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Chinese Regional Development, a Consequence of State Interventions or the Private Sector?

An inter-regional panel data analysis

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Abstract

A current topic in today's China is to find paths for passing the middle income. Although the restoration process has been ongoing for a couple of decades, the complete marketization transition has not yet turned into reality. However, the pace of development is still impressive, partly depending on an increasing private enterprise mobility. This paper provides a panel data analysis of Chinese regional development approaches and discusses whether growth is driven mainly by the state or by the private sector. Using Dumitrescu-Hurlin Granger-causality tests, this study reveals that the regional level of marketization is an important element in order to generate growth. Further, both gains in institutional efficiency and an increasing share of private enterprise employment show significantly positive effects on per capita GDP-growth, indicating on a necessity of a mutual influence from these components to achieve regional economic development. However, private employment also significantly effect level of marketization, why this paper suggests that the main driver of regional development is the private sector.

Keywords: Private, State, Development, Growth, Marketization

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1. Introduction

The exponential emergence of China as a central participant in the international field has not only implied changes in the market structure, but also an augmented interest in the Chinese market and the peculiar political approach apparent in the world's most populated country. An important aspect is whether China is mostly a planned or a market economy. This is a suitable question when evaluating the impact of, on one hand institutional politics, and on the other hand market mechanisms. A decisive element in this subject is if private or state-owned enterprises are leading in developmental aspects regarding e.g. production, investment and profitability (Scissors, 2016). A general theme is to discuss the elements determining development differences between countries worldwide. However, if we delimit the topic to just China and the disparities apparent between its administrative regions, what conclusions could be drawn regarding the structure of a working regional economic approach?

This paper will focus on China and all comparisons with other countries will be excluded. Instead, the 31 administrative regions (Hong Kong and Macao are excluded) will be handled as separate players and compared against each other. The research will be to examine which component that affects regional development the most, market mechanisms or institutional changes pursued through state interventions during the period 1997 – 2009.

The examination deals with the area whether the presence and extent of private enterprises as a share of total enterprise ownership structure correlates with level of marketization. Fan et al. (2011) have done a number of repetitive versions about the NERI index, which is a tool for measurement of marketization in China's administrative regions. A comparison between NERI index numbers and private enterprise expansion and the eventual correlation has never been done before in its pure form, why this paper aims to somehow fill this gap in economic research. Moreover, the desire is to find a relationship between private employment and level of marketization, hence concluding or denying the general idea about private enterprises driving the marketization process in China. Since the beginning of the transformation in 1978, loads of reforms have taken place in order for China to develop the living standard and catch up with other countries. Some of these reforms are elucidated in this paper to partly explain the Chinese progression. Additionally, an interesting thought would be to evaluate to what degree future level of regional marketization could be predicted based on development of the private sector.

In short terms, this study reveals that regional economic growth cannot be explained only by one factor. However, a higher share of private enterprise employment tends to imply greater GDP-numbers, both regarding growth and pure level of economic development. This suggests that the private sector has a great impact on regional development. Simultaneously, the NERI index, comprising all types of components necessary for a functioning market, has a significant effect both on private employment and economic growth. Therefore, institutional structure is an important factor in order to keep the market in roll. One single component could impossibly describe the entire development process.

2. Background

The Chinese economic development has been dramatic since the middle of the 80s, especially when taking the large population into account. The average annual economic growth has been 9% the last three decades (Gong & Cortese, 2017). In Table 1 real per capita GDP-numbers and annual growth are illustrated for 1997 and 2009. There is of big interest to look at the economic situation in China's administrative regions during the period of examination in order to get an overview of conditions and differences across China. Hence, an appropriate measurer would be regional GDP per capita. What should be taken into consideration is the doubtful credibility of these data, since provided separately by each region. Moreover, the measurement ability could be disputed, at least in 1997, since the course of measurement action was not sufficiently reliable. This is emphasized by some of the provided numbers, e.g. the annual growth in Chongqing and Sichuan, which claim that their pace of development/economic decline has been unreliably high. The distorted truth further underlines some kind of regional untrustworthiness which is a general problem in China. However, despite lack of credibility, it is clear that there are large dissimilarities between regions, which obviously is a current issue since contemporary GDP-growth shows large spread when comparing regions (Babones, 2018).

In Table 1 the three different types of administrative regions are demonstrated. The municipalities are Beijing, Chongqing, Shanghai and Tianjin. The autonomous regions are Guangxi, Inner Mongolia, Ningxia, Tibet and Xinjiang. The rest are provinces. The most inhabited region in China is Henan province with a population of almost 93 million, and with 2,62 million inhabitants Tibet is the least populated region. Guangdong province has had the largest population increase in percent the last ten years (China Today, 2018).

Table 1:
Regional real annual GDP per capita and growth numbers (Yuan)

	1997			2009	
Region	**Real numbers**	**Annual growth**	**Region**	**Real numbers**	**Annual growth**
Shanghai	22594.45	10.00%	Shanghai	56463.68	4.32%
Beijing	16035.75	14.43%	Beijing	54194.36	4.86%
Tianjin	12709.05	9.01%	Tianjin	50798.65	7.97%
Guangdong	10555.51	9.10%	Jiangsu	36592.97	11.34%
Zhejiang	10115.20	6.48%	Zhejiang	36146.34	6.60%
Jiangsu	8947.02	7.55%	Inner Mongolia	32864.86	14.83%
Fujian	8374.04	11.52%	Guangdong	32327.35	5.55%
Liaoning	8287.94	9.63%	Shandong	29687.63	9.76%
Shandong	7123.56	7.39%	Liaoning	29066.51	11.43%
Heilongjiang	6807.90	8.66%	Fujian	27685.24	13.05%
Hebei	5800.80	10.52%	Jilin	22037.38	13.87%
Xinjiang	5794.33	10.22%	Hebei	20322.58	7.72%
Jilin	5334.24	4.97%	Chongqing	18944.46	12.74%
Hainan	5297.58	1.38%	Hubei	18794.39	15.06%
Chongqing	4751.18	-43.13%	Heilongjiang	18615.63	3.99%
Inner Mongolia	4748.14	8.64%	Shaanxi	18181.70	12.23%
Hubei	4656.45	10.10%	Ningxia	17953.98	11.87%
Shanxi	4498.72	9.85%	Shanxi	17807.41	0.81%
Hunan	4219.11	8.36%	Henan	17031.40	8.23%
Henan	4185.44	7.21%	Hunan	16909.41	13.38%
Ningxia	4056.68	5.76%	Xinjiang	16434.20	1.65%
Yunnan	3919.46	5.97%	Qinghai	16092.65	6.34%
Qinghai	3917.16	5.45%	Hainan	15879.04	9.58%
Guangxi	3754.98	3.08%	Sichuan	14340.34	12.47%
Jiangxi	3704.17	9.46%	Jiangxi	14325.92	9.81%
Sichuan	3681.04	48.11%	Anhui	13613.53	14.59%
Anhui	3667.58	7.95%	Guangxi	13253.13	10.40%
Shaanxi	3656.57	8.15%	Tibet	12374.24	11.26%
Gansu	3046.10	5.60%	Yunnan	11195.38	8.51%
Tibet	2986.40	13.60%	Gansu	10997.50	7.57%
Guizhou	2139.32	6.77%	Guizhou	9175,.3	1250%
Total	6153.49	6.93%	**Total**	27618.67	8.84%

(China data online, 2018)

All numbers are provided in Chinese Yuan, which was worth around 0.1465 American Dollars in 2009 (X-Rates, 2018). The Chinese growth model can easily be illustrated by Table 1, showing interregional disparities. The opinion of the political elite regarding development strategies and general objectives has been important during the years of transformation. Due to the central government's support of the hierarchical top, regional policy initiatives have more or less been ignored. This is the core to interregional growth dissimilarities and why some regions have been prioritized over the years in the strive towards development (Opper, Nee and Brehm, 2015). One of the main issues in today's China is to pass the middle income trap, defined as the inter stage between a low and a high income country (Woo, 2012). This requires China to include more regions in the development process, hence equalize the interregional disparities.

