Harmonizing Regional Development: Challenges and Options

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China's remarkable success in modernizing its economy has been characterized by the glaring wealth gap between the coastal-urban regions and the inland-rural areas. How to contain this growing disparity across the country poses a major challenge to China's policy makers in the 21st century. By reviewing the main causes of the disparity, this paper discusses the policy options to achieve a more harmonious regional development as the economy moves beyond the take-off phase of industrialization.

1. Introduction

In the past three decades, the Chinese economy has surged ahead at a rate of 9-10 % per annum, doubling total income every seven to eight years. This scale of wealth creation, which involves one fifth of the global population, has been unprecedented in the world history.

This remarkable development achievement has, however, been characterized by the glaring wealth gap between the coastal-urban regions and the inland-rural areas. China's economic boom has clustered around several major gravity centres along the east

coastline while most of the inland provinces, especially their rural areas, remain underdeveloped. Given the country's vast territories of various geo-economic features, it is a major challenge to the policy makers to achieve a more harmonious regional development as the economy moves beyond the take-off phase of industrialization.

This paper will examine the issue of harmonious regional development by looking at the economic factors that contribute to regional growth variance. We will first identify several mechanisms that may facilitate growth convergence according to the existing literature. We will then discuss the dynamics of these mechanisms in China's regional development.

2. Mechanism of Growth Convergence

An important implication of neoclassical growth theory is that growth rate in any economy should converge towards its own steady-state growth path at a predictable rate. By neoclassical growth model (Solow 1956, 1957), if per capita income, y, is a function of per capita capital stock, f(k), capital accumulation (Δk) should depend on saving rate (s), growth rate of labour force (n), and depreciation (δ) as follows:

$$\Delta k = sy - (n + \delta)\, k \qquad (1)$$

At steady state, $\Delta k = 0$, so $sf(k) = (n + \delta)k$. If technology is assumed to be identical across economies, then any two economies with identical saving rates and population growth rates should be expected to converge to the same level of income. In the same vein, we can predict that all economies should converge to a level of per capita income corresponding to their saving rates (s) and population/labour force growth rates (n).

Early studies provided empirical evidence for convergence in the negative relations between economic growth rates and initial income levels (Baumol, 1986; De Long 1988; Baumol and Wolf 1988). These studies suggest that convergence appeared to be more evident among the industrialized countries than among the less developed ones. There also have been many studies of regional income convergence on intra-national scales, pioneered by Barro and Sala-i-Martin (1991), who structured the empirical analysis in a Solow-type growth model framework. Most of these studies have generated empirical results that are interpreted as evidence in favour of the neoclassical convergence hypothesis despite controversies in interpretation (Quah 1993).

There are a few mechanisms of convergence identified by the literature. The first is technology diffusion. This process makes technology levels more similar across countries and regions, thus fulfilling a key assumption of convergence towards the same steady-state growth path predicted by the neoclassical Solow model.

The second mechanism is demographic changes. Demographic economists have long observed the phenomenon of the three-stage "demographic transition" that occurs with modern economic development. In the *initial stage*, both fertility rate and death rate are high and life expectancy is short so the population growth is constrained at a relatively slow pace but dependency ratio (i.e., dependents-to-working-age-adults ratio) is high due to large number of children to take care of. When economic modernization arrives with improved public health care, better diets, and rising income, the death rate (especially infant mortality rate) starts to plummet and people live longer. The growing divergence between the high birth rate and the falling death rate accelerates population growth and leads to an unprecedented expansion of the population size which features the

second stage of demographic transition. Sooner or later, with further modernization and rise in standard of living, fertility rate starts to decline and population growth slows. At this *third stage* of demographic transition, the falling birth rate converges with the lower death rate overtime. In the post-transition era, as the fertility decline nears or passes the replacement level – average 2.1 births per woman, population growth eventually comes to a halt and even starts to decline. With the low birth rate and lengthening life expectancy, the population age structure gets older and an aging society emerges.

When demographic transition enters the third period, as birth rate starts to fall, the baby boomers from the second period enter the working age while the dependency ratio declines since there are fewer kids to be fed. According to the Solow model (1), the steady-state capital to income ratio $k/y = s/(n+\delta)$. Therefore both the slowing growth of the population (n) and the rising saving rate (s, thanks to a bulging working-age portion of the whole population) favour capital accumulation and the rise of per capita income. Since the labour force grows at a faster rate than the total population, per capita income must rise as long as the growing labour force is sufficiently employed. Demographic economists call these benefits “demographic dividend” or “a window of development opportunity” (Lee and Mason 2006). If we consider human capital accumulation, the smaller family size and rising income should also be in favour of higher-quality child rearing. In contrast, for those rich economies, entering the post-transition aging society implies a rising dependency ratio and perhaps a less dynamic human capital accumulation process. The opportunity of faster growth for those less developed economies with younger populations and falling dependency ratios thus helps the convergence of income levels.

The third mechanism is trade of goods and services. When trade occurs among economies of different factor endowment structures tend to equalize factor prices across economies. According to the Stolper-Samuelson theorem, as each economy increasingly specializes in the productive activities that use more intensively the factor(s) relatively better endowed in it, trade tends to raise the returns to the factor in economies where it is relatively more abundant and vice versa in economies where it is not (Stolper and Samuelson 1941). Through equalizing factor prices, trade facilitates per capita income to converge across economies.

The fourth mechanism is factor flows across economies, which work more directly on equalizing factor prices. If capital flows but labour does not, the law of diminishing returns implies that capital will flow from capital-rich economies, where marginal product of capital is low, to capital-scarce economies, where marginal product of capital is high. By the same token, if capital is stationed but labour flows, labour will equalize wages by migrating from labour abundant economies to labour scarce ones.

Factor price equalization is, however, a necessary condition for income convergence but not a sufficient one. As shown by Slaughter (1997), per capita income is:

$$y = \frac{wL + rK}{L} = w + r\,\frac{K}{L} = w + r\,k \qquad (2)$$

where w is wage rate, r is rate of return to capital, and L and K refer to labour and capital respectively. Even if w and r are equalized across regions, the occurrence of convergence in y will depend on whether per worker capital stock, k, converges. As evident in equation (1), k may vary due to different saving rates and/or population growth rates across regions.

Razin and Yuen (1997) discuss two kinds of convergence: the convergence of total income growth rates and the convergence of per capita income levels. They show that capital mobility between economies along the balanced growth path must equalize their growth rates of total gross regional product (GRP).[1] Under the same logic, labour mobility plays a similar role.

However, with convergence of total income growth rates, per capita income levels may still diverge as long as labour force/population growth rates are different across regions. In particular, convergence of total income growth rates may not lead to per capita income convergence if technology progress (or augmenting rate of labour) is endogenous to human capital accumulation. On the other hand, even if per capita income growth rates converge, inter-regional income gap may still persist. This can be easily seen in the steady-state condition, $sy = (n + \delta)k$. If two regions achieve the same steady growth rates for k and thus y, the gap between the levels of their k (and thus y) will not diminish as the growth continues.

Razin and Yuen (1997) prove that, in the presence of human capital externalities (as modeled by Lucas, 1988), labour mobility is the key to per capita income level convergence. Migration of workers from low-wage (human capital poor) regions to high-wage (human capital rich) regions will create an indirect channel of productivity transmission across regions if some of those workers continue to accumulate human capital in their homeland regions (by, for instance, educating their children). In the process of wage equalization brought in by the migration, the upward lift of wages earned

[1] This was proved both in a simple scenario of balanced trade-capital flows between two economies on balanced growth path and in the context of a stylized model of endogenous growth.

by the migrants provide incentives for those left behind to raise the rate of human capital accumulation, thus leading to equalization of the levels of human capital and hence the levels of per capita income across regions.

