

2016

The Chinese Hukou System: Structural Change and Political Reform

Benjamin N. Glasner

Follow this and additional works at: http://digitalwindow.vassar.edu/senior_capstone

Recommended Citation

Glasner, Benjamin N., "The Chinese Hukou System: Structural Change and Political Reform" (2016). *Senior Capstone Projects*. 620.
http://digitalwindow.vassar.edu/senior_capstone/620

This Open Access is brought to you for free and open access by Digital Window @ Vassar. It has been accepted for inclusion in Senior Capstone Projects by an authorized administrator of Digital Window @ Vassar. For more information, please contact library_thesis@vassar.edu.

The Chinese Hukou System: Structural Change and Political Reform

By BENJAMIN N. GLASNER*

The Chinese household registration system, or hukou system, has been a staple of the Chinese economy since its introduction. Since the post-Mao period it has undergone significant reform, both directly and indirectly. At the same time, China has seen a remarkable period of growth, which included important structural change. A majority of this structural change occurred through the urbanization of China's large agricultural labor force. We examine the relationship between political reforms associated with the hukou system and structural change, demonstrating that it has a significant positive correlation. Keywords: Structural Change, China, Hukou, Political Reform

The hukou system in China has operated as a means of restricting the rural agricultural labor force from migrating into urbanized areas since its introduction in Maoist policy. This has served both political and economic purposes, and currently is utilized to limit the benefits regional cities are required to offer to large portions of their labor force. This restriction on benefits is described as a preventative measure for mass urbanization. The rapid expansion of industry in urban areas as well as the shifting relative productivities of sectors has attracted numerous laborers who are willing to work even without benefits, and so the floating population of China has formed. This has allowed China to utilize its mass reserves of low skill and cheap labor to grow rapidly, even with the institutional restriction of internal migration.

The dramatic rise in productivity amongst urban sectors has also created an incentive for positive labor based structural change from the rural agriculture sector into urban employment, specifically manufacturing and services. This structural change offers an avenue for stable natural development as labor moves into more productive industries, better utilizing the capital available in China. Even so, the hukou system continues to limit the movement from rural to urban spaces, creating artificial restrictions to otherwise positive structural change. This poses problems for both the urban and rural economy as China moves forward.

Reform of the hukou system would encourage a surge in available labor, and allow many to leave lower paying rural agriculture work, reducing inequality, while aiding the modernization of the Chinese economy. This is to say, reform may aid in a rebalancing of the Chinese economy. We will demonstrate that previous

* Glasner: Vassar College, 7490 County Road 153, Ovid, New York 14521, beglasner@vassar.edu. I would like to acknowledge Ergys Islamaj, Sarah Pearlman, Matt Gabriele, and Yujie Feng for their valued feedback and criticism of early drafts of this paper.

reductions in hukou restrictions have correlated with positive structural change, and as a result the development and transition of the Chinese economy as a whole.

This is a point we feel is necessary to highlight given the numerous challenges facing China. Though some reform has been enacted recently, it has simply allowed large first tier cities, such as Beijing, Shanghai and Guangzhou, to set restrictions of their own. Beyond the explicit regulation of internal migration, numerous state owned enterprises (SOEs), which have been a player in the study of structural change, in China are debt laden and require reform, as highlighted by Xi Jinping, the current President of the People Republic of China. The reform that has been introduced is minimal in comparison to the issue at hand, yet change could be detrimental to millions in the form of job loss. When combining these internal policy problems with the issue of developmental shifts facing China as a result of their rapid growth, namely the uncertainty of devaluation, these problems are amplified. All of this demonstrates the need for further study into the process of political reform and structural change in China.

I. Description of Urban and Rural Dynamics in China

The hukou system is translated to the “household registration system” and can refer to any of three qualities, ones hukou booklets, ones hukou records, or the hukou system as a whole. We will examine all three throughout this paper under the term “hukou system” in line with most English literature.

The Chinese Communist Party first enacted the hukou system in 1958 with the intent of restricting the movement of people between rural and urban areas. This system was borrowed from a series of historical practices in China, specifically the Baojia system¹ in 11th century China (Young 2013). In the Communist adaptation, people are categorized as either “rural” or “urban”, and for one to move between categories they must seek approval from the relevant bureaucratic institution. This process has been tightly regulated as China wished to ensure structural stability. Though the system allowed officials to enjoy political control over social mobility, it held the added benefit of preventing an immediate flood of urbanization, which could have overwhelmed the communist command structure.

In the post-Mao era, the hukou system has seen incremental reform, which has loosened the grip once held on migration. We will examine a series of political reforms, which have had an influence on the political control over internal migration. In 1978 we saw the first of these reforms occur as collectivization of agriculture began to be loosened, ending in production being privatized while

¹Instituted by Lord Shang Yang, a Chinese statesman of the State of Qin during the Warring States, the system was used to group families together for the purposes of collective responsibility. These responsibilities included taxation and collective punishment for crimes committed by members. One of the results of this system was a punishment associated with migrating illegally, and abandoning one's registered *bao*, or family group.

ownership of the land was not.² This is the first stage of reform highlighted, as it revealed the excess rural labor that existed in China. When this happened, rural labor gained the ability to migrate more effectively and to work two lives. Often times migrants would work in urban sectors while retaining their land use rights, creating a population of laborers neither urban nor rural, thus creating the floating population in China.

One should take note that at the start of these reforms China was one of the worlds largest buyers of grain. This was a result of the rapid population growth, which combated the increases in agricultural production (Barnett 1981). With this understanding, Deng Xiaoping, termed the paramount leader of China from 1978 to 1989, saw an opportunity for change after Maos death to begin the process of amending Chinas agricultural sector. He described in “Emancipate the Mind, Seek Truth from Facts and Unite as One in Looking to the Future” a plan to enact reforms throughout the economy.

Deng was aware that this process would pose some issues throughout the bureaucratic power structure in China, but managed to produce change after building powerful allies amongst the modernizing economy. Deng befriended the once ostracized factions of the intellectual elite and industrial capitalist groups who found little joy in Maoist policies. Given the underperformance of collectivization, the modernization process was met with little resistance when the enforcement of de-collectivization began. Combining this with savvy language and propaganda, rural reform became the ideal springboard for a modernizing economy.

The benefits seen as a result were immense. Justin Lin, former chief economist of the World Bank, finds that from 1978-1984 output grew in the cropping sector by 42.2 percent. Of this growth, 43.6 percent was attributed to reforms. He goes on to state that “among the productivity growth, 94 percent can be attributed to the change in farming institutions from the production team system to the household responsibility system” (Lin 1989). This near immediate adoption and success of the responsibility system paved the way for further reforms throughout China’s economy. The results meant greater power for management, technicians, and intellectuals, easing the way for future reforms.

The second wave we highlight occurred in 1984. This was the period when China began to restructure SOEs. The bureaucratic elite decided to allow SOEs to act more autonomously, setting prices, determining marketing and personnel, and just generally functioning as profit maximizing institutions. This reform also shifted planning away from mandates and to advice. Though this was motivated by the need to upgrade the inadequate industrial infrastructure, it ended up creating an environment that could support migrants. These profit maximizing SOEs created a labor market of sorts, and this allowed migrants the ability to survive in cities even without explicit working documentation as SOEs gained the ability

²This process was not immediate, occurring throughout the late 70s and early 80s, but for the purposes of our analysis, we will view the start date as 1978 (Xu 2013).

to hire a workforce independent of the primary bureaucracy (Solinger 1999).³

The further reform period began and persisted throughout the 1990s. Beginning in 1992 numerous cities offered blue-stamps to migrants who met the individual locations requirements; these were titled locally-valid hukou. This allowed numerous individuals to purchase their way into a portion of the urban sphere. The number of these blue-stamps made available, and the qualifications necessary to attain them, was a decision left to local governments as China continued the campaign toward local need and expertise.⁴

The final point of reform that will be highlighted in this paper is the repealing of the Custody and Repatriation (CR) system, established in 1982 and ended in 2003. This system was a means by which the authorities in China could detain citizens without proper hukou certification and deliver them to their officially registered location. This was a means of deporting rural workers out of urban spaces. This system was abandoned after the death of a migrant worker, Sun Zhi-gang, and the following public outcry. Sun died from physical abuse while being arrested under the CR system. We will find that this reform correlates with a different type of impact on structural change than the others, when broken down by industry.

As an update on recent reform in China, in December of 2015 a new wave was announced. The initial change promises to grant 13 million unregistered citizens some form of registration status. They later released an official statement in January reaffirming the need to address this issue. Some feel that these reforms in general are aimed at reducing the strain placed on large first tier cities (Martines 2016). If this is the intent, one may expect to find second tier and medium sized cities playing a greater role in Chinese development in the years to come.

II. Literature Review

This paper explores the Chinese political and economic situation both past and present. As a result, the literature utilized extends across a range of methodologies, and a number of fields. Firstly, an understanding of the hukou system is necessary; as this will be the political and economic lens we address this paper through. Once the hukou system is understood, an economic study on the theory of structural change can be addressed, giving us insight into the process of Chinese development.

Numerous authors have discussed the historical process of the hukou systems evolution, and we shall highlight a few. Jason Young outlines in his book "China's

³This proves vital to the support of the floating population in China. As the trend of autonomy develops we see greater opportunity for an illegal migrant population to survive and grow. Given the trend of migrants to work in urban sectors, this pairs with structural change.

⁴It is important to note though that the individuals who do go through this system are not recognized as having migrated via the centralized hukou system. It was simply a means of legalizing the already active migration occurring throughout China, without having to commit to central financial obligations.