Although China is not yet the world's leading economy regarding GDP, there will always be of great importance to include China in international negotiations of current and future cross-border issues. According to all previous research, China will become the world leading economy in a soon future. When the extensive program of economic reforms initially was launched in 1978, China had the world's ninth largest economy in GDP-numbers. Today the east giant holds the second place in the same list (Focus Economics, 2018). However, one should keep in mind that the market term is rather new in China, and it was first after 1992 the national commitment to markets somewhat became reality. Despite this and the significant diminishing growth numbers over the last decade, the real Chinese growth rate is still high, why the United States will be seen passed within approximately one decade (Bai, Hsieh and Song, 2017).

In order to reduce the all through planned economic approach, China needed to expand the private sector on the expense of state-owned enterprises (SOE). This ownership transformation has been of great importance for China's road towards a more market oriented appearance (Qiaobin, 2006). Since 1992, the share of private enterprise employment has increased dramatically. This could mainly be explained by the government's changing attitude to entrepreneurship and private enterprises. In 1992, the share was 4.57% and 18 years later the share of private enterprise employment was 21.38%.

Table 2:

The evolution of private enterprise employment 1992-2010 (in 10 000 persons)

	1992	*1995*	*1998*	*2001*	*2004*	*2007*	*2010*
Total employment	59120	62388	70637	73025	75200	75321	76834
Private employment	2700	5570	7824	7474	9604	12749	16425
Share	4.57%	8.93%	11.08%	10.23%	12.77%	16.93%	21.38%

When putting these numbers in relation to the share of employment in state-owned enterprises, there is an obvious pattern of transformation. In 1992, 24.54% of Chinese employees worked in state-owned units. 2010, this number was 8.72% (Appendix 1A-B). Thus, more market oriented firms have obtained greater market share, including private - and self-employed enterprises. Due to the absence of government support, private firms have been forced to maximize profit in order to survive in the Socialist Market Economy. This implied a great contribution to Chinese GDP and the impressive growth numbers. In 2011 The National Bureau of Statistics reported that enterprises which were not majority owned by the state produced around two thirds of total output (The Economist, 2011).

3. Theoretical Review

3.1 Previous Research

All Chinese regions do not follow the same growth paths. Andersson et al. (2013) argue that there exist growth clubs, i.e. some regions develop similarly. Analogously, there are differences between clubs, why the pace of development is not the same for all regions. This causes a long-run convergence pattern, which to some extent has been the Chinese government's objective.

Except of historical aspects, contemporary differences regarding government efficiency on the local level is an important component when analysing reasons behind Chinese region disparity. Tang et al. (2014) find strong evidences of positive correlation between local government efficiency and regional economic development. They further observe convincing indications of inequity between western and central regions comparing to their counterparts in the east. According to Tang et al. (2014) an appropriate approach for the former should be to develop their institutions and streamline the general government operation, including the public service as well as the welfare system.

Structural characteristics could be explained as operational conditions for a specific region to succeed, e.g. population growth, structure of the factor market and present technology. Galor (1996) emphasizes the importance of a region's structural characteristics, since the long-run equilibrium heavily depends on the composition of the components and how well these work in the aim of generating development. Hence, changes in structural characteristics have great impact on market appearance variations, why a better understanding of structural features could be an important tool for policy adjustments. The level of development therefore differs partly depending on the aptitude of each regional government to form a functioning policy structure (Andersson et al., 2013).

In their book *Capitalism from Below,* Nee and Opper (2012) examined the phenomena of an emerging functioning private economy in China, a communist state with a feature of strong central governing and a history of turning the back towards capitalism. The economic priority has historically not been directed towards private firms, why there have been difficulties for entrepreneurs to develop their business. They have been forced to operate according to Chinese society restrictions, characterized by more friendly attention towards the state-owned sector, as well as stricter budget constraints for private firms. Legacies of this still exist. For instance,

firms with total absence of affiliation to the state received 1% of total lending in 2011 but still produced more than 68% of total GDP (The Economist, 2011).[1] However, the private entrepreneur's silent existence has gradually changed over time due to endogenous institutional shifts. Moreover, the Chinese entrepreneurial sector started in rural areas in the 1980s (Tse, 2016). As a member of the countryside, you could either choose to stay on the farm, migrate to low paid rural employments or be a modest part of Township Village Enterprises, why lots of people chose to start their own business. This was an opportunity for the low educated to get out of poverty. The private enterprise market has gradually increased its involvement in the Chinese market. However, this was not anticipated by the government, why restructuring processes have been time consuming over the years. Nee & Opper (2012) emphasize that there have not occurred extensive policy changes. Hence, they argue that the emergence of a somewhat functioning private economy does not exclusively depend on political framework.

Nee & Opper (2012) put a great weigh on the availability degree of political capital for entrepreneurs and private firms. Historically, it has been harsh for private enterprises to get access to this type of capital, since most of it has been allocated towards the state-owned sector. A current verification of this is the presence of heavyweight state-owned enterprises, where the 12 largest firms in China are state-owned (Cendrowski, 2015). Nee & Opper argue that some kind of political relationship with the communist party befriend the entrepreneur's opportunities to obtain capital and supplementary benefits in order to run their business in a more sustainable manner. On the other hand, greater access to political capital does not show any significant impact on profitability. However, these relationships are more crucial for successful firms. A quotation received from *Capitalism from Below,* page 239 states the following; "once you are big, then you must have good relationships with the government. If the party wants you to die, you have no way to live" (Nee & Opper, 2012). This pretty much clarifies the power of the communist party and the benefit of getting along well with the government.

Over the period 1997 – 2007 the National Economic Research Institute (NERI) index on average accounted for 1.45 percentage points to annual rate of economic growth in China according to Gang et al. (2012). During the same time frame, the NERI index contributed just under 40% to the increase in total factor productivity. This indicates that the NERI index of marketization greatly visualize areas necessary for economic development. Gang et al. (2012)

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[1] Firms without connection to the state include more than just private firms.

therefore concluded that marketization gains imply improved resource allocation. In order to maintain a sustainable economic growth in the future, market-oriented reforms need to be prioritized to generate conditions for different kinds of enterprises to utilize a changing market structure into economic development.

Ye et al. (2015) studied the phenomena of an increasingly emerging cross-regional market integration. They examined the relationship between the spread of cross-regional market integration and network resources within enterprises. The results showed that there exists a positive relationship between enterprise network resources and cross-regional market integration. Further, a subtler institutional market involvement was shown to moderate the correlation.

In order to investigate the internal relationship between economic growth and government quality within Chinese provinces, Wilson (2016) used a Granger-causality test. The results do not show any significant effect of government quality on economic growth. However, the tests find a positive and significant effect of economic growth on government quality. This pretty much mimics the pattern described by Przeworski & Limongi (1993), that there are no clear evidences that authoritarian states or dictatorship affect economic development negatively. Rather economic development tends to imply gradual democratization. Hence economic development seems to be an important tool for a functioning institutional system, at least in the long run.