It is also noteworthy that, by definition, GRP refers to the goods and services produced in a region while gross regional income (GRI) refers to factor incomes accrued to the residents of a region. Since capital owners usually do not migrate with their capital, capital flows will change the *k* and thus *y,* the per capita GRP, across regions but it will not change per capita GRI across regions if capital owners stay where they are. In contrast, labour mobility often leads to migration and thus changes per capita GRP as well as per capita GRI, leading to more effective convergence in per capita income levels (Yao, 2003).

According to the above discourse, variance in per worker capital stock is a major reason that per capita income levels vary across regions. Per worker's capital stock is determined mainly by demographic features of the population and saving rates. Demographic transition thus offers a window of development for the poorer regions. Difference in productivity growth, or augmenting rate of labour, is another major source of interregional disparity of per capita income. In this regard, human capital accumulation plays a crucial role. Across regions, interregional trade and factor mobility both contribute to factor price equalization, a necessary condition for convergence of per capita income levels. Labour mobility has the potential to make additional contributions to income convergence by facilitating human capital accumulation in poor regions.

3. Rising Regional Income Disparity in China

It is well observed that China's regional disparity in per capita income has increased since the 1980s. As shown in Figure 1, the per capita GRP gap between the East coastal region and the inland provinces was significantly enlarged between 1980 and 2005.

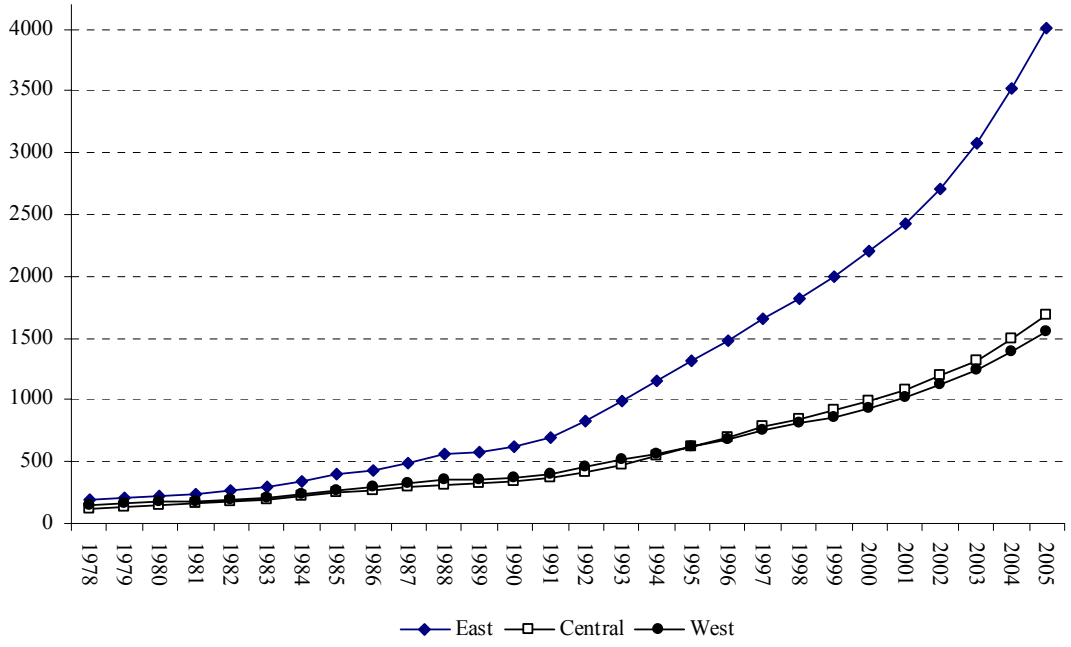

Figure 1. Per capita gross regional product of three provincial groups (1978-2005)

Unit: Yuan, in 1978 price

Source: NBSC, various years.

Notes:

1) The 'East Region' includes: Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shangdong, and Guangdong. Hainan Province is not included due to missing data. The 'Central Region' includes: Shanxi, Inner Mongolia, Jilin, Heilongjiang, Anhui, Jiangxi, Henan, Hubei, Hunan, Guangxi. The 'West Region' includes: Sichuan, Guizhou, Yunnan, Shaanxi, Gansu, Qinghai, Ningxia, and Xinjiang. The data of Chongqing Municipality is consolidated with that of Sichuan and Tibet is not included due to missing data.

2) The average per capita GDP is weighted by the provincial populations in each group.

To examine the sources of regional income disparity, we will focus our attention to the changes since the mid-1990s, of which the statistical data is relatively more

complete and reliable than earlier years. First, let us compare the changes of per capita incomes across provincial economies. Figure 2 displays the changes of per capita GRP indices between 1997 and 2007. As some provincial economies' per capita GRPs moved closer to the median level, others' deviated away. The net result is a rise of coefficient of variation from 0.673 to 0.724.

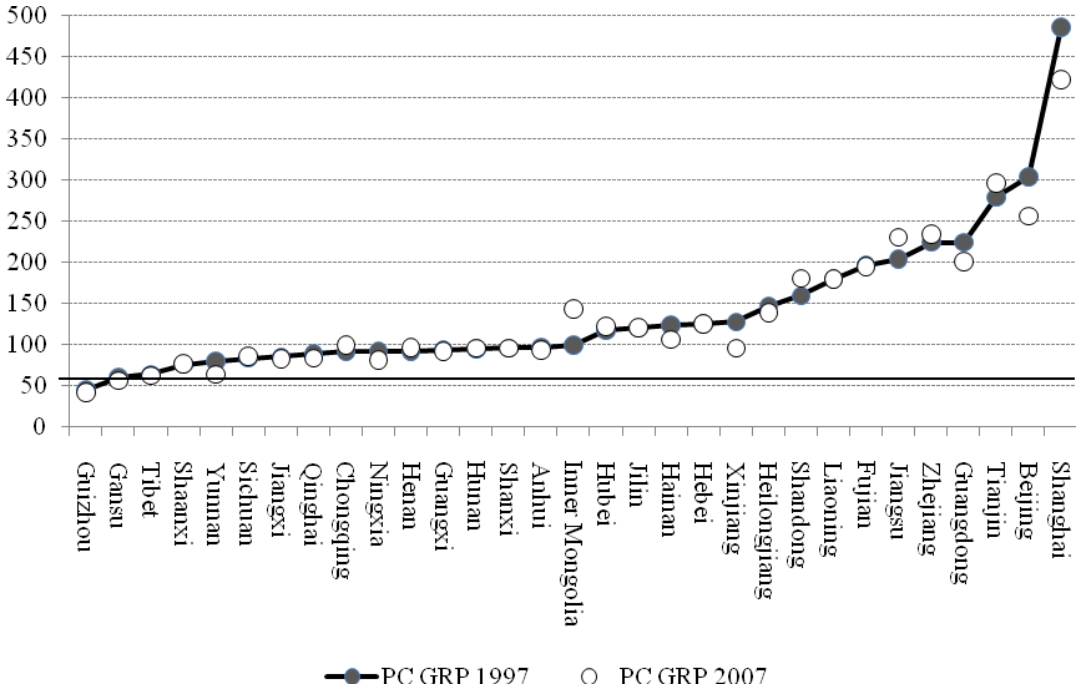

Figure 2. Per capita GRP indices: 1997 vs. 2007

Source: NBSC (1998, 2008)

Note: Both years' GRP statistics are deflated to constant price levels. Median level = 100.