Hukou System: Markets, Migrants and Institutional Change” both the historical development of the system, how it has gone about reforms, and the social impacts as a result. Throughout the book Young discusses the hukou system on both the regional and national level. This allows him to provide a strong case study analysis within the context of economic reforms.

Others produce studies more focused on the individual migrants experience under the context of the hukou system. Li Shi, Professor in the School of Economics and Business, Beijing Normal University, examines the working conditions of rural migrants and highlights the rise in migrant workers over time (Li 2008). The demanding working conditions stemming from low wages, a lack of written contracts, the difficulty of acquiring social services, and numerous other factors have all contributed to the attention many have paid to the system. Shi notes that reforms have occurred, and have improved the situation, but predicts that it will remain a major challenge in the years to come.

As the economy has grown, we have also seen little change in the political rights of citizens, even with substantial economic reform. Windrow and Guha examine critically the interplay between the economic and political spheres in China, specifically how unauthorized migration has damaged the effective projection of political power (Windrow and Guha 2005). In this way, they explore how migrants have been affected and are affecting the evolution of reform on both the central and regional levels of government. This is crucial as the year-to-year process of reform in China has not been independent of the migrant experience. To examine solely the economic aspects, and through a static model, would offer a flawed view of the subject while doing a disservice to the migrant experience.

At the same time, this paper cannot capture a comprehensive picture of both the macroeconomic influences of the hukou system on structural change and give in depth analysis of the day-to-day experiences of migrant workers. It is for this reason that much of the literature on the subject must remove the stories of the individual in their historical analysis. Chan and Zhang outline the role of the hukou system in administrating migration (Chan and Zhang 1999). They review the changes, which have occurred in hukou policies since 1978, and the impacts of these changes. In addition to recounting the reforms, they illustrate the major issues as well as exploring prospective reforms for the future.

An understanding of what structural change is, and its relevance to development, will prove to be beneficial when examining these characteristics of the hukou system moving forward. The concept of structural change has been discussed greatly,⁵ and has focused primarily on descriptive processes of structural change, noting that the means of production shift from agricultural, and generally primary sectors, toward secondary and tertiary sectors. It was Rostow (1960) who outlined a series of stages in which development occurs. He highlighted that

⁵Fisher (1939), Rostow (1960), and Kuznets (1966) are all examples of foundational literature. Each has held a respectable influence on the way that we view structural change in a broad context, but hold limited relevance to modern findings.

societies transition from traditional structures into a take off stage, ultimately ending in mature consumption based economies. This mode of thought has held a lasting impact on the field and in social perspective.

Though this literature has resonated well, the field of economics has shifted away from descriptive methods, and more rigorous analysis has begun to take form. A great deal of literature has continued to reinforce the benefit that structural change can offer. McMillan, Rodrik, and Verduzco-Gallo highlight the benefits, which could be realized if effective full structural change were to occur throughout the developing world (McMillan 2014). They define effective structural change as movement of resources out of low productivity industries and into higher ones. Though a simple concept, it creates a powerful tool to study trends in the structural make up of an economy. In addition to this general confirmation, they highlight that since 1990 structural change has actually reduced growth in Latin America. In fact, they demonstrate that structural change is a significantly more fluid process than the stages outlined by Rostow. The process of negative structural change occurring is a feature, which can be confirmed in this study as well. The dynamic methodology utilized by McMillan, Rodrik, and Verduzco-Gallo will be borrowed from in many ways further in this paper when discussing and developing our measure of structural change.

Rigorous analysis has revealed a number of insights into the process of structural change. Other models have shown that structural change is not as clear as once suspected. Carmignani and Mandeville highlight that structural change in Africa has taken place with limited industrialization (Carmignani 2014). They have found that economies have specialized over the course of their full development, leap frogging industrialization, and shifting into the service sector. This model is not the only one to identify abnormalities. In fact Justin Lin demonstrated that manufacturing in African economies held a smaller share of the labor force in 2005 than it did in 1965. Clearly, the stages outlined by Rostow are less than certain (Lin 2010).

As a result of these and other findings, new general theories on structural change have been necessary. Take for example Justin Lin's "New Structural Economics", where he outlines a framework to explore sustainable growth strategies. He argues that as an economy develops, the factor endowments change, thereby changing the ideal industrial structure of the economy. This requires a fluid framework of factors so that a society can evolve with the economy. He notes that economic development operates along a continuum, a step further than Rostow, with the agrarian economy on one end, and high income industrialized economies on the other. This supplies a partial explanation for how a number of the strange or unexpected results in this literature have occurred when compared with classical theory, as it allows for more fluid transitions along the spectrum in both directions, as observed.

Given the great deal of literature, which revolves around China's remarkable growth over the previous 40 years, structural change, and the hukou system, a fo-

cused reading is clearly necessary. In addition to those works outlined, numerous other sources offer insight into these complicated issues, but one conclusion can be seen linking these papers, the hukou system has been a crucial part in creating the circumstances regarding China's development. Its continued investigation is very much necessary to ensure a balancing of the Chinese economy moving forward.

III. Methodology and Data

Our method involved the use of graphical analysis and regressions on our combined dataset of the Groningen Growth and Development Center (GGDC) 10 sector model (Timmer and De Vries 2014), the Penn World Tables information (Feenstra, Inklaar and Timmer 2013), The China Industrial Productivity (CIP) Database Round 3.0 (2015) (Wu and Keiko 2015), and the Chinese National Bureau of Statistics (NBS). We utilized our graphical analysis methodology for all countries in the GGDC 10 sector model to better understand how structural change behaved across countries. This was necessary to understand how effective our variable performed, and how China compares to other similar countries. This paper will focus solely on the results in China.

Two pieces of information, which are crucial to our results and the calculation of structural change, are a measure of capital, either labor or industrial capital, and value added in each sector from year to year, which we use to create sector productivity and total productivity. Our data will operate from 1970 to 2010, and our time indicator, t , is yearly, while i will represent a given sector. First we shall outline our methodology for labor based structural change.

$$(1) \quad \text{Total Employment} = E_T = \sum_{i=1}^9 \text{Sector Employment}(E_i)$$

$$(2) \quad \text{Total Value Added}(PPP) = VA_T = \sum_{i=1}^9 \text{Sector Value Added in PPP}(VA_i)$$

$$(3) \quad \text{Sector Productivity} = P_i = \frac{VA_i}{E_i}$$

$$(4) \quad \text{Total Productivity} = P_T = \frac{VA_T}{E_T}$$

Using sector productivity and total productivity we construct the relative pro-

ductivity of each sector. This is needed to identify under and over performing sectors, and begin to identify structural change.

$$(5) \quad \text{Relative Sector Productivity} = y_i = \frac{P_i}{P_T}$$

A method of understanding employment movements is then required to see what sectors are growing and shrinking within the economy. We opted for shares of employment instead of absolute employment, as this can better describe the transformation of the economy over our extended period. We can then create the change in employment share, which allows us to see what sectors are growing relative to others in the economy from year-to-year.

$$(6) \quad \text{Sector Share of Employment} = \theta_{(i,t)} = \frac{E_{(i,t)}}{E_{(T,t)}}$$

$$(7) \quad \text{Change in Sector Share of Employment} = \Delta\theta_{(i,t)} = \theta_{(i,t)} - \theta_{(i,t-1)}$$

Utilizing both the change in sector share of employment and the relative sector productivity we construct a measure of structural change.

$$(8) \quad \text{Structural Change} = \gamma_{i,t} = \log(y_{(i,t-1)}) * (\Delta\theta_{(i,t)})$$

This equation works through the interaction of relative productivity and changing labor shares. For example, the relative productivity of an underproductive sector will be less than one, and the log of such a sector will be negative. Couple this with an increase in employment and we see a negative value for structural change. This means that when labor moves into an underproductive sector, the economy experiences negative structural change. One can work out the other variations of this thought experiment rather simply.

When we apply this equation to our data we find a number of interesting results, which require some explanation. When presenting our findings in graphical form we add each years structural change onto the previous years summation. This is meant to create a clear visual representation, but we regress on a non additive version. We will go into greater depth further on in this paper. Before this though, it is important to note some of the weaknesses of our methodology with regards to defining labor structural change. This method does not completely capture one area, which would be useful to examine, the shift of labor from one underproductive industry to a less underproductive industry. We would see our structural change term result in a negative value even though logically one could

interpret this as a form of weak positive change. One could also view this as a negative change as the labor is not moving into a relatively productive sector. This is up to the reader to decide. The reverse of this problem exists as labor could move from a relatively productive sector into one slightly less so while still positive. We feel this does not compromise the results as a whole, and is simply an artifact of the type of data we utilize, since we cannot track individual employees.

We also see a possible source of difficulty in interpretation within our measure of structural change as productivity is calculated with the use of employment data and the change in this employment share is used again. Take for example a sector that cuts employment while maintaining its value added. This means they cut extraneous costs, and therefore became more productive in our measurements. At the same time, employment has now left the sector as a result of these cuts so we see a negative structural change occurring. We address this problem in two ways, through a structuring of our term and through an examination of the factors at play. We utilize relative sector productivity from the previous year to account for this immediate issue. In addition, this is something that can be caught through a careful examination of the results. Given the intensive analysis of China utilized in our paper, as well as the time lagged relative productivity, this is not seen as a compromising problem, but rather a characteristic that needs to be checked for.

We see a slightly different construction of structural change when we utilize homogenous hours worked (HHW) in conjuncture with the number employed. This method is limited when we compare across industries, as HHW are relative only to a base year, and not to other industries moving forward.