3.2 Chinese Reforms

The government's impact in China has historically been extensive, and the legacy of the communist governance is tangible still today. Until the end of the Mao era 1976 and the negative perception of private operations, entrepreneurship was barely existing at all (Kshetri, 2007). In 1992 China officially abandoned its position as pure planned economy in conjunction with the declaration of China to be a Socialist Market Economy. This phase can be illustrated as an approval of the market economy, where China learned from capitalism and operation methods, although the primarily focus was still on the planned economy (Gong & Cortese, 2017). Many of the following reforms have become reality as a consequence of the Socialist Market Economy announcement. In connection to the declaration, the former Chinese leader Deng Xiaoping quoted "let a part of the population get rich first" (The Guardian, 2012). This

statement would turn out to characterize the Chinese development approach, since an apparent modernization of the society was put into system, partly causing unbalanced regional development (Andersson et al., 2013). However, the guidelines provided by Xiaoping's quotes are not the only core to the existing region disparities. The implementation of special economic zones (SEZ) in two rounds 1979 and 1984 has evidently had great impact on today's situation. These regions were offered a free market-oriented economic approach and political benefits where domestic and foreign investment and trade could be pursued without authorization of the government. According to Fan (2002), the anticipated growth would spread from these specific zones, ending up in a long run sustainable development process where all parts of China is to be included. This, though, has not yet turned into reality since the general pattern is that regions where these institutional advantages originally were implemented also today are developmentally at the forefront. In order to continue developing the internal market, entrepreneurs must be prioritised and perceived as an important component in the process towards further economic growth. This implies that these have access to adequate conditions for a successful operation (Fan, 2002). According to Kshetri (2007) there has been a substantial transformation regarding the government's attitude towards entrepreneurs, which has led to developmental gains in China.

The wave of administrative decentralization in China has been on-going for several decades, initially through the Great Leap Forward in the end of the 50s and the Cultural revolution in the 70s (Montinola et al., 1995). However, the reforms generating greater conditions for decentralization and a more democratic approach really speeded up after 1978. The decentralization has changed a couple of crucial aspects in Chinese society. Quite expected, the reform enhanced the local governments' powers and further stimulated the relation between these and the central authority. It also facilitated the path towards the desired pragmatic market oriented approach, since the Maoist communism gradually was fading out. These changes, together with the continued opening up of China resulted in the Fiscal Federalism Chinese style, a new political system in China, featured by increased decentralization (Montinola et al., 1995).

In 1997, despite the death of the energetic Deng Xiaoping the same year, a Chinese state-owned enterprise (SOE) reform were undertaken as thousands of state-owned enterprises were sold off in the behalf of the government. These subsequently became private owned, a reorganization that turned out to become crucial for further marketization and a central stage in the objective to achieve market socialism. Furthermore, this is perceived to be one of the most important

reforms in regard of the desire of getting more efficient in enterprise operations (Taylor, 2002). In present time there are loads of evidences showing that private enterprises are more productive than its counterparts owned by the state. However, Taylor (2002) emphasize that there exist constraints regarding the success of this reforms and the efficiency gains achieved, mainly depending on the fundamental Chinese scepticism remaining towards capitalism.

Another big step was taken in 2001 when China entered the World Trade Organisation (WTO). Not only this implied extensive changes for China itself, it also revolutionized the global economy since China's entrance made other WTO-countries forced to take another billion people into consideration when making resolutions (The Wall Street Journal, 2017). Obviously this further opened up China towards the outside world, which befriended international cooperation and China's abilities to take part of more developed technology outside its borders. However, it also gave domestic firms another level of competition, since enterprises present in international markets in general were on a considerably higher level of development, both regarding technology and revenues. The increased competition in many cases led to bankruptcy or ownership take-over by foreign firms. This somewhat devastated the domestic independence (Spectrezine, 2017). On the other hand, the elimination of these Chinese firms may have been the cost of taking the next step of development and further normalize the market economy. Another effect of the WTO entrance was the dramatically decrease of state-owned enterprises in China the years after. Between 2001 and 2004 the number of state-owned enterprises was almost halved, indicating on a new attitude regarding reforms necessary in order to keep up with the outside world (Bajona, 2010).

A couple of years after the entrance into WTO, the Chinese government accelerated the economic reforms. This time, structural amendment was the main objective since the reigning authority argued that the extensive marketization approach had overtaken to much focus on expense of the fundamental organisation structure. From 2003 and a few years forward a restructuring of the central system was undertaken in order to eliminate corruption and revitalize state banks. New institutions were implemented to fulfil these tasks. However, the importance of maintaining a growing private sector was not neglected. Major policies were introduced in order to shield private property rights. The middle and late 00s could be seen as a stabilization period in order to make the privatization reforms sustainable in the longer perspective (Stratfor, 2004).

The opening up also led to an interest in the Chinese market among multinational foreign enterprises. From the view of China, this became an opportunity to take part of higher level of technology as well as developed enterprise approaches, which led to the implementation of foreign direct investment (FDI) during the 80s, as a method for further development. This has also helped China to adapt to market fluctuations and developed domestic infrastructure (McCaffrey, 2017).

3.3 Hypothesis

Whether economic development in Chinese regions depend on the visions of the state or market mechanisms is difficult to answer. However, according to previous research and general intuitions, the purposes of institutional changes seem to go in the same direction, namely to generate a more market friendly political approach. With the opening up of China, as well as the later entrance into World Trade Organisation, one could argue that the government were more decisive and involved in regional growth in the early phase of transformation than in more recent years. However, with the time frame of this study in mind, there are reasons to believe that there are great differences of the political involvement when comparing 1997 and 2009. Since the share of state-owned enterprises decreased dramatically after the WTO entrance, this study argues that there should be some kind of transformation in the market structure during the few years after 2001. Hence, the following hypothesises have been created:

H1: Private enterprises drive level of marketization and economic growth more than the state does.

H2: There is a break around 2004, when the private sector took over the leading role from the state as driver of marketization and economic growth.

4. Empirical Strategy

In this section the different indices will be introduced in further detail. The NERI index and its contexture is explained, as well as the self-composed private enterprise employment index and the growth index.

4.1 NERI Index

The NERI index measures the process of marketization in Chinese administrative regions. In other words, this means that it describes the capacity of each region to adapt to the contemporary market structure (Gang et al., 2012). It is created through large sample enterprise surveys. The index comprises objective indicators of the functionality of respectively market system, as well as development gaining or disfavouring aspects, all together forming a somewhat reliable index for measuring the level of marketization in different regions. The NERI index consists of 23 indicators divided into five main components which are described later. The index has a base year, in this paper's content allocated to 2001. For the base year each indicator receives numbers between 0 and 10, the best performing region gets the score 10 and the worst 0. Due to the base year system regions potentially receive negative indices as well as scores above 10 during other years than 2001. The reason is to detect yearly fluctuations and the variation over time. The 23 indicators are the basis for five separate field indices, all weighted equally together, resulting in the overall index of marketization (Fan et al., 2007). The index (j) score for each region (i) is calculated as follows;

$$Sij = \frac{Vi - Vmin}{Vmax - Vmin} \, x10 \, , \tag{1}$$

where S_{ij} is the specific index, V_i is the indicator for respectively region, V_{min} and V_{max} are the lowest and highest indicators across all regions during the base year.

In figure 1 and 2, all region's respectively total marketization NERI index for 1997 respectively 2009 are illustrated. The highest index reported in 1997 was 6.29 in Guangdong and the lowest was reported by Qinghai, 1.29.[2] In 2009, the highest NERI index was 11.8 and reported in Zhejiang and the lowest in Tibet, with 0.38. The level of marketization is hence demonstrated by the colour shades in each figure.