It would be interesting to compare the change of per capita GRP with that of per capita GRI. Unfortunately, per capita GRI statistics is not available from official sources. The National Bureau of Statistics of China nevertheless publishes per capita household disposable income of urban residents and per capita net household income for rural

residents based on survey results. Since disposable or net household incomes do not include important components of national income such as taxes and depreciations, they are not close substitutes for the per capita GRI data.

Notwithstanding that, comparing these income statistics with GRP may reveal some useful observations. In Figures 3 and 4, we plot the regional indices of per capita urban and rural household incomes against that of per capita GRP for the years 1997 and 2007 respectively. These two figures reveal several interesting observations. First, for both 1997 and 2007, the regional disparity of per capita household incomes is much smaller than that of per capita GRPs. We will discuss this phenomenon later. Second, for both years, disparity of rural per capita household incomes is much higher than that of urban ones. This phenomenon indicates that much of the regional income disparity arises from disparity in rural development. Third, the rise of disparity (measured by coefficient variance) is much faster in the case of rural household incomes than the case of urban household incomes (Table 1).

Table 1. Comparison of Income Disparity between 1997 and 2007

Per capita		GRP	Urban HH income	Rural HH income
1997	Mean (*yuan*)	6,420	5,160	2,090
	Coefficient Variance	0.67	0.27	0.46
2007	Mean (*yuan*)	18,934	13,786	4,140
	Coefficient Variance	0.72	0.28	0.49
% rise of mean (with constant price)		232	210	156
% rise of Coefficient Variance		108	102	108

Source: NBSC (1998, 2008)

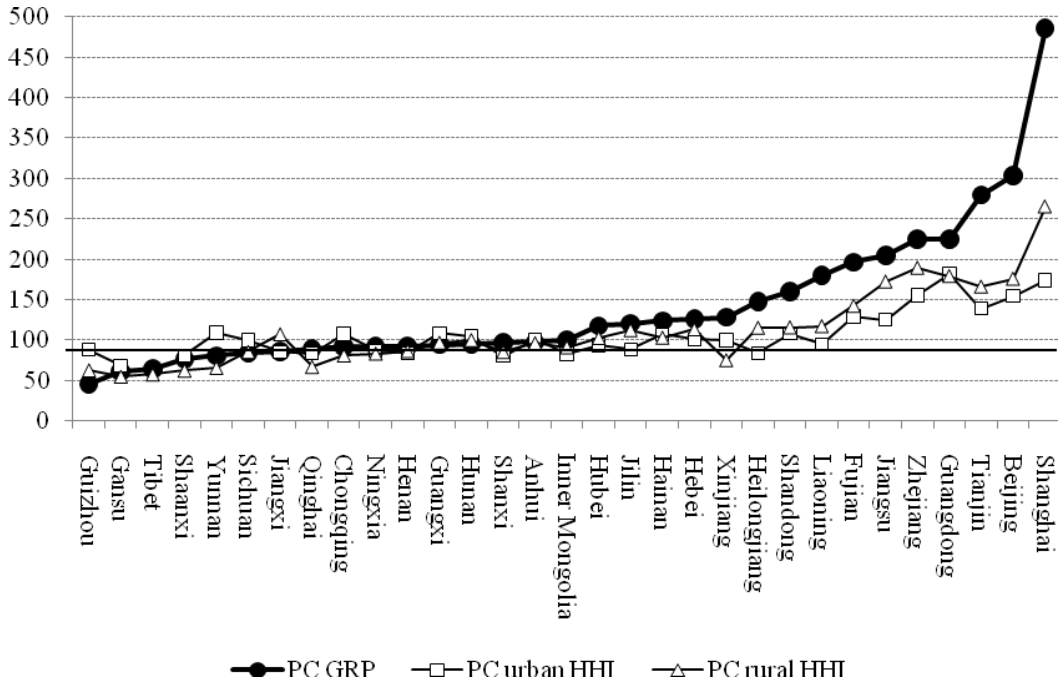

Figure 3. Indices of per capita GRP, urban household disposable income, and rural household net income (1997)

Source: NBSC (1998, 2008)

Note: Median level = 100.

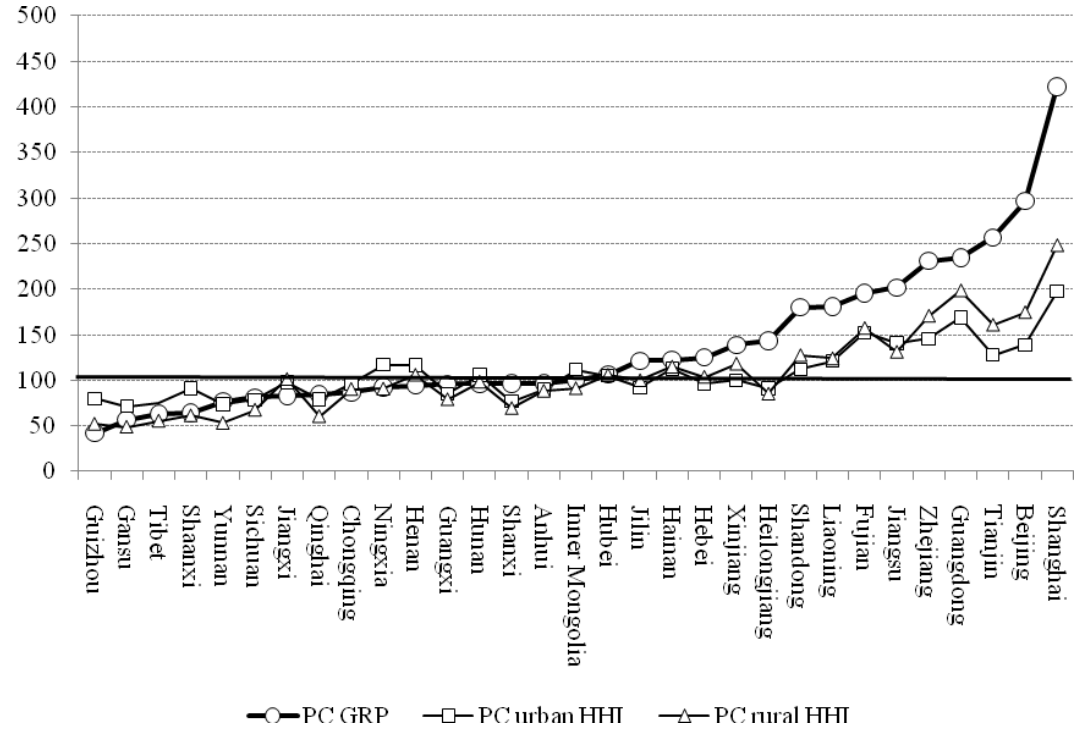

Figure 4. Indices of per capita GRP, urban household disposable income, and rural household net income (2007)

Source: NBSC, various years.

Note: Median level = 100.

4. Sources of Income Disparity

To examine the sources of per capita income disparity, we apply a simple assumption of a Cobb-Douglas aggregate production to the regional economy:

$$Y = A E^{\lambda} K^{\beta} \qquad (3)$$

where Y = output, A = a coefficient that indicates overall productivity, E = employed labour, K = capital stock, and λ and β are elasticity-coefficients of output to labour and capital respectively. Assuming constant-returns-to-scale, $\lambda = 1 - \beta$.