We begin by constructing our total employment and value added in the same way as previously outlined. We first divert from our old method when we build our measure of sector productivity. Here we divide our value added by a modified measure of those employed in a given sector. By dividing the number employed by the HHW we display the advantage that a greater HHW supplies. The greater the HHW, the smaller the denominator, and therefore the larger the sector productivity, all other things held constant.

$$(9) \quad \text{Sector Productivity} = W_i = \frac{VA_i}{\frac{E_i}{HHW_i}}$$

The remainder of the construction is nearly identical to our previous method. The changes this has on our results will be explored in the following section. We need to alter our variables for a final time to explore the impact of changes in capital stock. Traditional theory regarding structural change would argue that relative capital stock should shift from primary sectors toward secondary and tertiary sectors. We seek to explore this in the construction of our structural change relative to capital stock variable. This variable is made in a nearly identical way

to that of our labor share version, with the exception of having our sector productivity defined via capital stock shares. Where C_i is defined as the share of the capital stock a given industry occupies.

$$(10) \quad \text{Sector Productivity} = W_i = \frac{VA_i}{C_i}$$

The construction of our data set utilizes the GGDC databases methodology (Timmer and de Vries, 2007, 2009) as a foundation and explores the data set utilized by McMillian, Rodrik, and Verduzco-Gallo (2014) to include information regarding Chinas sector breakdown. We define nine sectors in total, described as follows:

- AGR - Agriculture, Hunting, Forestry, and Fishing,
- MIN - Mining and Quarrying,
- MAN - Manufacturing,
- PU Public Utilities,
- CON - Construction,
- WRT Wholesale and Retail Trade, Hotels, and Restaurants,
- TRA Transport, Storage, and Communications,
- FIRE Finance, Insurance, Real Estate, and Business Services,
- GOV Community, Social, Personal, and Government Services.

Note that we followed the example of McMillian, Rodrik, and Verduzco-Gallo in that we combined the two sectors Government services and Community, Social, and Personal services into one sector. We did this with reference to GGDC's database as well as with CIPs database. Though the format of data collection has limited our flexibility in regressing and analyzing, we feel that the multifaceted approach employed here lends more strength to our analysis.

When examining our regression results we begin to incorporate the data taken from the NBS. Here we needed to gain information on per capita total income of urban households and per capita net income of rural households both in Yuan. We also required a measure of GDP, taken from the Penn World Tables, and in our case we utilize it in PPP, to better account for Chinas position as a developing country. In addition we define a dummy variable for each political reform, specifically those outlined earlier in the paper. All of these reforms were relevant to the hukou system and those actors working within it, and as such the influence is crucial to gain an understanding of this relationship. These years in question

are 1978, 1984, 1992, and 2003.

We utilize an OLS regression⁶ by defining a number of variables, which are intended to isolate the impact of political reform on structural change. Our metric of GDP is used as a measure of the prosperity level in China. This is intended to account for the unrelated impacts that development can have on the labor market. We incorporate our ratio of urban and rural income to isolate the influence that wage rates have on migration flows. We do this to demonstrate that structural change, as a result of political reform, captures variation that income data cannot do alone. We also include a quadratic term on this ratio. This data ranges from 1981-2010, so it is less complete than other portions of our regression and as such we regressed both with and without it.

Additionally, we include a ratio of urban infant mortality rate to rural infant mortality rate as a measure of the difference in health care quality. This is meant to isolate the influence that health services, and public programs in general have on the decision to migrate. This data is our least complete, covering years 1991-2010, and so we include results both with and without it. Along with this ratio we include a dummy for trade liberalization occurring in 2001. We also include "year" into our regressions as a way of accounting for the general trend over time of economies becoming more liberalized, which could influence both structural change and political reform. Finally we include measures of Chinese industrial enterprises and SOEs. This is meant as another control for the general development of the Chinese economy, as well as China's modernizing institutions.

For the sake of our regression, we view each political reform as having reduced the systems restrictions on internal migration by some arbitrary amount. This reduction then remains constant for the rest of the sample. As a result we construct a series of dummy variables, which define the pre/post reform years. We demonstrate the results of four versions of our regression, which take the following forms:

$$(11) \quad \gamma = \beta_0 + \beta_1 \text{Reform1978} + \beta_2 \text{Reform1984} + \beta_3 \text{Reform1992} + \beta_4 \text{Reform2003} + \beta_5 \text{GDP} + \epsilon$$

$$(12) \quad \gamma = \beta_0 + \beta_1 \text{Reform1984} + \beta_2 \text{Reform1992} + \beta_3 \text{Reform2003} + \beta_4 \text{GDP} + \beta_5 \text{Income Ratio} + \beta_6 \text{Trade Liberalization} + \beta_7 \text{Year} + \epsilon$$

⁶Due to the limitations of our data, we felt that a simplified OLS regression would be most useful. Understanding these limitations, we must reiterate that the results presented are meant to establish a correlation between political reform and structural change. We do not feel our data can allow us to make a causal argument.

$$(13) \quad \gamma = \beta_0 + \beta_1 \text{Reform1992} + \beta_2 \text{Reform2003} + \beta_3 \text{GDP} + \beta_4 \text{Income Ratio} + \\ \beta_5 \text{Trade Liberalization} + \beta_6 \text{Year} + \\ \beta_7 \text{Industrial Enterprises} + \beta_8 \text{SOE} + \epsilon$$

$$(14) \quad \gamma = \beta_0 + \beta_1 \text{Reform1992} + \beta_2 \text{Reform2003} + \beta_3 \text{GDP} + \beta_4 \text{Income Ratio} + \\ \beta_5 \text{Trade Liberalization} + \beta_6 \text{Year} + \beta_7 \text{Industrial Enterprises} + \\ \beta_8 \text{SOEs} + \beta_9 \text{Infant Mortality Ratio} + \epsilon$$

IV. Summary Statistics

Our first finding is a logical confirmation, the primary force of positive structural change in labor has been movement out of agriculture into urban sectors. This is what one would expect from a developing nation, which held over 80 percent of their labor force in agriculture 45 years ago. In fact, when we examine the relative productivity levels of each sector we also see a similar relationship to what one would expect from most developing countries. The relative agricultural productivity is below average and sectors such as manufacturing, wholesale, and utilities are all above.

The periodic nature of its movement is interesting when compared to the trends in productivity. We can see in figure 1 that relative Chinese agricultural productivity remains at a somewhat steady decline, but falls at a greater rate throughout the 90s. This demonstrates to us that the relative value added in relation to workers remains semi-consistent with the rest of Chinas development up until the 90s. Note this is not to say the value added per worker is constant, just that it grows at a rate similar to that of other industries until this point. We see the decline occur in the 90s, and continue to trend down until the end of our data set. A number of other sectors experience similar changes in relative productivity, such as Wholesale and Trade, Government, and Construction, with the final two dipping into negative territories. That is to say, they become below average industries. This coincides with the further reform period, and correlated to the restructuring of SOEs.

This trend does not appear in figure 2, where the share of agricultural employment diminishes then stabilizes and repeats. We would expect that labor would leave consistently as relative productivity falls yet the pattern appears independent of this effect. We use this result as a springboard into the investigation of what is influencing labor movements if not the productivity of sectors. When we examine the general time periods in which these dips occur, they match somewhat well with the years outlined as reform periods. This will be a result further investigated, and confirmed, in our regression. With an understanding of both the movement in employment share as well as the relative productivity of sectors, we can investigate structural change, as shown in figure 3.

This demonstrates that periods of time exist in the Chinese economy where the share of labor slows its movement out of agriculture, an under productive sector, and reduces potential positive structural change, like pumping brakes. Since a majority of China's structural change has been a result of agriculture, it appeared reasonable to match the two. One can find this result in figure 4. While the agricultural sector remains the primary force of change, it is necessary to explore the other results of our data. While we constructed graphs of each sectors trend of structural change, we limit the number presented for clarity and brevity.

In figure 5, figure 6, and figure 7 we can see the results for the manufacturing, Wholesale and retail trade, and government sectors respectively. Each begins with an above average level of relative productivity and so as labor moves into the sector we see positive structural change occur. The results are expected for each case, except for the fall in relative productivity amongst Community, Social, Personal, and Government Services. This fall did not change the movement of labor into the sector though, and this is a force of negative structural change on the Chinese economy. Similarly, but less dramatically, we see a brief stint of negative structural change as manufacturing declines as a share of the labor force in the early 2000s, but this is resolved as productivity remains high and labor moves back in.

Upon examining the other sectors in the Chinese economy, we find that the abnormality of this structural change variable is almost certainly linked to agriculture. This is where the hukou system comes into play. The Chinese system of restricting labor movement either explicitly or through the restriction of incentives can be easily linked logically to the theory of structural change. When we utilize the four years of reform outlined in our *Description of Urban and Rural Dynamics in China*, the link becomes clear. This is reinforced by our regression results.

Our graphical analysis utilizing the CIP dataset reveals a number of facets hidden from our investigation of the GGDC dataset. Financial services were the sole sector to demonstrate a great increase in significance levels after including HHW accounting. We can clearly see the positive structural change occurring in figure 8. The likely cause of this is a delayed impact from trade liberalization, which we are capturing later in our regression. Though we include a dummy for trade liberalization in China in the regression, we see low levels of significance for reform in 1984 and 1992, and it makes little sense that the repealing of the CR system would impact finance as greatly as it has in our data sets, as will be shown in our regression results later. It is for this reason that our initial reaction is that a delayed impact is being artificially caught in our sample given the closeness of variable years, 2001 and 2003.