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[2] No NERI index reported for Tibet in 1997.

Figure 1
NERI index 1997

1997

Figure 2
NERI index 2009

2009

The NERI index consists of five main components; Government-market relations, Development of the Non-state enterprise sector, Development of the commodity market, Development of factor markets and Intermediate/legal framework.

The government has a great impact on the market in general. Besides the size of the regional government, the Government-market relations handle the government interventions, both regarding allocation of resources and involvements in enterprises. It further distinguishes the tax and non-tax burden of farmers and enterprises.

The second component, development of the Non-state enterprise sector, consists of the share of total industrial output, fixed assets investments and urban employment, accounted for by the Non-state enterprise sector.

Third, the commodity market is an important factor to include when measuring level of marketization. This component comprises general market pricing as well as market pricing in retail sales, capital goods and farm products. It also includes a part describing trade protection on the local level.

Further, the factor market is included in the index and this component describes the financial sector and its marketization, the share of Non-state financial institutions and the share of loans taken by Non-state enterprises. It also comprises mobility of labour, foreign investments and technology development.

There is ultimately a part handling legal framework. This obviously has a substantial impact on the instruments deciding the market direction. It describes the efficiency of market intermediaries where local share of lawyers and independent accountants are included. The business operational legal environment is also taken into account, as well as protection of property rights and consumers' rights.

When looking deeper into the NERI index one can distinguish two components enlightening the progress of the Non-state enterprise sector, as well as institutional operations. When evaluating these component´s NERI indices separately, an apparent transformation has taken place during the period of examination. In 1997, the government-market relations, including institutional operations, showed higher index than that of the Non-state enterprise sector. In 2009, the relationship was the other way around (Table 3). Over the whole period though, the first contributed to a higher total marketization index when examining all regions as one unit. This is clear when watching the relation-column below, where all negative numbers are coloured in red and indicate on a greater government influence of total marketization level. This underlines that institutional processes have been important for the marketization in Chinese

regions. However, the pattern indicates on a transition process where the private sector tends to overtake the position as primary driver of economic development. This could be perceived as a consequence of the political reforms over the years, befriending entrepreneurship and the private sector. In Table 3, the field indices are demonstrated as yearly averages over all Chinese regions.

Table 3
Part components NERI index – average numbers of all regions.

Year	Non-state enterprise sector	Government-market relations	Relation
1997	3.50	5.63	-2.13
1998	3.75	5.73	-1.98
1999	3.17	5.63	-2.46
2000	3.64	5.76	-2.12
2001	4.05	5.85	-1.80
2002	4.88	6.18	-1.30
2003	5.68	6.65	-0.97
2004	6.47	7.55	-1.08
2005	5.96	7.93	-1.96
2006	7.81	7.98	-0.17
2007	8.40	7.96	0.45
2008	8.60	7.84	0.76
2009	8.61	7.61	1.00
Total average	5.73	6.79	-1,06

In this paper, the NERI index of marketization will be used in relationship to the relative share of private employment in different regions to detect eventual parallels in level of marketization and magnitude of private firms. The NERI will be lagged 1 period (1 year) since the index shows contemporary marketization numbers, probably performing higher effects one year ahead. A decent marketization level today should imply conditional gains for private enterprises in the near future, rather than in present time. Also, the number of available NERI-indices is limited from 1997, why the quantity of observations would have been fewer when using more lags. Private employment will include self employed individuals and engaged people in private enterprises. State-owned enterprises will comprise people engaged in state-owned enterprises as well as those employed by collectively owned units. A panel data analysis will be pursued over the period 1997 to 2009 in order to obtain a deeper credibility in our results. All data will

be gathered from *China data online* as well as *National Bureau of Statistics of China*. The NERI indices used are those from 1997 to 2009. [3]

4.2 Private Enterprise Employment Index

An index for private enterprise employment has separately been developed in this paper. It is built upon the same structure as the NERI index with base year 2001. Consequently, the indices could take values above 10 and below 0. The reason is to detect yearly development within regions and analogously identify conditional differences between regions. This index is developed in order to get a better understanding of dissimilarities between regions regarding share of private enterprise employment. The index referring to 1998 and 2010 can be viewed under Appendix 4A-B and it is calculated as follows;

$$Pij = \frac{Wi - Wmin}{Wmax - Wmin} \, x10 \, , \tag{2}$$

where P_{ij} is the specific index, W_i is the indicator for respectively region, W_{min} and W_{max} are the lowest and highest indicators across all regions during the base year.

4.3 Growth Index

Further, real GDP growth per capita will also be tested against the NERI index, its field indices and the share of private employment. All test components will be transformed into indices in the same manner as the NERI index, with 2001 as base year. Another reason of using growth numbers as indices is that all economic data are described in Chinese currency Yuan. Hence, an index transformation of growth numbers makes all values credible, independent on which initial currency that is used.

4.4 Model Specification

A Dumitrescu-Hurlin Granger-causality test will be used in order to test the hypothesis whether market mechanisms or institutional involvement affect growth and level of marketization to the greatest extent. Granger-causality tests are used in order to detect eventual causalities between variables, i.e. which variable that drives the evolution of the other variable, or if both variables

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[3] NERI index covers the period 1997 - 2009

affect each other mutually. The objective is to discover patterns of correlation. The formulas look as follows;

$$Y_{it} = \alpha_0 + \sum_{t=1}^{T} \theta_1 y_{it\text{-}1} + \sum_{t=1}^{T} \theta_2 x_{it\text{-}1} + \varepsilon_t , \qquad (3)$$

$$X_{it} = \rho_0 + \sum_{t=1}^{T} \beta_1 y_{it\text{-}1} + \sum_{t=1}^{T} \beta_2 x_{it\text{-}1} + \varepsilon_t , \qquad (4)$$

where, the $Y-$ and X- variables represent the dependent indices in each regression. θ and β are parameters, α_0 and ρ_0 are constants. There exist a couple of Granger-causality tests, opposed regarding the fundamental aspect that coefficients are different or not across all cross-sections. The Dumitrescu-Hurlin test allows all the coefficients to differ across cross-sections, why it is reasonable to use in this research. The purpose is to detect which component that drives regional development the most through finding the most significant parameter.

4.5 Data

Table 4 compares four Chinese regions with different conditions and degree of development. Shanghai and Jiangsu are regions located on the east coast, Xinjiang is an autonomous region furthest east in China bordering to Kazakhstan and Hubei is a province in central China west of Shanghai. Their GDP per capita numbers can be viewed in Table 1. Further, Table 4 demonstrates the total NERI index (1), the NERI part component index for government-market relations (2), the self composed private enterprise employment index (3) and the Non-state enterprise sector index (4) for three different years. One interesting aspect when comparing index (1) and (2) is that total NERI index was larger than government-market index for Shanghai and Jiangsu in 2009, which was not the case for Xinjiang and Hubei. This plays in harmony with with the PEE index, which elucidates that the latter mentioned regions have had more of a modest evolution of private employment comparing the east coast regions. The disparities regarding direction and pace of development are more prominent in the total NERI index than in its part component handling government-market relations. However, the largest disparities could be spotted in index (3), which reveals large relative differences, particularly when comparing the provinces 1997 and 2009. The extensive private employment increase present in Shanghai and Jiangsu is absent in Hubei, the index was barely changing at all during this 13-year period. It should be mentioned, though, that the self composed PEE index describes fluctuations in a separate field, namely private enterprise employment. The NERI index (1) and the separate field indices, (2) and (4), are all a merging of a variety of sub-components. This

makes the fluctuations less extensive comparing to the PEE index. The difference between index (3) and (4) is that the PEE index focuses on employment and the Non-state enterprise sector index focuses on output. However, when evaluating GDP-numbers of the regions below and analogously comparing the indices, one could easily detect that the regions showing comparatively high share of private enterprise employment also have greater per capita GDP – and growth numbers over the period of examination.