In order to understand how employment and demographics affect incomes, we introduce two more variables – population, *N,* and labour force, *L*, into this model to write per capita output as:

$$y = \frac{Y}{N} = \frac{AE^{1-\beta}K^{\beta}}{N} = \frac{AE^{1-\beta}K^{\beta}}{E} \cdot \frac{E}{N} = \frac{AE^{1-\beta}K^{\beta}}{E} \cdot \frac{E}{L} \cdot \frac{L}{N} \quad (4)$$

With dependency ratio, $d = \frac{N-L}{L}$, we can derive $N = (1+d)\,L$ and rewrite (4) as

$$y = \frac{Y}{N} = A\left(\frac{K}{E}\right)^{\beta} \cdot \frac{E}{L} \cdot \frac{1}{1+d} \quad (4a)$$

It is easy to see that per capita income would be lower if the dependent ratio rises. In logarithmic form, (4a) becomes:

$$\hat{y} = \alpha + \beta\,\hat{k} + \hat{e} + \hat{l} + \varepsilon \quad (5)$$

where $\hat{y}$ = ln (*Y/N*), $\hat{k}$ = ln (*K/E*), $\hat{e}$ = ln (*E/L*), and $\hat{l}$ = ln (*L/N*). Following the decomposition technique used by Zhang & Zhang (2003), we can decompose the variance of y as:

$$\text{var}(\hat{y}) = \text{cov}(\hat{y}, \beta\,\hat{k}) + \text{cov}(\hat{y}, \hat{e}) + \text{cov}(\hat{y}, \hat{l}) + \text{var}(\varepsilon) \quad (6)$$

where var(.) is variance and cov(y, .) is covariance of $\hat{y}$ with other variables. The logarithmic variance of per capita income has the desired features of scale invariance and size independence. The covariance terms on the right-hand side can be regarded as the contributions of the factor components to the total inequality. Suppose that average value of β is β_0 and each province's value of $\beta_i = \beta_0 + \nu_i$. Equation (5) becomes

$$\hat{y} = \alpha + (\beta_0 + \nu_i)\ \hat{k} + \hat{e} + \hat{l} + \varepsilon \qquad (5a)$$

The decomposition equation now can be rewritten as:

$$\text{var}(\hat{y}) = \beta_0 \text{ cov}(\hat{y}, \hat{k}) + \text{cov}(\hat{y},\ \nu_i \hat{k}) + \text{cov}(\hat{y}, \hat{e}) + \text{cov}(\hat{y}, \hat{l}) + \text{var}(\varepsilon) \qquad (6a)$$

We collected a data set of 31 provincial economies over the period 1995-2007 from various issues of NBSC (1996-2008). All GDP statistics are deflated by an accumulative price index with the base year 1995 as 1, derived from the annual indices of provincial GDP data.[2] The value of β_i for each provincial economy is imputed from data of "compensation of employees" in GDP statistics.[3] The difference of $\nu_i = \beta_i - \beta_0$, where β_0 is the annual average of the imputed β. Following the standard perpetual inventory approach used in Zhang and Zhang (2003), we estimated the capital stocks as:

$$K_t = \frac{I_t - \delta_t}{P_t} + K_{t-1} \qquad (7)$$

where K_t is capital stock in year t, I_t is fixed capital formation in year t, P_t is an accumulative price index with year 1995 as 1, derived from the annual price indices for fixed assets, and δ_t is capital depreciation. The initial values for the capital stock are also estimated by the same way as in Zhang and Zhang (2003).[4] Based on the hypothesis of conditional convergence, we construct an index of initial level of development, a_{i0}, as a

[2] China revised its GDP figures based on a nationwide economic census in 2004. The indices of gross regional product data back to 2001 published in NBSC (2006, 2007, 2008) have been used to account for the adjusted GRP statistics.

[3] Since data of "compensation of employees" were published for years 1994, 1997-2008, for years 1995-96, the value of β_i is estimated by the weighted average of 1994 and 1997.

[4] $K_0 = I_0/(\gamma + \delta)$, where δ is the depreciation rate assumed to be 5% and γ is the growth rate of real investment.

proxy to define the provincial fixed effect. The index of initial level of development is calculated as: $a_{i0} = y_{i0}$ – medium (y_0), where year 0 is 1995.

Figure 5 displays the results based on data of China's 31 provincial economies in 1995-2007. The inter-provincial inequality displays a slight upward move in 1995-99 and 2001-04. It is evident that major sources of inter-province per capita income inequality are variances in per worker's capital stock (9-14%) and capital productivity (9-15%). Labour force ratio only contributed less than 2-3% of the inequality. Such a marginal effect is mainly due to the fact that the variance value of labour force ratio is relatively small as compared to those of capital stock and capital productivity.

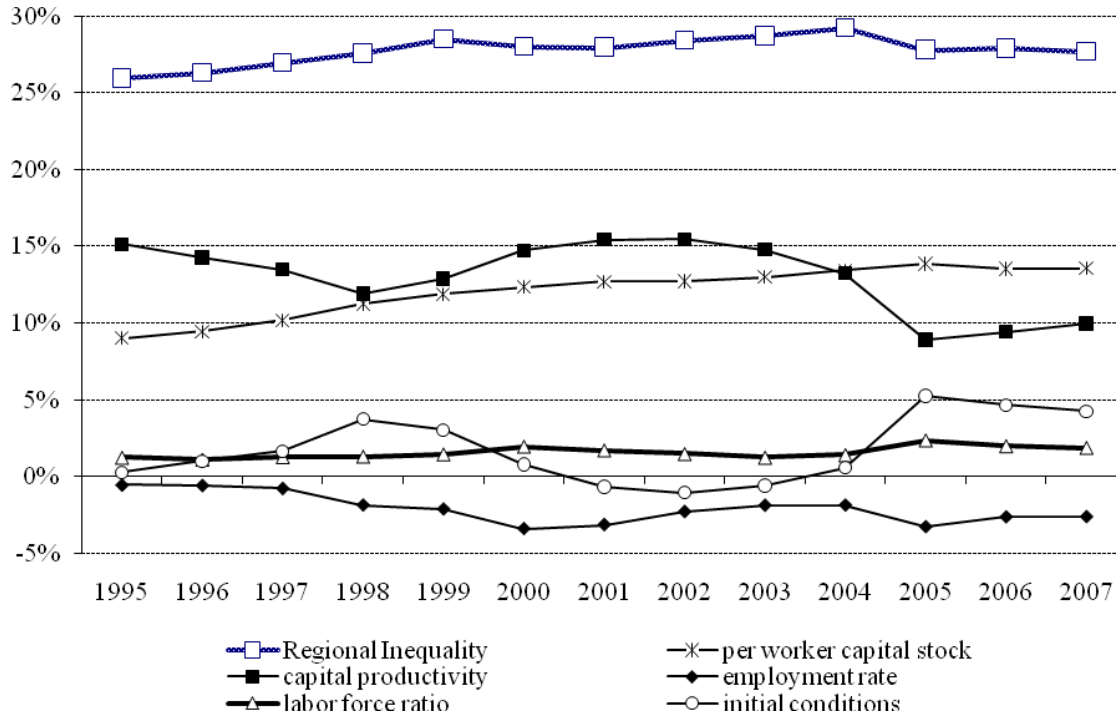

Figure 5. Regional Per capita Income Inequality and Its Sources (1995-2007)

Source: Calculated from data in NBSC (1996-2008).