The use of capital stock as a replacement for labor proved to be revealing of one trend in particular, the lack of positive structural change in capital allocation, as can be seen in figure 9. Though labor has seen dramatic positive change over the course of the last 40 years, capital stock has shown a different perspective

into the movement of the means of production between industries, when using a definition of productivity which utilizes capital stock as opposed to the number employed in a given sector. This does not change our approach, but does alter our previous definition of productivity. These results are shown in figure 10.

We found that the share of capital stock in finance increases both steadily and dramatically over the sample set of years. We can compare this to the relative decline of manufacturing throughout the 90s. Agriculture also sees a consistent decline in the share of capital stock over the entirety of our sample. When we compare these summary results to those of our regression on capital stock shares, we find that a number of industries are highly correlated with our political reform terms. Surprisingly, of those significant industries, neither agriculture nor financial services were included, though we find that manufacturing is highly correlated. This mixture of significance would lead one to believe that the immediate movement of shares in capital stocks between sectors, irrelevant of productivity, has little to do with the process of political reform related to the hukou system. This lack of significance in agriculture and finance disappears though when we begin to examine our structural change term.

V. Regression Results

With a firm understanding of our graphical analysis, we can begin regressing. The goal of our regression is to investigate the relationship between political reform and structural change in China. Naturally, one would expect that the lowering of labor movement restrictions would make it easier for structural change to occur, but the question remains, is reform a significant impact, or are other factors more important, such as wage rates or general economic welfare. We must also question what other factors influence the labor movement in China, how we can describe them, and how they compare to the hukou system reforms in terms of significance.

First, we will report the results of our variable for labor structural change. We can see that our reform terms in table 1, having been built on one another, increase in significance with each successive reform. This is demonstrating that each of the reforms correlate to positive structural change, implying that continued reform would benefit the process, to an extent. Obviously, labor can only move so much out of a sector and these results are still simplified. Note that as we include our data on both the income and infant mortality ratios we lose observations due to the gaps in our data. This requires us to utilize separate datasets to account for these gaps.

We found a similar series of conclusions through our use of the labor share information from the CIP database. Though we have found some variance in the levels of significance seen in our results, the regressions on our three political reform dummy variables proved significant when examining total structural change, these results can be found in table 2. We went further than in our pre-

vious dataset and investigate if any sectors were not affected by the reforms. To do this we included tests on each individual sector as well and ran joint significance tests. This revealed that Utilities, Wholesale Trades, and Transportation industries failed to be significantly influenced by our dummy variables, as can be seen in table 3. This can lead one to believe that these three industries are not as significantly influenced by the circumstances, which govern internal migration throughout China.

We then utilize the calculation of labor related structural change while accounting for HHW. This produced results with some variance in the levels of significance. Both agriculture and mining joined those industries, which we cannot say are significant. In addition to this change, we saw the significance level fall in all sectors other than Financial Services. The drop in significance of agriculture requires some investigation and upon an examination of the individual significance levels of each period of reform, we find that both 1984 and 1992 are significant. The dummy variable for reform in 2003 appears to drag down the level of significance in this case, and is likely a result of the type of political reform that occurred.

As outlined in our *Description of Rural and Urban Dynamic in China*, the reform of 2003 occurred as a reactionary policy to a single event. This differs from the other two we are working with in this case, as they were developed over a period of time, and utilized when China felt most able to capitalize, politically and economically, on the differences between sectors. The repealing of the CR system lacks any clear connection to the productivity of labor in the agriculture sector, and so it is unsurprising to find it lacks significance in our regression results. We highlight this because labor movements out of agriculture are the foundation of our analysis into political reform relevant to the hukou system.

Upon regressing both the share of capital stock, and the structural change relative to capital stock, while using productivity defined by labor, we see some variance in the levels of significance. The industry specific interactions become more difficult to interpret given the differing definitions of productivity, but this is necessary to investigate how the means of production are being allocated throughout China, and why it is occurring in this way.

We find that political reform is significant with both agriculture and finance when regressing on structural change, as one can see in table 3. One of the insights gained from this method, is a comparison of which industries move from significant to non-significant results when compared to our labor analysis. In agriculture for example, we found positive structural change occurring until the mid 80s followed by small levels of negative structural change throughout the remainder of the sample. This may be explained by a capital intensification in the agriculture industry as it develops, and levels of production are required to grow while labor is leaving it. This would be one method of rationalizing the results without compromising the integrity of our hypothesis.

Along the same lines, we see an intensification and growth in absolute capital

across all sectors in our sample. Though we attempt to account for this with the use of capital stock shares, it is possible that some of the shifting of significance in results are due to changing preferences of capital use as appose to labor as the engine of growth in sectors. Given that we find both transportation and wholesale to be significant when examining structural change from the perspective of capital stocks, and not when examining labor, clearly a dichotomy exists between the two primary means of production. This trend may prove interesting to examine, but it rests outside the scope of this paper.

VI. Conclusion

The hukou system in China has held mixed success restricting movements of labor from the rural agricultural sector into urbanized areas. The rapid expansion of industry in urban areas as well as the shifting relative productivities of sectors has attracted numerous laborers willing to work even without the social benefits of an urban hukou. This has fostered in China the large floating population, which is utilized as a reserve of low skilled labor. This reserve has operated and fluctuated with the growth of the Chinese economy and continued political reform.

The dramatic rise in relative productivity in urban sectors has also created an incentive for positive structural change, and a rebalancing of resources, which has been amplified throughout the 90s and 00s, from the rural agriculture sector into urban employment such as services. This structural change offers an avenue for development to continue as labor moves into more productive industries, better utilizing the capital available in China. Though China has clearly seen a substantial period of development, the hukou system continues to restrict migration from rural to urban spaces, creating artificial shortages of workers, while we express the issue of endogeneity, it is clear that moving forward China can benefit from fewer restrictions to internal migration. We have demonstrated this through both a graphical and regressive analysis. In summation the continued reduction and elimination of the hukou system holds a great deal of potential to benefit both the economy and the Chinese people.

REFERENCES

- Barnett, A. Doak.** 1981. "Chinas Economy in Global Perspective." *Northwestern Journal of International Law & Business*, Ch. III.
- Becker, Jasper.** 1998. *Hungry Ghosts: Maos Secret Famine*. Holt Paperbacks.
- Bernanke, Ben.** 2016. "Chinas trilemmaand a possible solution." *Brookings*.
- Carmignani, Fabrizio.** 2014. "Never Been Industrialized: A Tale of African Structural Change." *Structural Change and Economic Dynamics*, 31: 124 – 137.

- Chan, Kam., and Li. Zhang.** 1999. "The Hukou System and Rural-Urban Migration in China: Processes and Changes." *The China Quarterly*, The China Quarterly(160): 818–855.
- Cheng, Zhiming., Nielsen. Ingrid, and Smyth. Russell.** 2014. "Access to Social Insurance in Urban China: A Comparative Study of Rural-Urban and Urban-Urban Migrants in Beijing." *Habitat International*, 41: 243–252.
- Eggleston, Karen, and Et Al.** 2010. "Comparing Public and Private Hospitals in China: Evidence from Guangdong." *BMC Health Services Research*, 10(1): 1–11.
- Eloot, Karel, Alan Huang, and Martin Lehnich.** 2013. "A New Era for Manufacturing in China." McKinsey and Company Report.
- Feenstra, Robert C., Robert Inklaar, and Marcel Timmer.** 2013. "The Next Generation of the Penn World Table." NBER Working Paper No. 19255.
- Fisher, Allan.** 1939. "Production, Primary, Secondary and Tertiary." *The Economic Record*, 15(1): 24–38.
- Gautreaux, Sergio.** 2013. "Understanding China's Internal Migration." *International Policy Digest*.
- Golley, Jane, and Meng Xin.** 2011. "Has China Run out of Surplus Labour." *China Economic Review*, 22(4): 555–572.
- Han, Dongping.** 2008. *The Unknown Cultural Revolution: Life and Change in a Chinese Village*. Monthly Review.
- Knight, John, Deng Quheng, and Li Shi.** 2010. "The Puzzle of Migrant Labour Shortage and Rural Labour Surplus in China." *China Economic Review*, 22(4): 585–600.
- Kuznets, Simon.** 1966. "Modern Economic Growth." *Yale University Press*.
- Lam, Raphael, Xiaoguang Liu, and Alfred Schipke.** 2015. "China's Labor Market in the 'New Normal'." International Monetary Fund Working Paper WP/15/151.
- Li, Bingqin.** 2015a. "China's Hukou Reform a Small Step in the Right Direction." *East Asia Forum, Economics, Politics and Public Policy in East Asia and the Pacific*.
- Li, Luodan.** 2015b. "A Tripartite Alliance for Hukou Reform." *Chicago Policy Review*.
- Lin, Justin.** 1989. "Rural Reforms and Agricultural Productivity Growth in China." UCLA Working Paper 579.
- Lin, Justin Yifu.** 2010. "New Structural Economics : A Framework For Rethinking Development." s.n. , Report.
- Li, Shi.** 1993. "Health Care in China: A Rural-urban Comparison after the Socioeconomic Reforms." *Bulletin of the World Health Organization*, 71(6): 723–736.