Table 4
Index comparison.

NERI index

(1)	1997	2003	2009
Shanghai	5.00	9.35	10.96
Jiangsu	5.25	7.97	11.54
Xinjiang	1.77	4.26	5.12
Hubei	4.24	5.47	7.65

Government-market relations index

(2)	1997	2003	2009
Shanghai	6.3	9.02	9.75
Jiangsu	7.81	8.78	10.15
Xinjiang	3.95	5.03	5.44
Hubei	6.59	6.96	8.67

PEE index

(3)	1997	2003	2009
Shanghai	2.46	14.51	20.90
Jiangsu	1.57	5.12	12.35
Xinjiang	1.67	4.39	5.63
Hubei	4.81	3.45	5.27

Non-state enterprise sector index

(4)	1997	2003	2009
Shanghai	4.32	9.1	8.74
Jiangsu	5.8	9.28	13.63
Xinjiang	0.03	3.25	4.62
Hubei	4.49	5.26	8.9

Growth index

(5)	1997	2003	2009
Shanghai	4,48	7,58	-1,53
Jiangsu	4,92	10,81	5,12
Xinjiang	3,17	9,59	-4,05
Hubei	9,22	7,16	8,65

5. Results and Analysis

The first measurement of NERI was performed in 1997. Since then, a general increase in the index numbers has been apparent in all Chinese regions (Fan et al., 2011). The total progress of marketization between 1997 and 2009 can be viewed in Appendix 2. Further some regions show an index number above 10, which is explained by negative and positive variations over years, yielding digits outside the index limits 0-10 (Fan et al., 2007).

A rather anticipated verity apparent when watching the share of employees in the private sector is the general increase, almost in all regions (see Appendix 3). The overall change was 10.30 percentage points between 1998 and 2010, meaning a real relative increase of almost 100%. The regions that have had greatest increase in private employment are Shanghai, Beijing and Jiangsu, three of the most economic driving districts. Beijing is the capital of China, hence always in the spotlight of economic development. Both Shanghai and Jiangsu were selected as special economic zones in 1984. The focus on privatization predominantly generated effects in these three regions, which goes in line with the thoughts of Fan (2002) who emphasized that SEZ-regions have had development advantages over the whole period. When looking closer on the development of NERI during this period, one can conclude that the regions in question are among the ones with highest improvement pace regarding marketization. Further, it should be mentioned that the employment transition process started before 1997, which implies that the structure has changed even more since the marketization declaration in 1992. Hebei, Hubei and Hunan are the only regions showing negative development numbers regarding share of private enterprise employment. Analogously, these regions have had a normal NERI development pace. According to previous research and this paper's findings, the decreasing private employment should imply a somewhat lower NERI development pace. On the other hand, the NERI index is built upon several fragments, why a negative private sector development could be weighted up by other components.

The main regressions are illustrated in Table 5. There are nine different Granger-causality tests performed with the NERI index, PEE index, growth index, the Government-Market relations index and the Non-state enterprise sector index sequentially compared against each other. Notice that Government-Market relations and the index representing the Non-state enterprise sector are not compared against each other since these are included in the overall NERI index. The results reveal the existing causalities, demonstrated by implicates. The p-values in bold style illustrates the significant effects and delimited to the 5% level.

Table 5
Pairwise Dumitrescu Hurlin Panel Granger-Causality Tests 1997-2009
Observations: 360   Number of lags = 1

Regression	Relationship	p-value
(1)		
NERI vs PEE	NERI → PEE	**0.0000**
	PEE → NERI	**0.0002**
(2)		
NERI vs Growth	NERI → Growth	**0.0015**
	(Growth – NERI)	0.1986
(3)		
PEE vs Growth	PEE → Growth	**0.0028**
	Growth → PEE	**0.0244**
(4)		
Gov vs Growth	Gov → Growth	**0.0001**
	Growth → Gov	**0.0000**
(5)		
Gov vs PEE	(Gov – PEE)	0.0998
	PEE → Gov	**0.0000**
(6)		
Gov vs NERI	(Gov – NERI)	0.3408
	NERI → Gov	**0.0067**
(7)		
NonSt vs Growth	NonSt → Growth	**0.0016**
	(Growth – NonSt)	0.4251
(8)		
NonSt vs PEE	NonSt → PEE	**0.0000**
	PEE → NonSt	**0.0014**
(9)		
NonSt vs NERI	(NonSt – NERI)	0.2615
	NERI → NonSt	**0.0000**

Regarding regression (1), both the lagged NERI – and PEE coefficients are significantly positively affecting each other. The most interesting aspect to observe from this test is that the lagged independent NERI variable describing the evolution in PEE is more significant than the lagged PEE-variable describing NERI. This could be spotted when comparing p-values for both regressions. A smaller p-value implies greater significance, and in turn a greater intention to deny the null hypothesis; $\theta_2=0$, $\beta_2=0$.

Regression (2) shows the relationship between GDP growth per capita and the NERI index. In this test, the NERI index does homogenously cause per capita GDP-growth, but the other causality direction does not show any significance. This means that NERI has a great impact on the evolution of growth.

Per capita GDP growth does not significantly affect the NERI index. This could be perceived as rather unexpected when looking at previous research. According to Wilson (2016) economic growth affect government quality, but the latter does not significantly affect economic growth. This could potentially indicate on that the components describing market mechanisms within the NERI index have a greater impact on economic growth than the institutional parts. On the other hand, NERI measures the ability to adapt to contemporary market conditions, why there exist intentions to believe that variations in this coefficient should affect regional growth substantially. Further, the PEE index has a more significant effect on Growth than the other way around, according to a lower p-value. When evaluating regression (2) and (3), we can therefore conclude that variations of growth numbers to a greater extent can be explained by fluctuations in NERI - and PEE indices, rather than the other way around.

Regression (3) reveals the relationship between GDP growth per capita and the PEE index. In this test, there is a double directed causality where per capita GDP-growth significantly causes share of private employment, and vice versa. The coefficients are significant at the 5% level, where PEE seems to have a slightly greater impact on growth, since this direction indicate on a lower p-value.

An interesting aspect worth taking into consideration when evaluating the Granger-causality tests is that the NERI index has a significant impact on both private enterprise employment and GDP-growth. This implies that the total level of marketization describes the conditions of a

successful regional development to a great extent. Furthermore, the results indicate that an increased share of private enterprise employment contributes to regional growth. However, a functioning institutional system must be in place to take charge of advantages available when having a great share of private enterprises. Still, there are more components necessary than just institutions in order to create sustainable economic development. This is supported by the thoughts of Nee & Opper (2012), who emphasize that the emerging private sector, hence a developing economy, does not only lie in a functioning political system.

The fourth Granger-causality test evaluates the relationship between the index describing Government-Market relations (Gov) and per capita GDP-growth. The causalities show that both institutional variations and growth affect each other and the relationships are highly significant. These results are partly in line with Wilson's (2016) findings about economic growth driving government quality. However, unlike the outcome of Wilsons examination, this paper suggests that the relationship is mutual, i.e. a higher level of Government-Market relations significantly affects per capita GDP-growth.

Regression (5) describes the relationship between the Government-Market relations index and the share of private enterprise employment. In this test, Government-Market relations does not homogeneously cause PEE on the 5% level. On the other hand, PEE significantly causes Government-Market relations. However, the first relationship indicates on a significance on the 10% level.