It is noteworthy that employment rate has consistently been a negative source of inequality (varying from -0.5 to -4.0%), which suggests that distribution of employment rates among the provincial economies has offset some interregional inequality in per capita income.

The significant contribution of variance in per worker's capital stock and capital productivity to interregional per capita income disparity consists well with the two most crucial determinants of income levels implied in the Solow model, i.e. per worker's capital stock and technology level. An intriguing phenomenon is why the contribution of initial conditions has been positive for most years, indicating diverging, rather than converging, income trends between the rich and poor regions. Only for years 2001-03, it has negative values, probably reflecting the effects of the government's West China Development Program that invested huge amount of public funds in mega projects in inland areas. Since then, its aggravating impact on disparity has been resumed. This phenomenon prompts further explorations in the next two sections.

5. Directions of Factor Mobility

The literature reviewed in Section 2 suggests that factor mobility, especially labour mobility, is the most effective mechanism in income convergence. It is therefore interesting to examine whether factor mobility in China has increased over years and, more importantly, whether they flow to equalize factor prices.

There is empirical evidence (such as Kanbur and Zhang 1999) that before the mid-1990s changes in the distribution of capital among regions were much more rapid while inter-provincial labour mobility appeared to be rather sluggish. Nonetheless, by

various measurements, inter-regional labour mobility has increased very rapidly since the 1990s. A major part of this increasing labour mobility comes from the flow of rural migrant workers (农民工), who come to work in urban areas without becoming permanent urban residents due to various institutional restrictions. When official census started to collect data about migrant workers in 1987, there were only 15.2 million of migrants who were away from place of household registration for more than six months. That accounted to only about 1.5% of the total population. The number of such defined "floating population" increased to 30 million by 1990, 56 million by 1995, 80 million by 2000, and 140 million by 2004 (Mason and Wang 2005, National Population and Family Planning Commission 2005), more than one tenth of China's total population. Recent figures from the Ministry of Human Resources and Social Security suggest that the country has about 200 million migrant workers, of whom 120 million have moved from rural areas to work in cities.[5] Since the turn of the century, there has been a series of policy reforms, including reforms of the household registration system, to allow greater freedom of interregional labour mobility and rural-urban migration. However, due to persistent barriers to migration, most emigrant workers from rural and poor areas are unable to relocate with their kindred dependents to where they work. It is well observed that the inland regions "have lost relatively young and educated labour to emigration" (Fu, 2004).

We estimate provincial economies' net migration volume, m_t, in the following way:

$$m_t = \Delta N_t - g_{nt} N_{t-1} \qquad (8)$$

[5] "Creating jobs for migrant workers top govt agenda", *China Daily* (Beijing), 14 November 2008.

where $\Delta N_t = N_t - N_{t-1}$, which is the change of total population of residents in year *t*, and g_{nt} is the annual natural growth rate of the resident population.[6] We then define migration ratio in the period from year *0* to *t* as

$$Z_t = \sum_0^t m_i \Big/ \left(\frac{N_0 + N_t}{2} \right) \tag{9}$$

China conducted nationwide population censuses in years 1982, 1990, and 2000 on population of residence. According to NBSC (2006), the population statistics for years before 1982 are based on household registration and those for years between 1982 and 1990 are adjusted by the 1990 census results. The data of population by residence for years between 1990 and 2000 are adjusted in line with the data from the censuses of 1990 and 2000. The figures for 2001-2005 are estimates from annual 1% sample surveys on population changes. Therefore, the population statistics published in NBSC (2001-06) for years since 2000 are more reliable in accounting for the size of regional population, which includes rural migrant workers who do not have permanent residence in their host urban areas. In Figure 6, we plot the estimated migration ratios against the per capita income indices. It is interesting to observe that, in 2000-05, all the nine richest provincial economies experienced net immigration (indicated by positive migration ratios). Meanwhile, most of the net emigrating provincial economies had below-medium-level per capita incomes.

[6] The natural growth rate of population is the difference between crude birth rate and death rate.

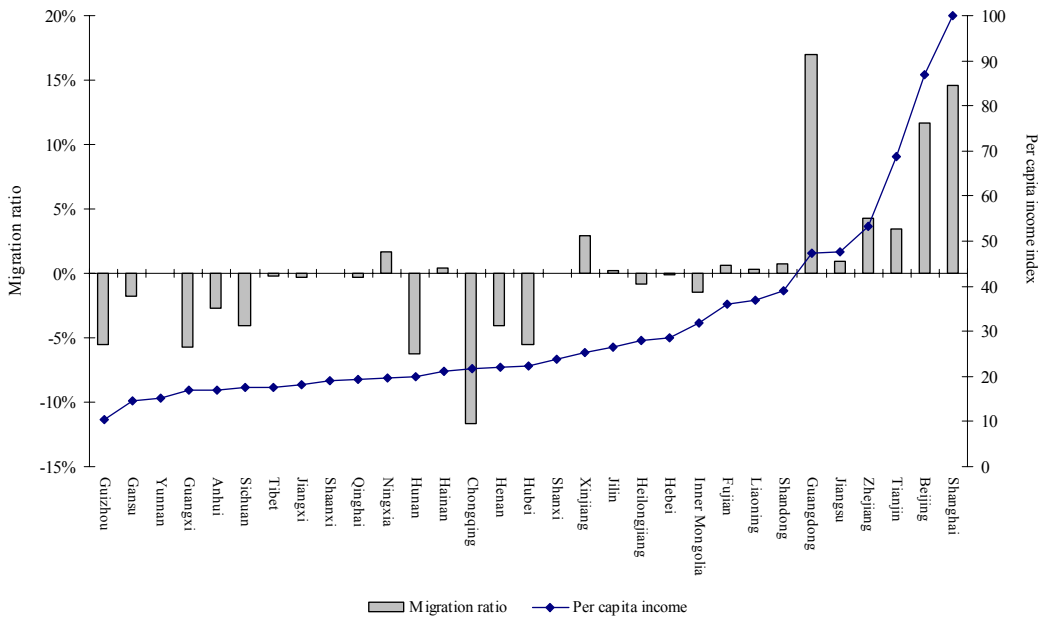

Figure 6. Regional Disparity of Per capita Income (2005) and Migration Ratio (2000-05)
Source: NBSC (2006).

The thesis that factor flows equalize factor returns is easy to establish in a static world, where schedules of factor marginal productivity are unchanged and full employment is presumed. In a dynamic world, however, changes in marginal productivity of capital or labour may be caused by reasons other than factor mobility. If there were strong forces (such as uneven progress in technological advances or institutional reforms) that diverges the marginal productivity of capital across regions, greater freedom in factor mobility may not be sufficient to override the diverging trends. For factor flows to play the role of equalizing the factor return rates, the flows must be in the "right direction", i.e. flowing to the regions' where marginal factor productivities are high.

Therefore, to evaluate the efficiency of factor flows, we should better investigate whether factor flows are in the right direction rather than try to directly measure their effects in equalizing factor return rates. In Figure 6, we plotted: (a) the correlation

between each year's changing rate of provincial shares of capital and the previous year's provincial marginal productivity of capital: Correlation [$\ln(\Delta K_{it}/K_{it})$, $\ln(MPK_{it-1})$]; (b) the correlation between each year's changing rate of provincial shares of employment and the previous year's provincial marginal productivity of labour: Correlation [$\ln(\Delta E_{it}/E_{it})$, $\ln(MPE_{it-1})$]; (c) the correlation between changing rates of provincial shares of employment and capital stock: Correlation [$\ln(\Delta K_{it}/K_{it})$, $\ln(\Delta E_{it}/E_{it})$] .