- Li, Shi.** 2008. "Rural Migrant Workers in China: Scenario, Challenges and Public Policy." International Labour Organization Working Paper 89.
- Li, Shi, Hiroshi Sato, Terry Sicular, and Cambridge University Press.** 2013. "Rising inequality in China: challenges to a harmonious society." *Cambridge University Press*, 1 online resource.
- Liu, Yang.** 2013. *China's urban labor market : a structural econometric approach*. Hong Kong Japan: Hong Kong University Press ; Kyoto University Press.
- MacFarquhar, Roderick.** 1997. *The Succession to Mao and the End of Maoism, 1969-82*. Cambridge University Press.
- Martines, Jamie.** 2016. "Despite Policy Reforms, Barriers to Obtaining Hukou." The Diplomat Report.
- McMillan, Margret Rodrik, Dani Verduzco-Gallo Inigo.** 2014. "Globalization, Structural Change, and Productivity Growth, with an Update on Africa." *World Development*, 63: 11–32.
- Rostow, W. W.** 1960. *The stages of economic growth, a non-Communist manifesto*. Cambridge Eng.: University Press.
- Ruwitch, John, and Li Hui.** 2013. "China Eyes Residence Permits to Replace Divisive Hukou system." Reuters Report.
- Sicular, Terry Ximing, Yue Gustafsson-Bjom Shi Li.** 2007. "The Urban-Rural Income Gap and Inequality in China." *Review of Income and Wealth*, 53(1): 93–126.
- Solinger, Dorothy J.** 1999. *Contesting citizenship in urban China : peasant migrants, the state, and the logic of the market*. *Studies of the East Asian Institute, Columbia University*, Berkeley: University of California Press.
- Tiezzi, Shannon.** 2016. "China's Plan for 'Orderly' Hukou Reform." The Diplomat Report.
- Timmer, M.P., and G.J. De Vries.** 2014. "Patterns of Structural Change in Developing Countries." *GGDC Research Memorandum*, , (149).
- Unlisted.** 2013. "What Worker Shortage? The Real Story of China's Migrants." China Real Time Report RSS Report.
- Unlisted.** 2014. "Ending Apartheid." *The Economist*.
- Unlisted.** 2016. "Chairman of everything." *The Economist*.
- Wang, Zhenqi.** 2011. "Hu Yaobang Harshly Criticizes 'Blocks'." *Shi ji qiao*, , (12): 45–47.
- Whalley, John, and Shunming Zhang.** 2004. "Inequality Change in China and (Hukou) Labour Mobility Restrictions." NBER Working Paper No. 10683.
- Windrow, Hayden, and Anik Guha.** 2005. "The Hukou System, Migrant Workers, and State Power in the People's Republic of China." Northwestern Journal of International Human Rights Report.
- Wu, Harry X., and Ito. Keiko.** 2015. "Reconstructing China's Supply-Use and Input-Output Tables in time Series." Rieti Discussion Papers, 15-E-004.

- Wu, Xiaogang, and Donald J. Treiman.** 2004. "The Household Registration System and Social Stratification in China: 1955-1996." *Springer on behalf of the Population Association of America*, 41(2): 363-384.
- Wu, Yvonne, and Sheryl Jacobson.** 2015. "2015 Health Care Outlook China." Deloitte Report.
- Xu, Zhun.** 2013. "The Political Economy of Decollectivization in China." *Monthly Review*, 65(1).
- Yao, shun Li.** 2002. "China's WTO Revolution." Project Syndicate Report.
- Young, Jason.** 2013. *China's Hukou System: Markets Migrants and Institutional Change*. . 1 ed., Palgrave Macmillan UK.
- Zhang, Xiaobo, Jin Yang, and Shenglin Wang.** 2011. "China Has Reached the Lewis Turning Point." *China Economic Review*, 22(4): 542-554.
- Zhan, Shaohua, and Joel Andreas.** 2015. "Beyond the Countryside: Hukou Reform and Agrarian Capitalism in China." *The Regional Center for Social Science and Sustainable Development*, Land Grabbing, Conflict and Agrarian environmental Transformations: Perspectives from East and Southeast Asia(7).

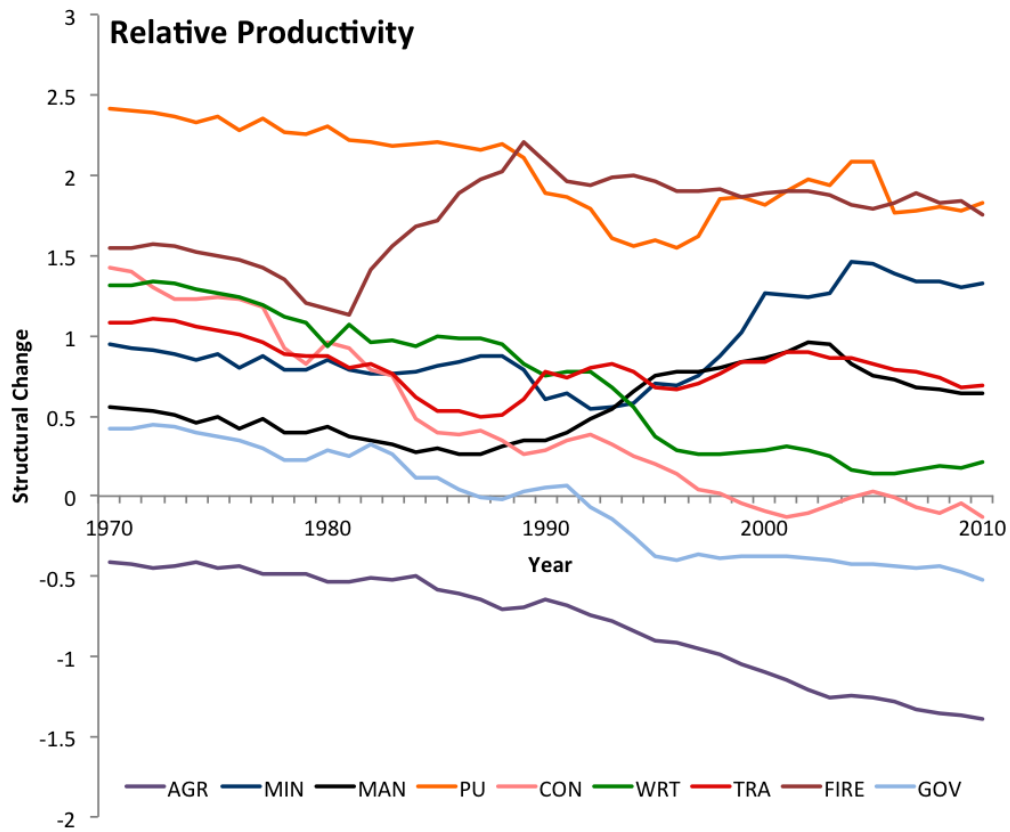


FIGURE 1. RELATIVE PRODUCTIVITY OF SECTORS IN CHINA, 1970-2010

Note: This is a break down of the relative productivity of each sector in China. We use the abbreviations for each sector outlined in the methodology, AGR - Agriculture, MIN - Mining, MAN - Manufacturing, PU - Public Utilities, CON - Construction, WRT - Wholesale and Retail Trade, TRA - Transport, FIRE - Finance and Business Services, and GOV - Government Services.

$$\text{Relative Sector Productivity} = y_i = \frac{\text{Sector Productivity}}{\text{Total Productivity}}$$

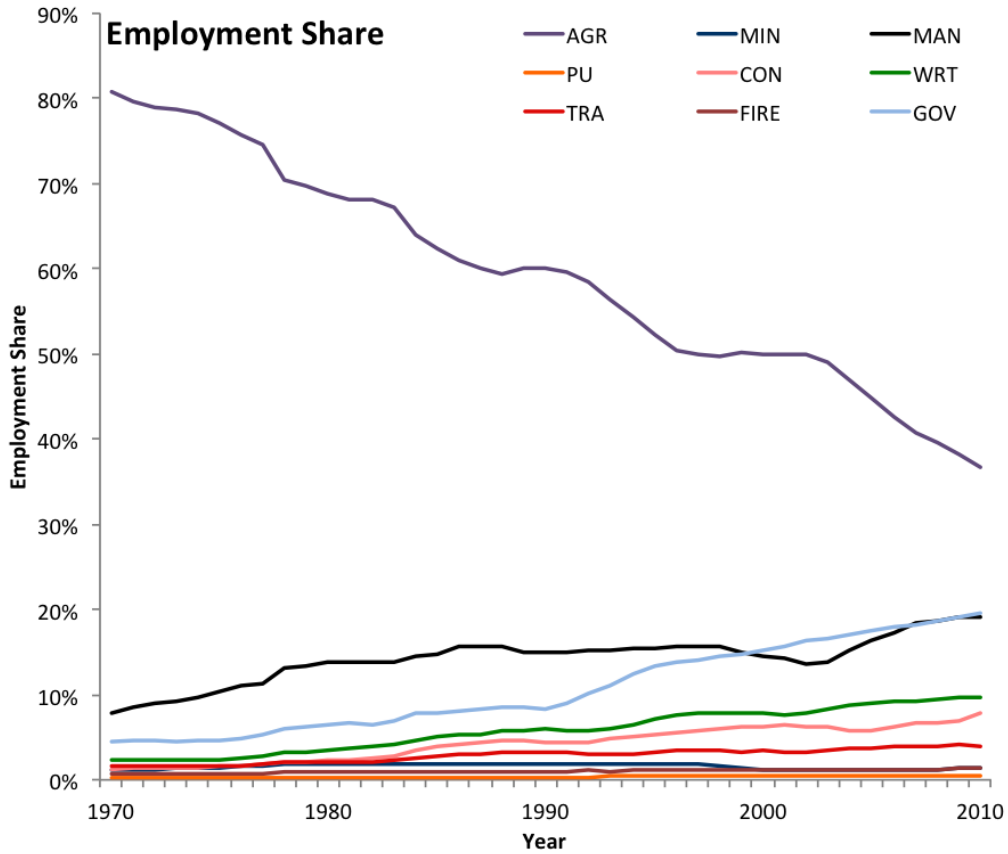


FIGURE 2. CHINESE EMPLOYMENT SHARE BY SECTOR, 1970-2010

Note: Here we can see the percent of employment each of the nine sectors occupies in the Chinese economy. We use the abbreviations for each sector outlined in the methodology, AGR - Agriculture, MIN - Mining, MAN - Manufacturing, PU - Public Utilities, CON - Construction, WRT - Wholesale and Retail Trade, TRA - Transport, FIRE - Finance and Business Services, and GOV - Government Services.