Watching the test describing the relationship between Government-Market relations and share of private employment (PEE), there is a clear dominant direction in which private enterprise employment drives the evolution of Government-Market relations. Historically the Chinese government has been authoritarian, which should imply that the reigning part does not sufficiently compromise for market desires. According to this investigation though, this hypothesis can be rejected, since the results indicate that the direction in which the state make decisions is affected by the share of private enterprise employment. This indicates on that the government takes market activities into consideration in its operation. Hence, private enterprises have a great impact on institutional changes.

The sixth regression shows causalities between Government-Market relations and the NERI index. There is an apparent causality significance in one direction, namely NERI

homogeneously causes Government-Market relations. There is further no significant proof that the latter causes NERI variations.

Test 7 reveals the relationship between the Non-state enterprise sector and per capita GDP-growth. Also in this case there is a one-way causality direction indicating that the Non-state enterprise sector homogeneously causes growth.

Regression 8 links the Non-state enterprise sector to share of private enterprise employment. This test indicates on a double-sided causality, where both variables significantly are affecting each other.

The last regression describes the relationship between the Non-state enterprise sector and the NERI index. Even in this case, the NERI index appears as a strong explanatory variable, since it causes fluctuations in the Non-state enterprise sector. The opposite relationship however, does not show any significance. This indicates that output numbers in the Non-state enterprise sector are not an equally strong determinant on level of marketization as employment is in the same sector.

When comparing regression (1) and (6) one can distinguish an interesting aspect, namely that share of private enterprise employment drives level of marketization, Government-Market relations do not. In other words, this means that the private sector has a greater impact on the market adaption capacity in each region, than what government interventions have. Due to the clear importance of NERI regarding development, this could partially conclude that private enterprises drive developmental progress to the greatest extent within Chinese regions.

The indices explaining institutional activity (Gov) and the Non-state enterprise sector are both driving growth. According to the Granger-causality tests, both are strongly significant. In order to evaluate whether government involvement or market mechanisms are driving regional development in China, an appropriate measurer would be to compare these field indices, since they cover these areas somewhat sufficiently. When returning to Table 4 there exist a clear pattern telling us that the Non-state enterprise sector has grown considerably in importance for the overall level of marketization during the period of examination. The government's influence has also increased, but not as extensive as the Non-state sector. Out of this one should be able to conclude that the government initially had greater impact on economic growth and

development, but that the Non-state enterprise sector overtook the leading role in the end of the 00s. On the other hand, neither government involvement or the Non-state enterprise sector have significant impacts on the overall NERI index. This implies that there are a several more components determining level of marketization.

In summary, the results state that the NERI index significantly impacts its counterparts in all tests, indicating on a solid contributor to overall development. This is further confirmed by Gang et al. (2012), who emphasized the weight of market oriented political decisions and whose results showed the connection between the NERI and economic growth to be significant. We can therefore conclude that the NERI index, hence level of marketization, is an important component for regional development.

The private enterprise employment (PEE) index reveals the conditional differences regarding share of private employment between regions during the years of examination. Evidently there are greater differences when comparing the top two regions 2010 than 1998 (Appendix 4A-B). The index also reveals which regions that have made the biggest employment structure transformation in the comparative perspective. Beijing can be mentioned as the one region transitioned the most. Potentially, this depends on the great share of the state-owned sector in Beijing during the 90s, which has steadily decreased over the years in favour of private enterprises. The capital of China has gone through a major structural transformation, generating increasing PEE index numbers. Further, there is a clear relationship between the NERI index and the private enterprise employment index, where higher NERI indices tend to imply higher PEE index. The relationship is also more obvious in 2009 than in 1997.

In order to analyse eventual differences occurring during the period of investigation (1997-2009), a division has been between the years until 2003 and those after. Unfortunately, the Dumitrescu-Hurlin test is not possible to practice when dividing the data since there are too few observations. However, the Stacked Granger-causality test is adoptable to causality tests with limited observations. This test is not equally efficient in this examination though, since it does not take the panel data structure into consideration, but assumes that all coefficients are same across cross-sections. Hence, this test is a simplification of the reality. On the other hand, it provides sufficient information about causality differences between time-periods. These tests are demonstrated in Table 6 where the p-values for both periods are revealed in each regression.

The p-values in bold style illustrates the significant numbers and the indicates are present when at least one of the periods show significant effect.

Table 6
Stacked Pairwise Granger-Causality Tests 1997-2003 and 2004-2009

			Number of lags = 1
		p-value	
Regression	Relationship	97'-03'	04'-09'
(10)			
NERI vs PEE	NERI → PEE	**0.0277**	**0.0097**
	(PEE – NERI)	0.0779	0.8532
(11)			
NERI vs Growth	NERI → Growth	**0.0113**	**0.0032**
	(Growth – NERI)	0.9714	0.5525
(12)			
PEE vs Growth	PEE → Growth	**0.0484**	**0.0007**
	(Growth – PEE)	0.0608	0.1201
(13)			
Gov vs Growth	(Gov – Growth)	0.8601	0.1669
	(Growth – Gov)	0.9575	0.9832
(14)			
Gov vs PEE	(Gov – PEE)	0.3851	0.1571
	(PEE – Gov)	0.4487	0.6016
(15)			
Gov vs NERI	Gov → NERI	**0.0090**	**0.0023**
	NERI → Gov	**0.0000**	0.8774
(16)			
NonSt vs Growth	NonSt → Growth	**0.0356**	0.0622
	(Growth – NonSt)	0.7382	0.7629
(17)			
NonSt vs PEE	NonSt → PEE	0.0895	**0.0067**
	(PEE – NonSt)	0.2679	0.3039
(18)			
NonSt vs NERI	(NonSt – NERI)	0.1208	0.2067
	NERI → NonSt	**0.0018**	0.1917

The causalities are rather similar when comparing the first period 1997-2003 to the second period 2004-2009. However, there is a big difference regarding one important aspect, namely the Government-Market relations compared against the NERI index (Regression 15). In the first period there is a mutual causality as government interventions seem to affect the evolution of NERI, and vice versa. In the second period, the government seems to affect the NERI index, but not the other way around. This indicates on that the government constantly has had an important impact on the level of marketization and that the structural government modification executed in the middle of 00s turned out to fulfil its purpose.

Furthermore, the NERI index seems to have been more driving in the first period compared to the second period, since it significantly affects its counterparts in all regressions in the first period, but not in the second. This could be explained by the gradual opening up of China, that the level of marketization to a greater extent decided direction of development in the earlier phase than in the latter, when more market driven factors easier got into the society and overtook greater share of the responsibility to drive development.

The Stacked Causality tests also reveal that the levels of significance in general are smaller than when testing the whole sample as in Table 5. This could partly depend on the limited numbers of observations in our second causality test. Further, the tests are different regarding the fundamental assumption that the Stacked test does not take the panel data structure into consideration, but assumes that all coefficients are same across cross-sections, why some causalities differ substantially.

The pattern apparent in this investigation where both share of private employment and NERI index are increasing in general seems to underline that an increasing marketization level befriends the operation of entrepreneurs and private enterprises, and vice versa. Shanghai, Beijing and Jiangsu are obviously the regions with both highest share of private enterprise employees, as well as greatest real increase in these numbers during the period of investigation. These regions also show comparatively high NERI indices, concluding that the relative level of marketization is high. Hence, the NERI index seems to detect advantages for entrepreneurs and the operation of private enterprises. On the other hand, if this would have been a consistent framework, e.g. Guangdong should have shown higher share of private enterprise employees when taking its 2009 NERI index into consideration.