In all years in 1995-2007 except for 2003, Correlation [$\ln(\Delta K_{it}/K_{it})$, $\ln(MPK_{it-1})$] was positive, indicating that capital generally moves in the "right direction" to the places where marginal capital productivity appeared to be higher. The correlation, however, dropped in the late 1990s and moved near zero in 2001-2003 before recovering in 2004-2007 upward to about 0.2. The "active fiscal policy" during the late 1990s that pump primed massive public funds into investment projects and the launch of West China Development Program with mega projects in the inland regions might have contributed to this lapse in capital flows.

As for the labour, the Correlation [$\ln(\Delta E_{it}/E_{it})$, $\ln(MPE_{it-1})$] was below zero before 2001 but rose to above 0.2 in 2001-2006, ending 0.1 in 2007. Many studies have suggested that China's household registration (*Hukou*) system, which restricts the right of rural residents to work and live in urban areas, had been a major barrier to inter-region labour mobility.[7] A major reform was launched in October 2001 when the *hukou* system was officially relaxed to allow the rural people to live and work in more than 20,000

[7] The system, established in the late 1950s, confined people, especially those in the rural areas, to the place of their birth. For a more detailed discussion on the *Hukou* system, see Chan and Zhang (1999).

cities and towns nationwide.[8] It is highly plausible that greater freedom in cross-region labour mobility has caused the jump of the Correlation [$\ln(\Delta E_{it}/E_{it})$ $\ln(MPE_{it-1})$] into the positive range.

The movement of Correlation [$\ln(\Delta K_{it}/K_{it})$, $\ln(\Delta E_{it}/E_{it})$] surges to 0.2 to 0.3 for a few years from 1999-2002. This may be due to the booms of investment driven by the event like China's accession to the WTO that attracted inflows of both capital and labour to some regions.

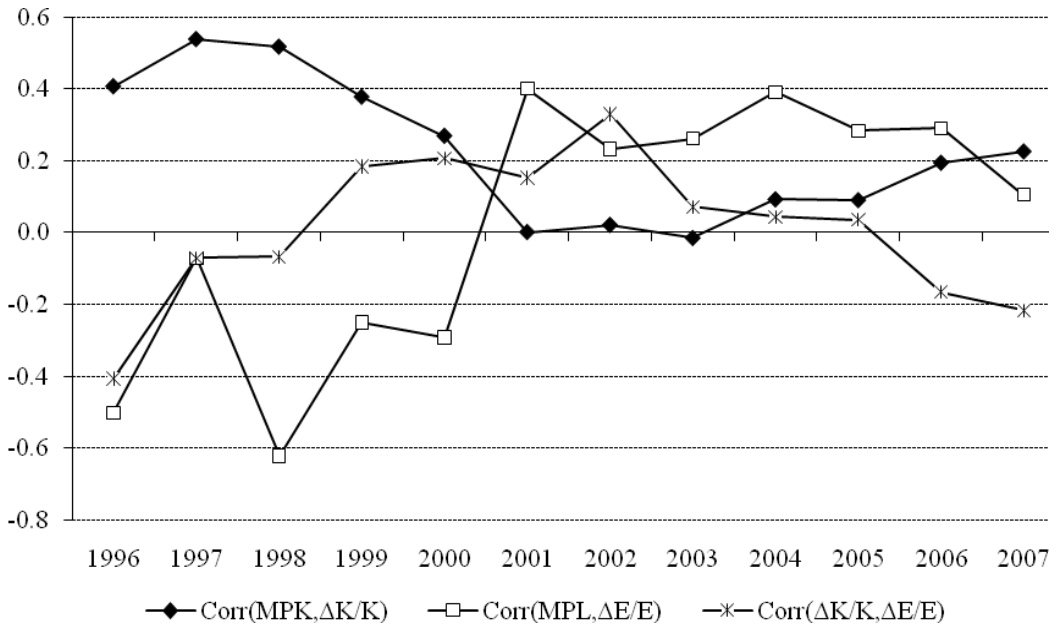

Figure 7. Correlations between Provincial Shares of Factor Allocation and Marginal Factor Productivity Changes (1995-2007)

Source: Calculated from data NBSC (1995-2007).

[8] "*Hukou* System Relaxation", Straits Times (Singapore), 10 October 2001; "Household registration reform in 20,000 cities and towns", *Beijing Qingnianbao (Beijing Youth News)*, 28 August 2001.

In a nutshell, the evidence that capital and labour movements are in the "right direction" in favour of per capita income convergence is rather weak. Although for most years capital and labour appear to flow to where their marginal productivity is higher, the correlations are below 0.6 for the years under investigation. Relatively speaking, labour mobility has improved its wage-equalizing function significantly since 2000 while capital mobility has yet to recover to its equalizing function to the pre-2001 levels. These results partially explain why convergence has not been observed for most years since the mid-1990s (Figure 5).

6. Demographic Consequences of Migration

From the literature review in Section 2, we learn that demographic transition may provide a window of catching up for poor regions. At the national level, China's economic takeoff has benefited tremendously from demographic dividends over the past few decades. Between 1970 and 2000, the juvenile dependency ratio (between those aged 0-14 and those aged 15-64) fell all the way from over 70% to below 30%, while the elderly dependency ratio (between those aged 65+ and those aged 15-64) remained relatively stable below 10%. The overall dependency ratio (between those aged 0-14 and 65+ and those aged 15-64) thus fell from nearly 80% to below 40%. Such a very favourable demographic change coincided with the crucial years of China's market-oriented reform and economic takeoff. From 1982 to 2000, roughly 15% of China's growth was attributable to "demographic dividend" (Mason and Feng, 2005).

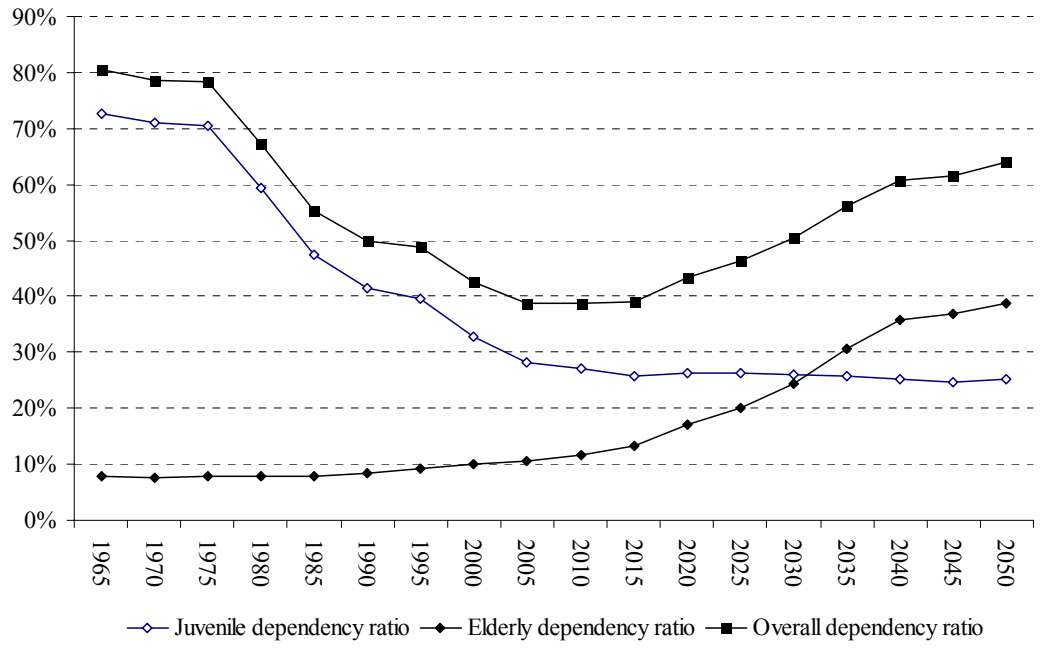

Figure 8. China's Juvenile, Elderly and Overall Dependency Ratios (1970-2035)