$$\text{Sector Share of Employment} = \theta_i = \frac{\text{Employment in Sector}}{\text{Total Employed}}$$

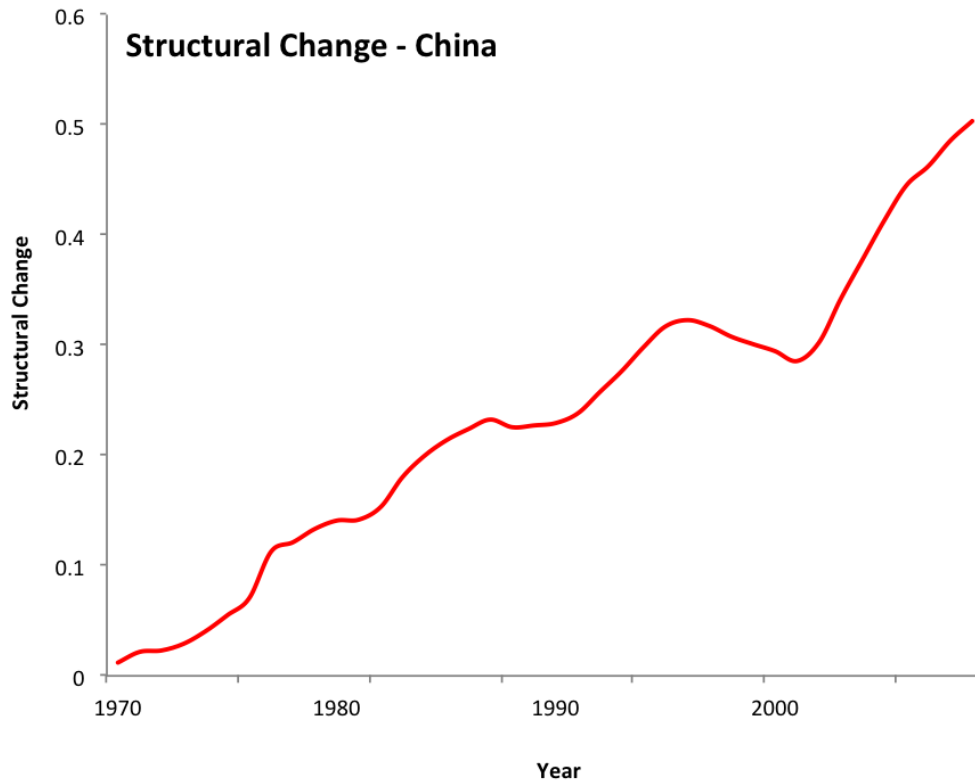


FIGURE 3. TOTAL LABOR STRUCTURAL CHANGE IN CHINA, 1970-2010

Note: The summation of total labor based structural change experienced by China from year to year.

$$\text{Structural Change} = \gamma_i = \log(y_{(i,t-1)}) * (\Delta\theta_{(i,t)})$$

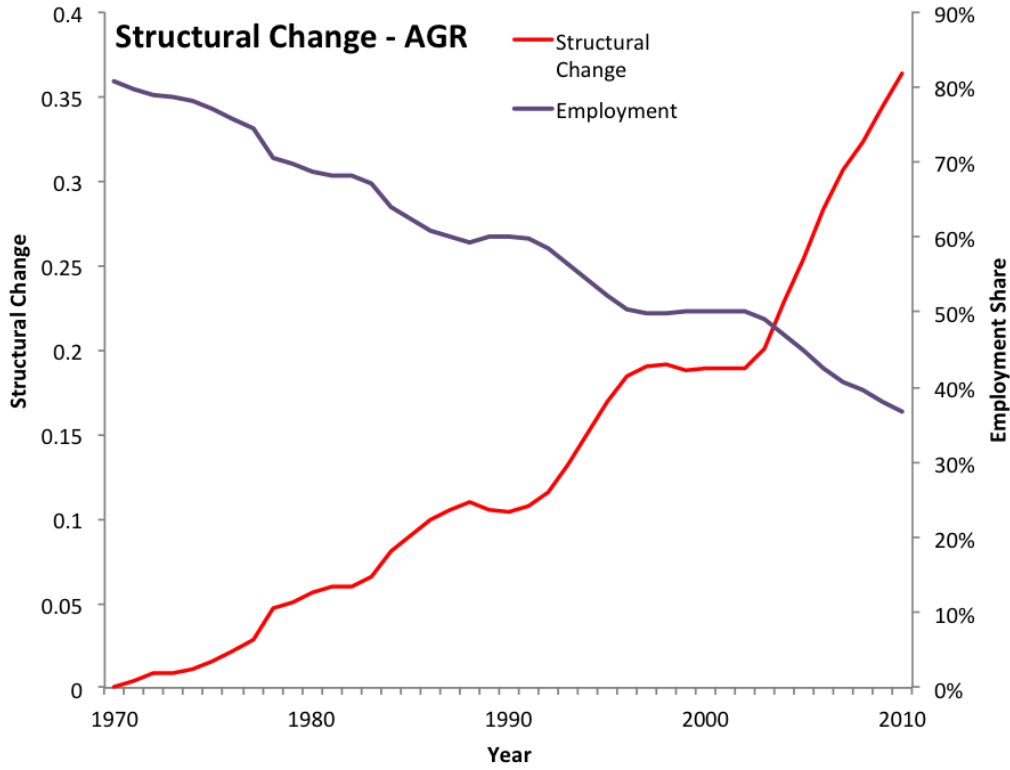


FIGURE 4. AGRICULTURAL LABOR STRUCTURAL CHANGE IN CHINA, 1970-2010

Note: The summation of agricultural labor based structural change from year to year depicted in addition to the labor share of agriculture, AGR - agriculture.

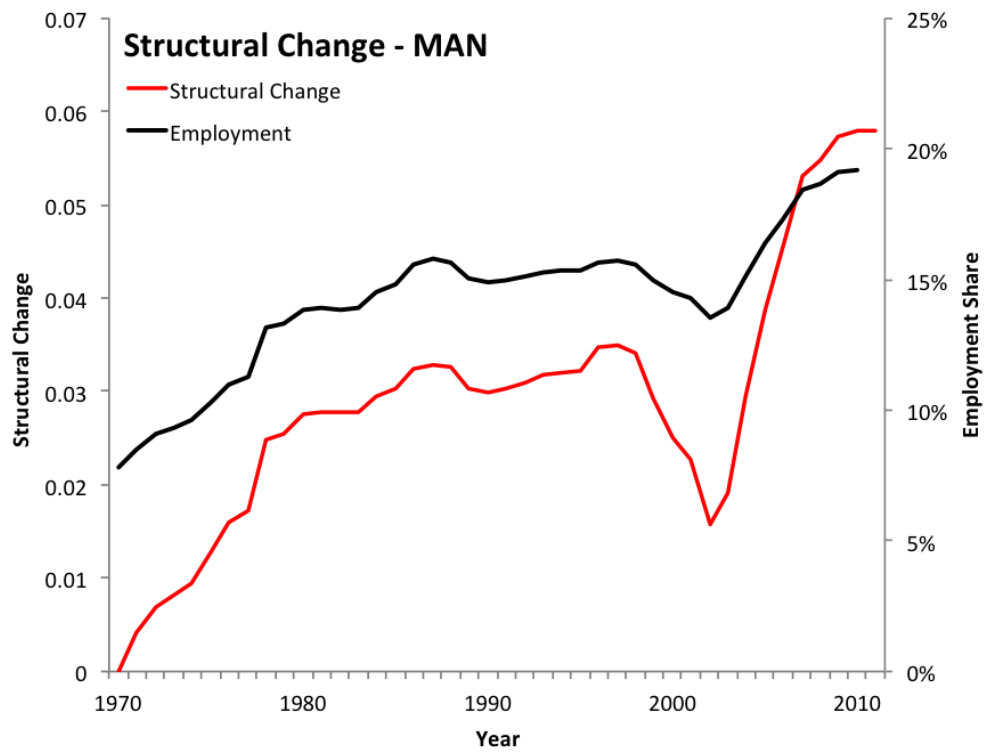


FIGURE 5. LABOR STRUCTURAL CHANGE IN MANUFACTURING, 1970-2010

Note: The summation of manufacturing labor based structural change from year to year depicted in addition to the labor share of manufacturing, MAN - manufacturing.

