Provincial returns to human capital in urban China, inter-regional inequality and the implicit value of a Guangdong hukou

15 May 2015

Jeffrey S. Zax

University of Colorado Boulder
Department of Economics
256 UCB
Boulder, CO 80309-0256
USA

As will be obvious, this draft is preliminary. Consequently, it is not suitable for quotation. Please refrain.

Provincial returns to human capital in urban China, inter-regional inequality and the implicit value of a Guangdong hukou

Abstract

This paper estimates province-specific regressions for urban earnings as functions of human capital characteristics in China for 1988, 1995 and 2002. These regressions differ dramatically across provinces within year for all three years. This demonstrates that the market mechanisms that would ordinarily equate returns to human capital across regions have been ineffective in urban China. Moreover, the persistent differences in returns to human capital across provinces have been responsible for reduced levels of earnings, elevated levels of inter-personal inequality and elevated levels of inter-provincial inequality. If all workers received the maximum of their predicted earnings across all provinces, rather than their predicted earnings in their home province, average earnings would approximately double, interpersonal inequality would decline by 40-50% and inter-provincial inequality would vanish. Throughout this period, returns to human capital in Guangdong province have generally been greater than in any other province. However, returns in Beijing increased over this period, to the point where, in 2002, they were greater than those in Guangdong for a noteworthy minority of workers.

J.E.L. codes: J24, J31, J61, R12, R23

Regional inequality in China is a subject of great scholarly and policy interest. However, virtually all of that interest is directed at comparisons of average income measures across provinces and regions. The extent to which these comparisons offer insight into the regional components, if any, of differences in individual welfare is unknown.

This paper attempts to provide this insight. It compares predicted incomes for workers in urban China across provinces. This comparison identifies the province of maximum predicted income for each worker and the predicted gains or losses associated with predicted income in the province of residence. As individuals reside in only one province, this comparison unavoidably requires the construction of counterfactuals.

The counterfactuals here are based on conventional province-specific regressions of observed labor earnings on observed, arguably exogenous controls, including measures of human capital. The 1988, 1995 and 2002 urban surveys of the China Income Project (CHIP) provide the necessary data.[1]

These regressions predict earnings within every province for all workers, regardless of the province in which they actually reside. These predictions identify the province in which each worker would maximize labor earnings. The comparison between this province and the province of residence provides a measure of the extent to which inequities that would presumably be eradicated by market forces nevertheless persist because of rigidities in Chinese labor markets.[2]

Section 1 of this paper summarizes the current understanding of inter-provincial inequality in China. Section 2 compares the province of residence and province of maximum predicted labor earnings for the year 1988 and analyzes the implications of this comparison for actual and counterfactual individual and inter-provincial inequality. Section 3 presents the same analysis for 1995, and section 4 for 2002. Section 5, yet to be completed, will extend the analysis to 2007. Section 6 summarizes the comparisons in these analyses across time. Section 7 concludes.

---

[1] These data are available at http://www.ciidbnu.org/chip/index.asp?lang=EN, accessed 20 October 2014.

[2] This analytical strategy is very similar to that in Xing (2014) and especially Xing and Zhang (2013).

1. Regional inequality in China

The many papers that examine inter-provincial differences in average incomes or growth rates yield a rough chronological consensus. There appears to have been no discernible difference in inter-provincial inequality from between 1952 and the mid-1960s. There may have been an increase in the middle of this period, during the Great Leap Forward, but the data from that era is untrustworthy (Tsui, 1991; Jian, Sachs and Warner, 1996; Kanbur and Zhang, 2005).

During the Cultural Revolution, from approximately the mid-1960s through the mid-1970s, inter-provincial inequality increased (Tsui, 1991; Jian, Sachs and Warner, 1996; Kanbur and Zhang, 2005). It declined into the early 1980s (Tsui, 1991; Tsui, 1996; Jian, Sachs and Warner, 1996; Kanbur and Zhang, 2005). It increased continuously from that time (Tsui, 1996; Jian, Sachs and Warner, 1996; Kanbur and Zhang, 1999) to as recently as 2000 (Kanbur and Zhang, 2005).

This literature is based on the calculation of inequality indices using provincial-level data. The interest in aggregation at this level is apparently motivated by one methodological and one political consideration. Methodologically, these papers place themselves within the macroeconomic tradition of convergence analysis (Barro and Sala-I-Martin; 1991, 1992a, 1992b, 1995). Politically, the interest in inequality at the regional level is, to some degree, motivated by the Chinese government's commitment to social stability (Jian, Sachs and Warner; 1996, 2).