The phenomena of cross-regional market integration within China is a sign of some degree of marketization. One could argue that this should lead to convergence when evaluating China overall. Simultaneously, the interest of enterprises entering other markets is mainly to achieve profitability in the long run, why these tend to end up in wealthier regions with a functioning market and greater probabilities to generate positive return on invested capital. In turn, this should lead to further deterioration regarding disparities across regions.

Based on the share of private employment in relation to marketization level, one could argue that market mechanisms, rather than institutions, drive economic development. On the other hand, the development of the private sector would never have been possible without a changing government attitude towards entrepreneurship. The government has due to a greater understanding of necessary components for a functioning market structure, gradually implemented institutional modifications in order to benefit private operations. The government still has a strong impact and as argued by Nee & Opper (2012), the destiny of Chinese firms lies in the hands of the state.

The fact that the Government-Market relations, including institutional operations, showed higher index than that of the Non-state enterprise sector in 1997 indicates that the government had greater influence on level of marketization at that point of time (Table 3). The gradual transformation apparent when following the development until 2009 seems to underline that the Non-state enterprise sector has caught a greater share of total impact of marketization. This could partly be explained by the institutional changes aiming to facilitate entrepreneurship and private enterprise operations. Another explanation is backed up by Taylor (2002), who argued that the SOE reform in 1997 was extremely important in the long-run transformation, where a large number of the state-owned enterprises were converted into private enterprises. Further, these institutional changes have led to a less restricted market, allowing market mechanisms to lead the way towards development success. Hence it is difficult to completely determine whether political agenda or market mechanisms are the main core for regional development. Probably, market mechanisms have a substantially greater impact today than in the initial phase of market transformation. However, the question whether there exists a break in the middle of the examined period where the private sector got more important for regional development, could not fully be concluded. This implies that Chinese economic development has had rather similar determinants over the period 1997-2009.

When looking at the share of employees in state-owned enterprises, there is a clear pattern of substantially falling numbers over the period of examination (Appendix 1A-B). This somewhat underlines the changing attitude to state-owned enterprises and their contribution to welfare, which partly explains a decreasing need for controlling general society operations in favour of market mechanisms.

Another apparent characteristic of the overall Chinese political agenda is the gradual phase out of the traditional Maoist communist approach. All reforms after 1992 have either through decentralization or invitations to the outside world generated a more market oriented Chinese style. In the long run this means that market mechanisms have taken up a steadily growing share of the range guiding domestic development.

A problem with using the NERI index as measurer of marketization is that one could not certainly believe that the included components corresponds accurately to the purpose of this investigation. Further, it is a domestic conditional measurer, taking only Chinese regions into consideration, why it is not an effective measurement tool when comparing in an international perspective. For instance, the high index number shown by Shanghai does not give an unbiased answer about the level of marketization in comparison to well developed cities worldwide. However, for the certain purpose of this examination, where domestic regional development is investigated, the index fulfils its task.

Regional data gathered from China Data Online tend to show somewhat miscalculated numbers. There exists a bias of regions overestimating e.g. their growth numbers to appear in a more positive manner. However, although the data are not accurately correct, one can assume that the relative differences between regions are quite precise and truthful.

6. Conclusion

According to the Dumitrescu-Hurlin Granger-causality tests the NERI index has a strong effect on Chinese regional development. This can be deciphered through the tests, where the NERI index has a significantly positive effect on all parts of society development. The share of private employment as well as government interventions also seem to affect development in most cases. Yet, in contrast to the two latter, the NERI index is not significantly affected by growth fluctuations, why level of marketization could be perceived as a cornerstone in Chinese development. Both the private sector and the state seem to pay a greater attention to market fluctuations. However, private employment has a significant effect on the NERI index, why there exist sufficient evidences to conclude that the expansion of private enterprises is driving marketization to a greater extent than the state, hence controlling the direction of regional development. Hence, we can accept the hypothesis stating that the private sector has a greater positive impact on development than the state sector has. However, the second hypothesis assuming that there is a structural break around 2004 is rejected since it cannot be supported by this investigation.

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APPENDIX
1A

Share of employees in state-owned enterprises (including collectively owned), 1992

Region	TOTAL NUMBER OF EMPLOYEES	STATE-OWNED UNITS	SHARE OF STATE-OWNED UNITS
Beijing	649.30	461.98	71.15%
Shanghai	806.91	494.46	61.28%
Heilongjiang	1483.40	875.50	59.02%
Tianjin	485.70	285.12	58.70%
Liaoning	1957.80	1020.70	52.14%
Xinjiang	646.94	317.31	49.05%
Jilin	1235.02	537.10	43.49%
Inner Mongolia	976.00	391.70	40.13%
Shanxi	1363.78	459.56	33.70%
Hainan	322.49	108.58	33.67%
Ningxia	225.85	71.41	31.62%
Qinghai	216.21	67.68	31.30%
Hubei	2524.39	727.37	28.81%
Jiangsu	3613.90	876.50	24.25%
Shaanxi	1671.50	393.00	23.51%
Guangdong	3367.21	776.28	23.05%
Hebei	3106.28	682.50	21.97%
Jiangxi	1870.40	406.40	21.73%
Fujian	1489.61	300.71	20.19%
Shandong	4302.60	828.20	19.25%
Gansu	1305.90	250.90	19.21%
Zhejiang	2600.38	479.58	18.44%
Chongqing	1662.58	295.35	17.76%
Hunan	3278.83	578.31	17.64%
Henan	4332.00	743.00	17.15%
Anhui	2985.80	505.52	16.93%
Yunnan	2032.50	307.45	15.13%
Tibet	110.92	16.69	15.05%
Sichuan	4539.83	681.75	15.02%
Guangxi	2217.00	330.00	14.88%
Guizhou	1739.03	234.55	13.49%
Total	59120.06	14505.16	24.54%

(China data online – provincial data 1992, numbers in 10 000 persons)

1B

Share of employees in state-owned enterprises (including collectively owned), 2010

Region	TOTAL NUMBER OF EMPLOYEES	STATE-OWNED UNITS	SHARE OF STATE-OWNED UNITS
Xinjiang	852.60	181.40	21.28%
Heilongjiang	1743.40	310.41	17.80%
Shanxi	1665.10	254.69	15.30%
Tianjin	520.80	78.40	15.05%
Beijing	1317.70	196.17	14.89%
Inner Mongolia	1184.70	175.28	14.80%
Jilin	1248.70	174.61	13.98%
Shanghai	924.70	129.27	13.98%
Liaoning	2238.10	301.13	13.45%
Shaanxi	1952.00	253.35	12.98%
Qinghai	294.10	37.56	12.77%
Hainan	445.70	55.23	12.39%
Tibet	175.00	19.13	10.93%
Ningxia	326.00	34.65	10.63%
Gansu	1431.90	149.22	10.42%
Hubei	3116.50	280.40	9,00%
Hebei	3790.20	336.90	8.89%
Jiangxi	2306.10	200.32	8.69%
Shandong	5654.70	477.05	8.44%
Guangdong	5776.90	444.50	7.69%
Fujian	2181.30	161.12	7.39%
Henan	6041.60	425.46	7.04%
Hunan	4007.70	281.14	7.01%
Sichuan	4997.60	349.72	7,00%
Guangxi	2945.30	201.10	6.83%
Yunnan	2814.10	191.09	6.79%
Chongqing	1912.10	129.02	6.75%
Guizhou	2402.20	153.22	6.38%
Jiangsu	4731.70	291.30	6.16%
Zhejiang	3989.20	224.07	5.62%
Anhui	3846.80	206.17	5.36%
Total	**76834.5**	**6703.08**	**8.72%**