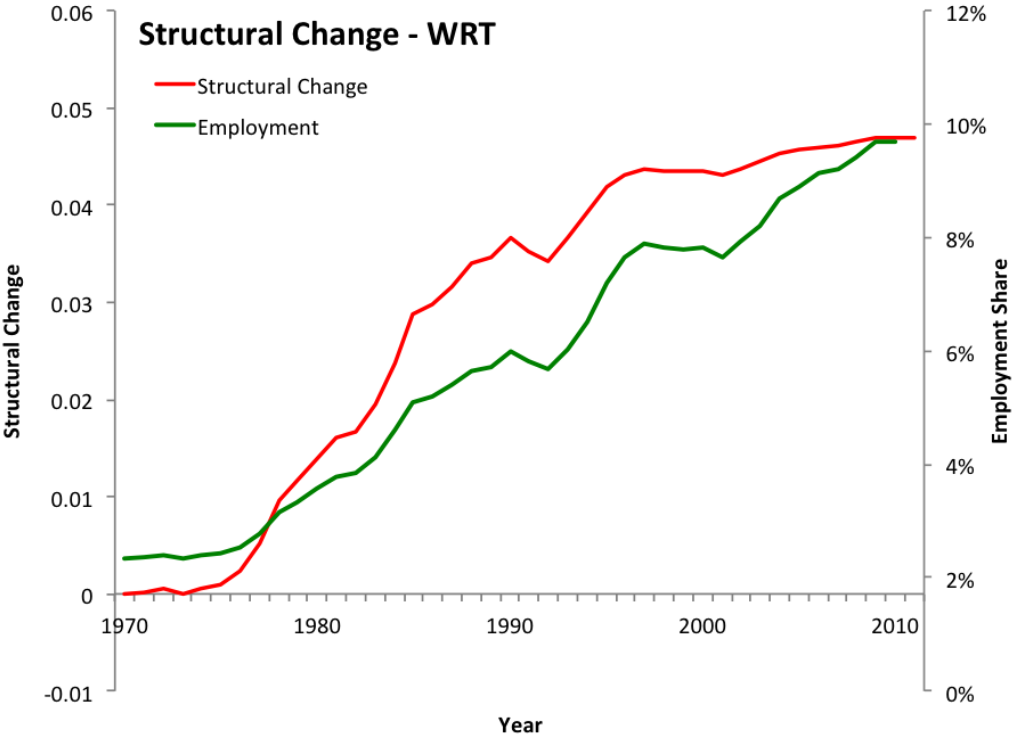


FIGURE 6. LABOR STRUCTURAL CHANGE IN WHOLESALE AND RETAIL TRADE, HOTELS, AND RESTAURANTS, 1970-2010

Note: The summation of wholesale, retail, and trade industries (WRT) labor based structural change from year to year depicted in addition to the labor share of WRT.

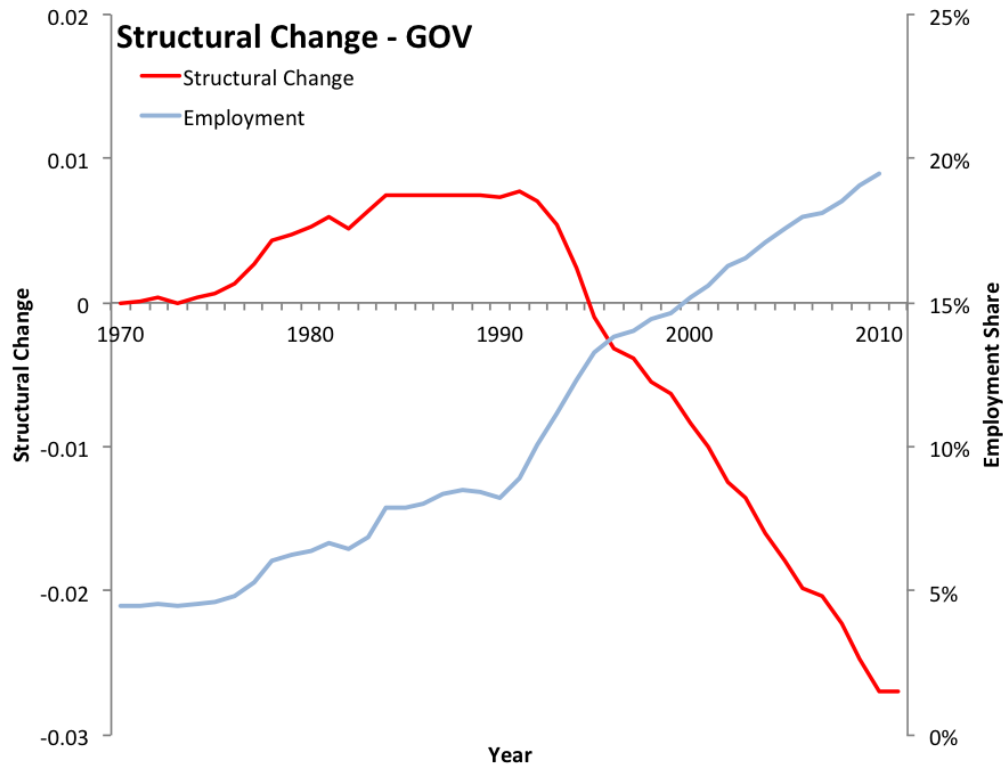


FIGURE 7. LABOR STRUCTURAL CHANGE IN COMMUNITY, SOCIAL, PERSONAL, AND GOVERNMENT SERVICES, 1970-2010

Note: The summation of community, social, personal, and government (GOV) services labor based structural change from year to year depicted in addition to the labor share of GOV.

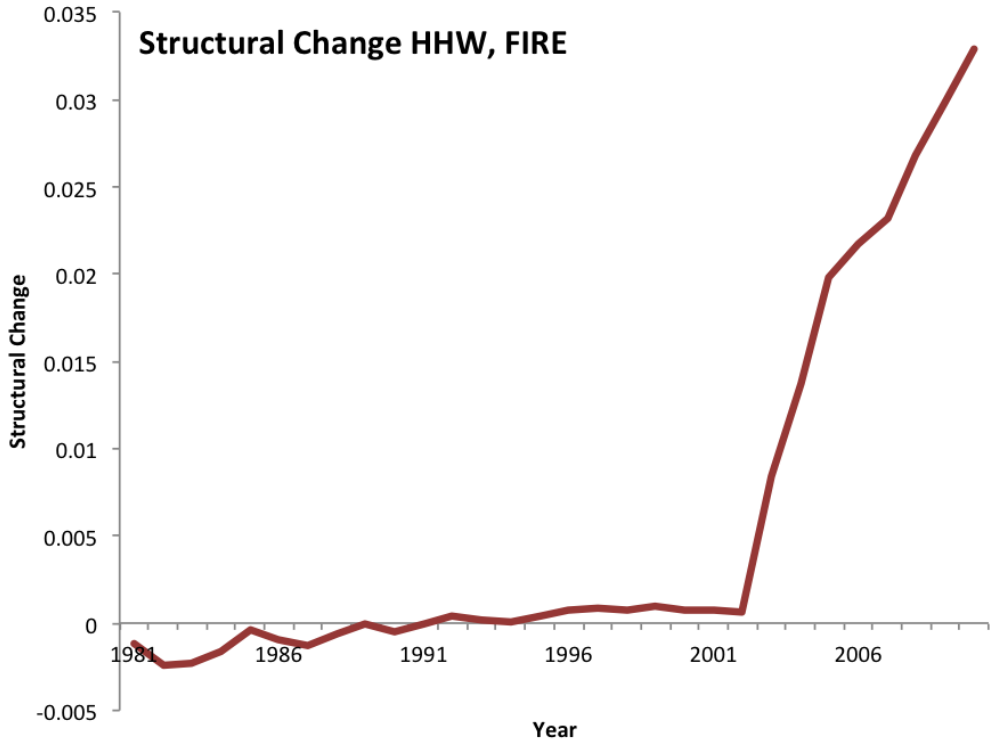


FIGURE 8. LABOR STRUCTURAL CHANGE INCORPORATING HOMOGENOUS HOURS WORKED IN FINANCE, INSURANCE, REAL ESTATE, AND BUSINESS SERVICES, 1970 - 2010

Note: Here we see the summation of labor based structural change in finance and business services (FIRE) from year to year using CIP data, and our Homogenous Hours Worked alteration.

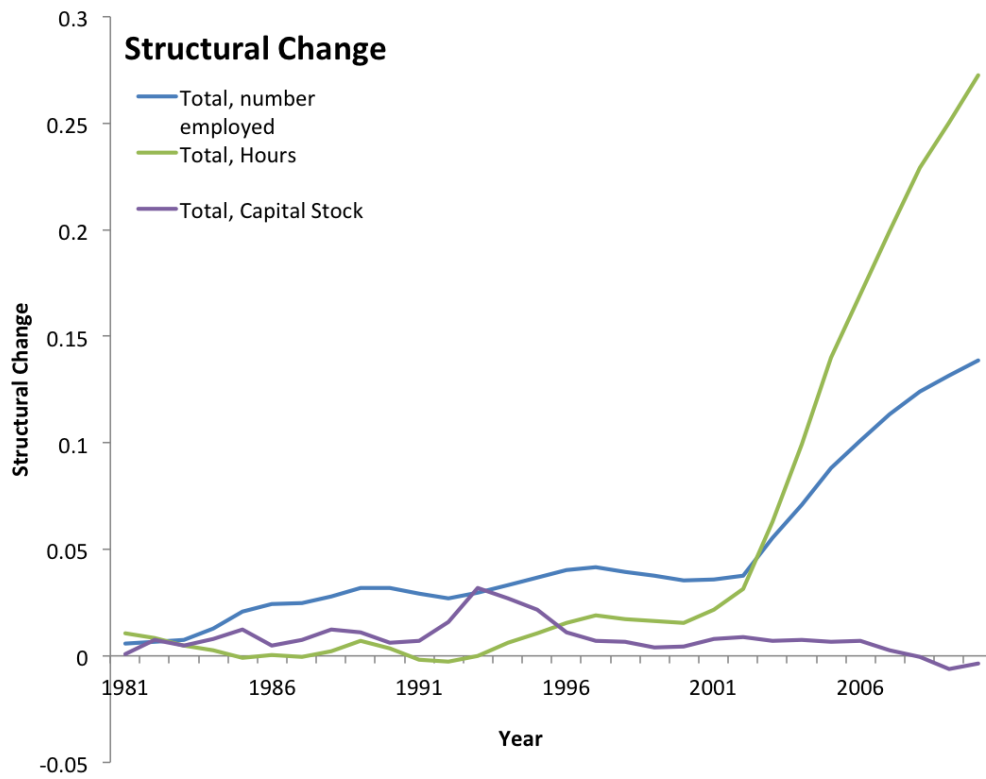


FIGURE 9. MEASURES OF STRUCTURAL CHANGE IN CHINA USING CIP DATA ON SHARE OF EMPLOYMENT, HOMOGENOUS HOURS WORKED, AND SHARE OF CAPITAL STOCK, 1981-2010

Note: A comparison of the summation of structural change from year to year as measured by shares of employment, homogenous hours worked, and capital stocks using CIP data.