Unit: Percent

Notes:

Juvenile dependency ratio = population age 0-14 to population age 15-64;

Elderly dependency ratio = population age 65 and above to population age 15-64;

Overall dependency ratio = (population age 0-14 and population age 65+) to population age 15-64.

Source: United Nations Secretariat (2006); NBSC (1999, 2005, 2006).

However, all indicators of demographic trends suggest that China has already entered a post-transition era of a fast aging population. By 2000, China's population age structure was that of a mature population with the working age cohort taking up the largest share. China's population age structure is projected to become a very old one by 2030. From 2005 to 2025, China's population aged over 65 will double in size to about 200 million people. From 2015, the overall dependency ratio will rise sharply as a result of the rapidly aging population (Figure 8).

Across China, demographic patterns are highly heterogeneous. As evident in Figure 9, there is a rough correspondence between aging and per capita income. The richest five provincial economies have the oldest population structures. Most lower-income provinces have relatively younger populations. Generally the rich provinces are at the later phase of demographic transition while the poor ones are more likely to be at the earlier phase of transition. The poor inland regions appeared to have more room for "demographic dividends" or "window of development" than the rich coastal regions.

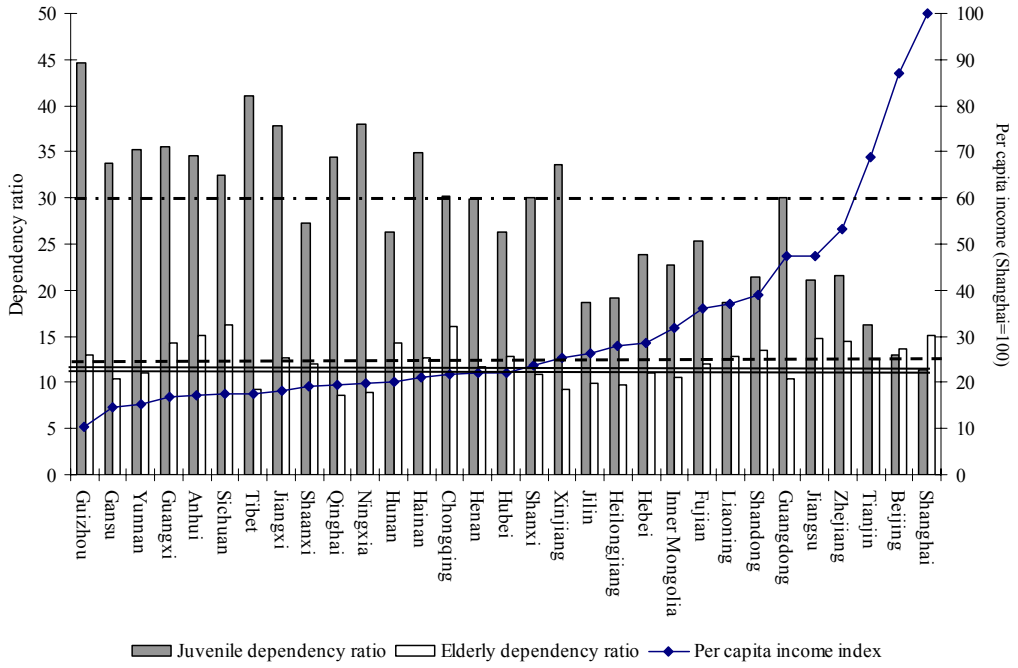

Figure 9. Regional Disparity of Per capita Income and Dependency Ratio (2005)

Note: "==" refers to medium per capita income, "- - -" refers to medium elderly dependency ratio, and "–·–" is medium juvenile dependency ratio.

Source: NBSC (2006).

Unfortunately, greater labour mobility across regions has somehow diluted the demographic dividends for the poor regions, most of which with net outward migrations.

The outward migration of the working-age population from the poor regions to the rich coastal regions has helped the latter cope with problems of an aging population by providing young workers to its labour force. It nevertheless shrinks the size of the labour force in the poor regions and raises its dependency ratios.

Table 2 compares the changes in demographic structures in ten poor regions with net outward migration and seven rich regions with net inward migration between 2000 and 2006. During the period 2000-2006, the ratio of working age population declined on average by 5.6 percentage points in the seven rich provincial economies and by 11.3 percentage points in the ten poor regions. Meanwhile, the average ratio of elderly population climbed by 5.3 percentage points in the seven rich regions and sharply doubling by 6.7 percentage points in the ten poor regions. The poor regions are quickly losing their demographic dividends to the rich ones.

Table 2. Changes in Demographic Structure (2000-2006)

	2000			2006		
Age	0-14	15-64	65+	0-14	15-64	65+
Poor 10 average	24.6	68.7	6.7	29.3	57.4	13.4
Guizhou	30.3	63.9	5.8	42.2	45.3	12.5
Gansu	27.0	68.0	5.0	30.8	58.8	10.4
Guangxi	26.2	66.6	7.1	32.3	54.6	13.1
Anhui	25.5	67.0	7.5	31.2	53.9	14.9
Sichuan	22.7	69.9	7.4	28.9	54.7	16.4
Hunan	22.2	70.5	7.3	25.2	60.0	14.8
Chongqing	21.9	70.2	7.9	28.2	55.3	16.6
Henan	25.9	67.1	7.0	29.4	59.2	11.4
Hubei	22.9	70.8	6.3	23.2	63.4	13.4
Inner Mongolia	21.3	73.4	5.3	21.4	68.4	10.3
Rich 7 average	17.9	73.5	8.6	18.2	67.9	13.9
Shangdong	20.8	71.1	8.0	20.3	67.0	12.7
Guangdong	24.2	69.8	6.1	27.8	62.4	9.8
Jiangsu	19.7	71.6	8.8	20.2	64.8	15.0
Zhengjiang	18.1	73.1	8.8	20.0	66.6	13.4
Tianjin	16.8	74.9	8.3	15.6	70.8	13.6
Beijing	13.6	78.0	8.4	12.7	73.1	14.3
Shanghai	12.2	76.3	11.5	10.5	71.0	18.6
National average	22.9	70.1	7.0	25.5	61.8	12.7

Source: compiled from NBSC (2001, 2007).

