaining of decades of rigid wage structure and create a flexible labour market where skill and ingenuity is rewarded.

My guess is that the dramatic (more than 100 000 more international students representing a 600% growth between 1994 and 2003) increase of Chinese students going abroad to study (see figure 15), will help bring forward demands of more schooling sensitive wages, just as the ones they have seen during their travels outside China.

Figure 15, Number of students studying abroad

Legend:
Number of Students Studying Abroad
Number of Returned Students
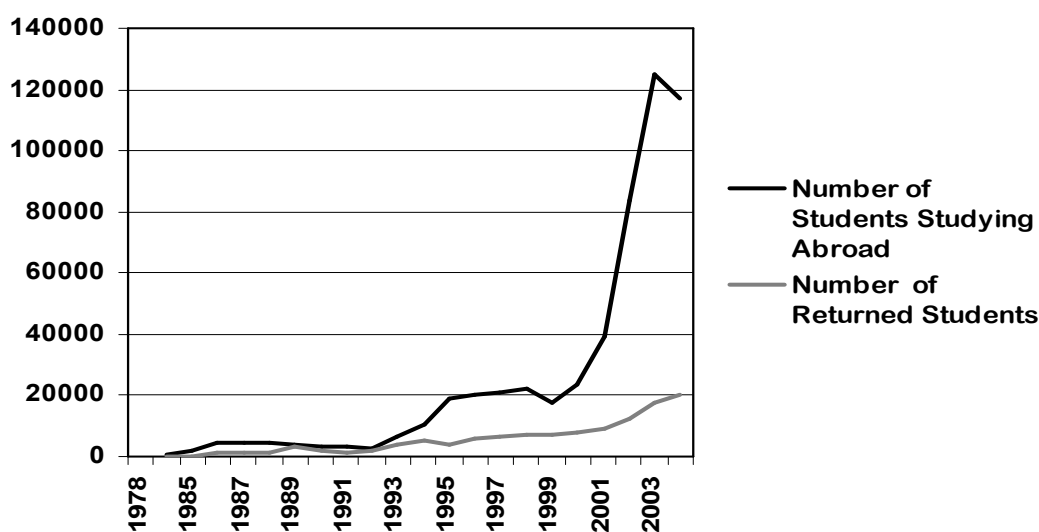
Multi-national companies building industries within China have created unprecedented demands on skilled labour demands (Heckman 2003, p. 796.). International firms are to a higher extent willing to pay higher wages in order to attract the young and educated, thus increasing competition on the domestic market.

Cheung et al (2004) describe the impact of foreign direct investment on innovation from a provincial perspective. They emphasize the importance of ability to obtain technology from developed countries and then further develop on that technology when setting up domestic innovation capability (ibid p.25). Today most of FDI flows in to the coastal regions and has a very uneven distribution (ibid p.30), the authors built on the notion that abundant FDI and technological expertise would create spill-over effects into inland provinces. They present an elaborate panel chart (ibid p.31) of the spatial distribution of FDI inflow to China in percent. This chart indicates that spill over effects in terms of attracting FDI barely exists, since the coastal region has been attracting constant rates of around 90% of all FDI for the full period between 1996 and 2000. Drawing from my own analysis of higher education and the theories of endogenous growth, we find this to relate to the lack of skilled staff in central and western provinces. Another problem brought forward by said authors is the very low number of domestic application for invention patents (ibid p.32). They display a chart of spatial distribution of domestic applications in percent. Here, the coastal region clearly dominate the invention patents with 70% (ibid p.34), this dominance has not changed in a big way during

the researched period. The major influence of FDI they found, also having positive spill over effects into the country, was on external design patents (ibid p.39). The major reason for reviewing this article is to show the link between the link between education, reform and profits. Education and FDI-promoting reform lead to higher profits. Higher profits leads to higher wages as wage reforms have made wages profit-based rather than skill-based.

4.4 Other social aspects

Before concluding my thesis, I feel it necessary to mention some of the social aspects of Chinese culture preventing people to reap their optimal wages and attain higher positions. Social structures that are more prominent in rural areas than in urban areas where one has to some extent abandoned these values in favour of more capitalist ideas. Apart from the reform explanatory reasoning this might supply additional clarification to why wages and educational levels have had slower growth rates in rural, inland China.