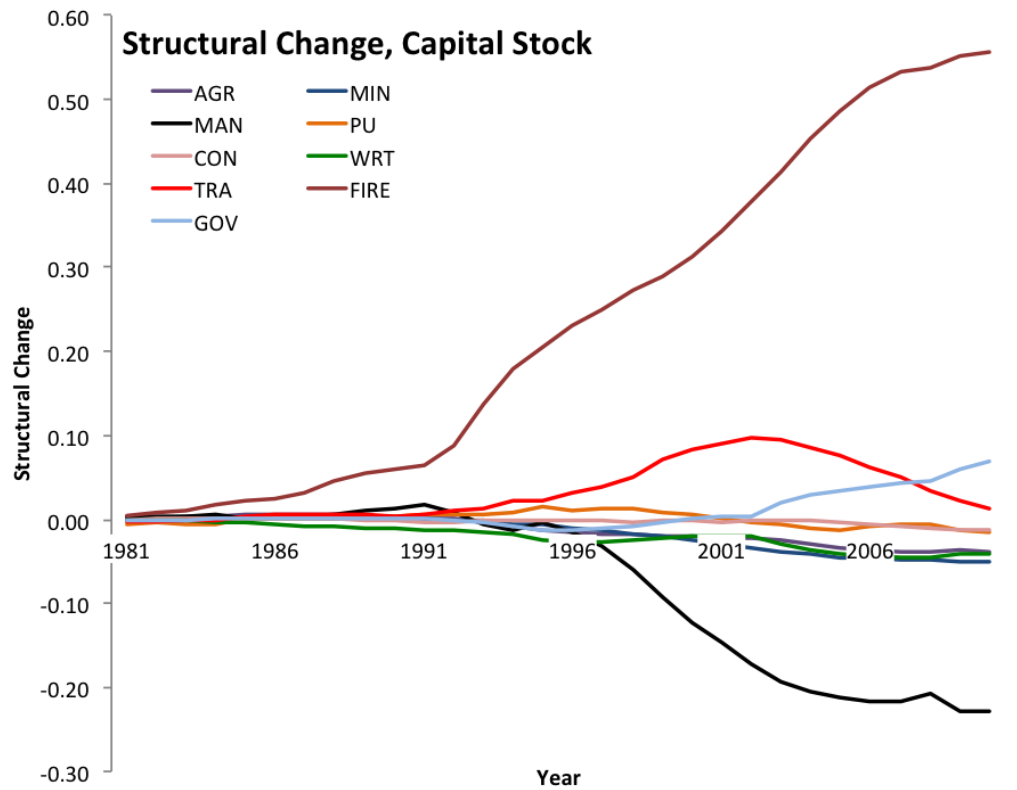


FIGURE 10. . INDUSTRIAL CAPITAL STRUCTURAL CHANGE BY SECTOR IN CHINA, 1981-2010

Note: These are the contributions to total structural change through industrial capital share by sector. We use the abbreviations for each sector outlined in the methodology, AGR - Agriculture, MIN - Mining, MAN - Manufacturing, PU - Public Utilities, CON - Construction, WRT - Wholesale and Retail Trade, TRA - Transport, FIRE - Finance and Business Services, and GOV - Government Services.

TABLE 1 – GGDC DATABASE INFORMATION, LABOR STRUCTURAL CHANGE REGRESSIONS
 DEPENDENT VARIABLE: STRUCTURAL CHANGE

	(11)	(12)	(13)	(14)
1984	-0.00249 (0.00601)	0.0233*** (0.00730)	0.0243* (0.0119)	
1992	0.00200 (0.00577)	0.0297*** (0.00853)	0.0260*** (0.00849)	-0.00658 (0.0126)
2003	0.0408*** (0.00942)	0.0397*** (0.0113)	0.0471*** (0.00840)	0.0230* (0.0117)
GDP	-3.86e-09** (1.62e-09)	5.44e-10 (2.19e-09)	1.45e-09 (1.88e-09)	6.04e-10 (3.48e-09)
Ratio of Urban and Rural Income		-0.0868 (0.0682)	0.00174 (0.0113)	0.0455* (0.0227)
(Ratio of Urban and Rural Income)^2		0.0167 (0.0137)		
Trade Liberalization		-0.00296 (0.0103)	0.00394 (0.00809)	-0.0246 (0.0159)
Year		-0.00333*** (0.00110)	-0.00367*** (0.000973)	-0.00638** (0.00267)
1978	0.00508 (0.00614)			
Industrial Enterprises			9.17e-08* (4.76e-08)	5.69e-08 (8.85e-08)
SOEs			-5.51e-07 (4.36e-07)	-1.92e-06 (1.26e-06)
Ratio of Urban and Rural Infant Mortality				0.293** (0.122)
Constant	0.0106** (0.00417)	6.721*** (2.141)	7.284*** (1.925)	12.69** (5.418)
Observations	40	30	30	20
R-squared	0.432	0.769	0.798	0.897

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 2 – COMPARISON OF OUR RESULTS UTILIZING EQUATION 12 ACROSS DATASETS
 DEPENDENT VARIABLE: STRUCTURAL CHANGE

VARIABLES	(12) GGDC, labor share	(12) CIP, labor share	(12) CIP, HHW	(12) CIP, capital share
1984	0.0233*** (0.00730)	0.00409* (0.00209)	-0.000551 (0.00339)	0.0129*** (0.00421)
1992	0.0297*** (0.00853)	0.00458* (0.00245)	0.00376 (0.00396)	0.0142*** (0.00492)
2003	0.0397*** (0.0113)	0.0167*** (0.00324)	0.0316*** (0.00525)	-0.00397 (0.00652)
GDP	5.44e-10 (2.19e-09)	-1.09e-09* (6.29e-10)	-1.28e-09 (1.02e-09)	-1.30e-09 (1.27e-09)
Ratio of Urban and Rural Income	-0.0868 (0.0682)	-0.0112 (0.0196)	0.0514 (0.0317)	-0.0130 (0.0394)
(Ratio of Urban and Rural Income) ²	0.0167 (0.0137)	0.00221 (0.00392)	-0.00834 (0.00635)	0.00610 (0.00789)
Trade Liberalization	-0.00296 (0.0103)	0.00455 (0.00294)	0.00970* (0.00477)	-0.00444 (0.00592)
Year	-0.00333*** (0.00110)	-0.000568* (0.000315)	-0.000604 (0.000510)	-0.00176** (0.000634)
Constant	6.721*** (2.141)	1.142* (0.614)	1.129 (0.994)	3.492** (1.235)
Observations	30	30	30	30
R-squared	0.769	0.886	0.947	0.744

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 3 – COMPARISON OF JOINT SIGNIFICANCE TESTS ON POLITICAL REFORM

Joint significance of reform	GGDC	CIP Number employed	CIP	CIP	CIP Capital
F test values			HHW	Capital	shares
AGR	5.83***	2.57*	2.11	2.87*	1.44
Prob > F	0.0046	0.0811	0.1290	0.0609	0.2622
MIN	2.07	3.79**	1.71	1.3	1.13
Prob > F	0.1352	0.0258	0.1946	0.3021	0.3623
MAN	11.35***	4.88***	3.56**	2.2	6.7***
Prob > F	0.0001	0.0099	0.0316	0.1183	0.0029
PU	0.61	0.07	0.13	0.91	6.92
Prob > F	0.6143	0.9775	0.9410	0.4519	0.0024
CON	14.73***	11.7***	8.82***	1.52	7.87***
Prob > F	0.0000	0.0001	0.0006	0.2380	0.0013
WRT	2.55*	1.52	1.26	4.07**	4.61**
Prob > F	0.0834	0.2390	0.3144	0.0199	0.0138
TRA	0.88	1.16	1.78	4.59**	11.46***
Prob > F	0.4657	0.3477		0.0127	0.0002
			0.1818		
FIRE	0.89	4.72**	8.5***	5.7***	0.33
Prob > F	0.4639	0.0113	0.0007	0.0051	0.8038
GOV	0.64	4.27**	3.37**	1.6	2.05
Prob > F	0.5978	0.0168	0.0379	0.2188	0.1405
Total	7.75***	9.67***	12.38***	5.01***	-
Prob > F	0.0011	0.0003	0.0001	0.0089	

*** p<0.01, ** p<0.05, * p<0.1

Table 3