(China data online – provincial data 2010, numbers in 10 000 persons)

Change in total market NERI index between 1997 and 2009

Region	Index 1997	Index 2009	Change
Anhui	4.42	7.88	3.46
Beijing	5.15	9.87	4.72
Chongqing	4.28	8.14	3.86
Fujian	5.43	9.02	3.59
Gansu	3.01	4.98	1.97
Guangdong	6.29	10.42	4.13
Guangxi	4.22	6.17	1.95
Guizhou	2.89	5.56	2.67
Hainan	4.60	6.40	1.80
Hebei	4.98	7.27	2.29
Heilongjiang	2.73	6.11	3.38
Henan	4.82	8.04	3.22
Hubei	4.24	7.65	3.41
Hunan	4.73	7.39	2.66
Inner Mongolia	2.55	6.27	3.72
Jiangsu	5.25	11.54	6.29
Jiangxi	3.93	7.65	3.72
Jilin	3.51	7.09	3.58
Liaoning	4.58	8.76	4.18
Ningxia	1.69	5.94	4.25
Qinghai	1.29	3.25	1.96
Shaanxi	3.03	5.65	2.62
Shandong	4.80	8.93	4.13
Shanghai	5.00	10.96	5.96
Shanxi	3.34	6.11	2.77
Sichuan	4.24	7.56	3.32
Tianjin	4.53	9.43	4.9
Tibet		0.38	0.38
Xinjiang	1.77	5.12	3.35
Yunnan	2.70	6.06	3.36
Zhejiang	6.17	11.8	5.63
Average			**3.46**

(The NERI index, 2009)

3

Share of private – and self employment between 1998 and 2010

Region	Share 1998	Share 2010	Change (pp)
Hebei	23.88%	14.31%	-9.57%
Hubei	20.76%	20.28%	-0.48%
Jilin	19.36%	24.76%	5.40%
Heilongjiang	19.34%	22.59%	3.26%
Shanghai	17.42%	66.64%	49.22%
Shandong	16.81%	20.96%	4.15%
Liaoning	16.78%	32.05%	15.27%
Zhejiang	15.87%	33.57%	17.70%
Inner Mongolia	15,00%	21.85%	6.85%
Tianjin	14.89%	27,00%	12.10%
Hunan	14.85%	14.03%	-0.82%
Guangdong	12.61%	26.67%	14.06%
Shaanxi	11.69%	17.33%	5.64%
Jiangsu	11.43%	42.36%	30.93%
Hainan	11.41%	20.51%	9.10%
Xinjiang	10.60%	20.48%	9.88%
Jiangxi	10.56%	23.20%	12.64%
Shanxi	10.48%	17.44%	6.96%
Anhui	10.48%	14.84%	4.36%
Chongqing	10.09%	17.14%	7.05%
Fujian	9.90%	22.23%	12.33%
Gansu	9.19%	12.40%	3.21%
Ningxia	8.67%	24.85%	16.18%
Henan	8.55%	11.59%	3.04%
Qinghai	7.34%	20.54%	13.20%
Beijing	6.94%	39.92%	32.98%
Guangxi	6.83%	14.01%	7.17%
Yunnan	6.79%	15.69%	8.90%
Sichuan	6.45%	15.31%	8.86%
Tibet	4.90%	21.03%	16.13%
Guizhou	4.34%	7.01%	2.67%
TOTAL	11.08%	21.38%	10.30%

(China data online)

4A

Private enterprise employment index 1998 (from highest to lowest)

Region	PEE index 1998	Region	NERI 1997
Hebei	6.96	Guangdong	6.29
Hubei	5.85	Zhejiang	6.17
Jilin	5.36	Fujian	5.43
Heilongjiang	5.35	Jiangsu	5.25
Shanghai	4.68	Beijing	5.15
Shandong	4.46	Shanghai	5.00
Liaoning	4.45	Hebei	4.98
Zhejiang	4.13	Henan	4.82
Inner Mongolia	3.82	Shandong	4.80
Tianjin	3.79	Hunan	4.73
Hunan	3.77	Hainan	4.6
Guangdong	2.98	Liaoning	4.58
Shaanxi	2.65	Tianjin	4.53
Jiangsu	2.56	Anhui	4.42
Hainan	2.56	Chongqing	4.28
Xinjiang	2.27	Hubei	4.24
Jiangxi	2.26	Sichuan	4.24
Anhui	2.23	Guangxi	4.22
Shanxi	2.23	Jiangxi	3.93
Chongqing	2.09	Jilin	3.51
Fujian	2.02	Shanxi	3.34
Gansu	1.77	Shaanxi	3.03
Ningxia	1.59	Gansu	3.01
Henan	1.55	Guizhou	2.89
Qinghai	1.12	Heilongjiang	2.73
Beijing	0.98	Yunnan	2.70
Guangxi	0.94	Inner Mongolia	2.55
Yunnan	0.93	Xinjiang	1.77
Sichuan	0.81	Ningxia	1.69
Tibet	0.26	Qinghai	1.29
Guizhou	0.06	Tibet	-

(China data online)

4B

Private enterprise employment index 2010 (from highest to lowest)

Region	PEE index 2010	Region	NERI 2009
Shanghai	22.04	Zhejiang	11.80
Jiangsu	13.48	Jiangsu	11.54
Beijing	12.61	Shanghai	10.96
Zhejiang	10.37	Guangdong	10.42
Liaoning	9.84	Beijing	9.87
Tianjin	8.05	Tianjin	9.43
Guangdong	7.94	Fujian	9.02
Ningxia	7.30	Shandong	8.93
Jilin	7.27	Liaoning	8.76
Jiangxi	6.72	Chongqing	8.14
Heilongjiang	6.50	Henan	8.04
Fujian	6.37	Anhui	7.88
Inner Mongolia	6.24	Hubei	7.65
Tibet	5.95	Jiangxi	7.65
Shandong	5.92	Sichuan	7.56
Qinghai	5.78	Hunan	7.39
Hainan	5.76	Hebei	7.27
Xinjiang	5.75	Jilin	7.09
Hubei	5.69	Hainan	6.40
Shanxi	4.68	Inner Mongolia	6.27
Shaanxi	4.64	Guangxi	6.17
Chongqing	4.58	Heilongjiang	6.11
Yunnan	4.07	Shanxi	6.11
Sichuan	3.93	Yunnan	6.06
Anhui	3.76	Ningxia	5.94
Hebei	3.58	Shaanxi	5.65
Hunan	3.48	Guizhou	5.56
Guangxi	3.47	Xinjiang	5.12
Gansu	2.90	Gansu	4.98
Henan	2.62	Qinghai	3.25
Guizhou	1.00	Tibet	0.38

(China data online)

5

$$Y_{t-1} = \alpha_0 + \beta X_t + \varepsilon_t,$$

Y_{t-1} is the NERI index lagged one period and X_t is the private enterprise employment index.

Relationship between level of marketization and private employment

YEAR	β	R^2	INTERCEPT
1998	0.140	0.074	3.437
1999	0.152	0.096	3.590
2000	0.095	0.063	3.763
2001	0.238	0.163	3.541
2002	0.409	0.266	3.392
2003	0.505	0.347	3.647
2004	0.587	0.366	4.118
2005	0.608	0.370	4.405
2006	0.392	0.176	5.145
2007	0.539	0.269	5.186
2008	0.608	0.335	5.412
2009	0.637	0.330	5.542
2010	0.711	0.318	5.469