Figure 9 shows that some of the below-medium-income provinces, such as Guizhou, Guangxi, Anhui, Sichuan, Hunan, and Chongqing, have already displayed above-medium elderly dependency ratios. Situations in some provinces like Shaanxi, Hunan and Hubei are more worrying since they have below-medium juvenile dependency ratios but near- or above-medium elderly dependency ratios, indicating a fast aging population in the near future. Since per capita incomes in these provinces are below the medium, they are likely to be trapped in a status of "getting-old-before-getting-rich." Another problematic group consists of the three Northeast provinces, Liaoning, Heilongjiang and Jilin, which are located in the heavy industry "rustbelt," with high ratios of loss-making state-owned enterprises. All three have juvenile dependency ratios only 2/3 of the medium level and near-medium elderly dependency ratios, which again foretell of a fast aging population.

7. Managing Migration for Harmonious Regional Development

Despite its detrimental impact on the poor regions' demographic structures, labour migration enhances efficiency of labour resource allocation across regions. It improves the welfare of residents in poor regions as well as in rich regions.

Our literature review in Section 2 suggests that interregional movements of labour directly work on equalizing factor prices, creating a crucial necessary condition for income convergence. In regions where labour is relatively scarce, its rate of returns (i.e. wage rate) is higher than other production factors. Such differences in rates of returns for production factors are the bases of differing comparative advantages of regional

industries and products as well as movements of production factors. Migrant workers from the poor regions gain from better-paid jobs in the rich regions. The existence of surplus rural labour only bolsters the efficiency gains of migration to sectors and regions with a booming demand for workers. This process of "factor price equalisation" benefits not only the workers from poor regions but also the employers of the rich regions since they can hire cheap labour. The resulting lower production costs will eventually be passed to the general public (especially the consumers) in all regions through cheaper goods and services.

Poor regions may also benefit from labour mobility through its impact on human capital accumulation, an effect discussed by Razin and Yuen (1997). Migration of workers from low-wage (human capital poor) regions to high-wage (human capital rich) regions can create an indirect channel of productivity transmission across regions if some of those workers continue to accumulate human capital in their homeland regions (by, for instance, investing in their children's education there). In the process of wage equalisation from migration, the prospect of getting better-paid jobs provides incentives for those left behind to raise the rate of human capital accumulation, thus leading to equalisation of levels of human capital and hence levels of per capita income across regions.

Poor regions also benefit from migrant workers' remittance back home. As shown in Figures 3 and 4, for both 1997 and 2007, the regional disparity of per capita household incomes is much smaller than that of per capita outputs. That happens largely thanks to the migrant workers' remittance. The migrant workers' remittance lifts not only consumption of family members who stay behind, but also the saving and investment

rates in the homeland. Higher savings and faster accumulation of capital stock are the preconditions for faster growth of per capita income. Although statistics on China's regional migrant workers' remittance are easy to get, international experience may shed some light. The Filipino overseas workforce amounts to eight million, accounting for 10% of the Philippines' population. Those migrant workers' remittance home amounts to 10% of the country's GDP.[9]

Despite the aforementioned benefits, the poor regions face a major challenge in maximizing the benefits of labour mobility and controlling the negative impact of losing the demographic dividends. Unfortunately, the current institutional environment in China is far from conducive for the poor regions to gain sufficient benefits from outward migration of their labour.

One of the author's recent empirical findings shows that, since the mid-1990s, the dependency ratio's constraining effect on per capita income in the rich coastal regions has only been *half of* the average level in all regions. In other words, the rich coastal regions have been significantly less constrained by the rising dependency ratios (Lu, 2008). It is evident that increased labour mobility has generated biased benefits to regions with net inward migration. If this pattern of welfare effects continues, greater interregional labour mobility will only aggravate interregional disparity in development as the poor regions lose their most productive workers to the rich regions.

The household registration system and other institutional barriers continue to keep the migrant labour force "floating" or "temporary". The fact that a great proportion of

[9] Asia in Brief, *Vancouver Sun*, 24 November 2008.

migrant workers' dependents are left behind in their homeland has deteriorated the demographic structures of the poor regions. The remarkably higher dependency ratios in most poor regions and higher elderly dependency ratios in some poor areas (Figure 9 and Table 2) substantiate this observation. A great proportion of the poor regions' population spends most of their productive years outside the local economy only to return to their homeland after becoming aged dependents themselves. Therefore gaps in per capita incomes across regions are more likely to be persistent and even enlarged. Migrant workers' remittance can only moderate the gaps but not enough to close them as shown in Figures 3 and 4.

Even the migration's spill-over benefits of faster human capital accumulation at homeland may be discounted since the fruits of human capital accumulation will eventually be drained away by the outward migration of the more productive workers. Sociologists in China have well observed that with their parents being separated or away for jobs outside the homeland, children of migrant workers suffer severe disadvantages in the quality of their school education. The issue has raised serious concerns among the public. By 2007, there were about 150 million rural migrants working in the urban areas. About six million of these migrants' children had moved with their parents to live in urban areas but many of them were deprived of equal educational opportunity as children of permanent urban residents. Another 22 million migrant workers' children had been left behind in the rural homeland, accounting for 17% of the total schooling-age cohorts.

Without direct care by their parents, these "left-behind children" (留守儿童) face various psychological and social problems.[10]

The long-term effects of labour mobility on interregional income disparity depend on the migration patterns. If migrant workers from the inland and rural areas were allowed to establish permanent residence with their dependents in the coastal and urban areas, migration will improve the age structure of the rich provinces as well as the welfare of those migrant workers and their dependents.

By moving their dependents with them, the detrimental impact of labour emigration on the homeland demographic structure is minimised. Meanwhile, they will not only be contributors to the rich regions' GDP but also become the income earners of these regions' GNP. The wage rate in their hometown regions will also be raised as labour becomes relatively scarce thanks to emigration. In the longer run, most emigrants who established residence in the rich regions will not return as elderly dependents to add burden to their homeland population after their retirement. Many of them, as future investors, can be expected to be more prone to find investment opportunities in their homeland, as evident in the mainstay role played by overseas Chinese investors in the early years of China's opening up. In contrast, if the household registration system and other institutional barriers continue to keep the migrant labour force "floating" around the country, the interregional income disparity is likely to persist and worsen.

For governments in regions with net outward migration, it is important to understand that outward migration of labour is driven by market forces and should not be

[10] "Standing Committee of National People's Congress concerns over the education problems faced by children of rural migrant workers," *Xinhua* News Agency, 28 June 2007 (www.gov.cn).

resisted. To maximise the benefits of labour migration and minimise its negative impact, the following policy options could be taken:

i. Removing institutional barriers to permanent migration of rural workers and their dependents to urban areas should be a long term goal at the national level. Governments of poor regions should persistently lobby and push for an overhaul of the nationwide household registration system to achieve that goal.

ii. At the local level, the provincial governments should move ahead to lower or remove the barriers of rural-to-urban migration in their administrative territories. Rural migrant workers who can find jobs in local cities or towns and are willing to move there with their dependents should be welcomed and supported by the government. This will make local cities and towns more attractive for them to settle in. Meanwhile improving the physical and social-economic infrastructure of local urban areas to absorb more rural migrants should be a priority of the local government.

iii. Governments of poor regions may negotiate with governments of rich regions on policies and regulations that will facilitate the assimilation of migrant workers in the urbanisation process of the rich regions. Such coordination among the regional governments will make it easier for workers and their families from poor regions to establish permanent residence in rich regions.

iv. Much can be done to improve the local business climate through investment in infrastructure, institutional reforms, and policy changes to attract more inward capital flows, especially inward direct investment from other regions or abroad. Continuous

inward investment will raise capital-labour ratio in the local economy, create more jobs, enhance labour productivity, and therefore raise local wage rate.

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