Social structures working against faster development are presented in King Whyte (1995). In rural areas small family, collectively run enterprises are very common. This is according to King Whyte (1995, p.1001) is an outmoded organizational form that prevents the opportunities of economies of scale to make industries really profitable. Family resources, and positions within the firm are distributed based on position in the family (i.e. when you are born) and not on individual skills. Demands for family loyalty might prevent sons and daughters from leaving the family enterprises for better and higher paid opportunities elsewhere (ibid p.1001). The family system also works hindering for women's economic productivity, lowering female incentives to schooling (ibid p.1002).

On the other hand, these family based systems also can act igniting for schooling incentives, especially for the older sons. Even though financial benefits might not be so great, young Chinese attaining higher education (specialized secondary schools or universities) study hard to maximize their time in school and to get good grades rather to make their family proud then to make a lot of money (ibid p.1003). He stresses that Chinese families, even without pressure from the central government will make radical fertility decisions in order to ensure that some one in their family will be able to make lengthy educational investments in order to attain higher social status for the family as a whole (ibid p.1005).

5. Conclusion

At the start of the timelines, in 1994 some inequalities in terms of education and growth did exist within China. As deepening reforms showed results, divergence increased. Although basic education is practically universal in China, great disparities in terms of higher education create great human capital gaps between different provinces. This gap results in some provinces being more apt and able to adapt to new technology, creating better incentives for sustained growth. Reforms aimed at creating more flexible and skill-based wage rates thus get stronger implications in terms of speedy increases in average wages in provinces with a stronger stock of human capital stock. With respect to education finance, insufficient funding for basic education is a problem in China, creating obstacles for individuals to get higher human capital stock and for societies to adapt to new technology, increase firms' productivity and spur economic growth.

One of China's greatest problems in terms of the relationship between education and growth has been to restructure rigid wage structures. Wage structures that have worked as a counterforce to rewarding highly educated staff. Giving individuals the fruits of their skilled labour would motivate people to acquire skills without costing the government anything. In relation to private returns to human capital investments, Heckman (2003, p.800) stresses that allowing private incentives to operate in this manner would create the investment pools for human capital. Quoting Heckman (2003, p. 802) "human capital is the asset that ultimately will determine the wealth of China. Fostering human capital would likely reduce inequality in the long run and freeing up human capital markets would create opportunities for everyone."

The diverging trend witnessed is indeed very scary and it shows the vital need for tertiary education along with further investments in research and development in all those provinces that have lagged behind. I do not feel that provinces can afford to push higher education as much as they would like due to decentralization reforms resulting in greater financial responsibilities for individual provinces. These responsibilities are unbearable for some of the provinces. Stronger investments in tertiary education from central government in these areas would probably be very helpful.

5.1 Policy implications

The obstacles for sustainable growth presented in this thesis are mainly created by institutional flaws that need to be addressed. The diversification of sources of income for universities has been one of the policy changes that have proved positive.

I believe as Wan et al (2001, p. 17) that the primary goal in terms of policy creation for China is to urgently tackle insufficient and uneven distribution of educational investment if China is to sustain its growth and welfare improvement in the next decade. Especially since new technology is coming to China in a rapid way with increasing international forces creating higher demands on the domestic market.

Extended policy changes are desperately needed in order to ensure that young people from rural areas will be able to fulfil their potential. Access to higher education has to be made more accessible to the rural areas, e.g. by granting free access to promising students from poor families. Extensions of student loans and grant systems could be one way to achieve this. Another is focusing governmental resources on poor provinces, leaving universities in Beijing, Shanghai and Tianjin to fend for themselves financing their business by private means.

Yang (2005, pp. 23-24) suggest that the evolution of performance based compensation is positive and that future reforms should focus on creating specific policies creating institutional arrangements easing up labour mobility. Better labour mobility would lead to a trend of convergence of wages and returns to education. It would further spur incentives to invest in human capital.

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