The methodological tradition of convergence analysis suffers from its limited characterization of inter-provincial heterogeneity. As extreme examples, Pedroni and Yao (2006) distinguish provinces solely by their time series of growth rates. Lau (2010) does the same in his analysis of unconditional beta-convergence.

More generally, statistical explanations for indices of inter-provincial inequality are typically a secondary consideration, based on limited and arbitrary arrays of potential explanatory variables. As examples, Tsui (1991) decomposes aggregate inequality into agricultural, industrial and transfer components with some causal intuition, but without statistical inference. Jian, Sachs and Warner (1996) present evidence which suggests that average provincial incomes depend on the agricultural share in output and coastal location. Kanbur and Zhang (1999) also emphasize coastal location, as well as the distinction between urban and rural areas. Yang (1999) shares this latter concern. According to Kanbur

and Zhang (2005), inter-provincial differences in average income depend on fiscal decentralization, engagement in trade and the prominence of heavy industry.

Variables such as these probably capture some of the relevant heterogeneity across provinces. However, they are clearly not comprehensive. In particular, they omit province-specific measures of human capital accumulation. If, hypothetically, all workers in one province were high school dropouts and all workers in another were college graduates, it would be shocking if there were not substantial differences in average provincial incomes. Only Fleisher, Li and Zhao (2010) and Lau (2010) include measures of average provincial educational attainment among explanatory variables for growth rates of provincial GDP.

As a matter of policy, this literature is generally not informative about welfare concerns. These concerns ultimately apply to individuals rather than to aggregates.[3] From the perspective of individual welfare, the important question is not whether average incomes vary across regions, but whether an individual can live in the province where the returns to that individual's human capital are maximized.

Fleisher, Li and Zhao (2010) is an exception. As in this paper, they address the question of whether labor is allocated efficiently across Chinese provinces. They provide an answer from the perspective of province-level production functions, which estimate marginal products of both "educated" and "less-educated" labor that are much higher in the coastal and northeast regions than elsewhere. According to their estimates, equilibrating these marginal products across regions would require the relocation of a large fraction of the Chinese labor force.

This paper takes a more direct approach to the welfare implications of inter-provincial inequality It addresses a similar question to that of Fleisher, Li and Zhao (2010), but from the perspective of individual workers. This perspective yields estimates of inter-provincial imbalances that are even more striking than those of Fleisher, Li and Zhao (2010).

[3] "The individualistic roots of the economic literature on the measurement of inequality run very deep. Even the term 'interpersonal inequality' shows that the key focus is on the difference between individuals, and groupings of individuals have significance only in so far as individual outcomes are aggregated across the group, and group patterns have significance only as part of the overall picture of inequality across persons." Kanbur (2006, 369).

2. Earnings and inequality by province in 1988

In 1988, labor compensation in urban China was comprised of a large array of cash and in-kind payments. Most, if not all of them, were measured by the 1988 CHIP urban survey. In the analysis of this section, labor "earnings" consists of the sum of regular wage; "floating wage"; contract income; bonuses and above-quota wages; all subsidies including those for housing, heating, water and electricity, books and newspapers; "other wages"; "other cash income received from work unit" including bath and haircut subsidies, transportation subsidies, single-child subsidies, bonuses for birth control, and a variety of other productivity-related subsidies; "hardship allowances"; other working income including that from a second job[4]; the monetized value of meals in the work unit's dining room and baths in the work unit's bathhouse; the market value of all tickets received from the employer; and the excess of all private enterprise income over business expenses excluding taxes.

The analysis here utilizes three human capital characteristics, sex, years of schooling[5] and age. All are arguably pre-determined relative to earnings. The analysis consists of simple regressions in which the dependent variable is monthly earnings in yuan. The explanatory variables consist of the three human capital characteristics augmented by the square of age.[6]

The 1988 urban CHIP survey does not directly identify full-time workers, measure hours worked per week or weeks worked per year. In order to restrict the analysis to workers who are likely to be fully engaged in the labor market, the sample here includes only those who were older than 14 and whose monthly earnings exceeded 49 yuan.[7] Across the entire sample, average monthly earnings were 171.0

---

[4] Income from second jobs is included because the intent is to estimate the returns to human capital, regardless of whether or not those returns derive from a single employer.

[5] The 1988 CHIP urban survey records level of educational attainment rather than years of schooling. Here, the conversion between level of educational attainment and years of schooling assigns 16 years to "college (daxue) graduate or above", 14 years to "community college (dazhuan) graduate", 13 years to "professional school graduate", 12 years to "upper middle school graduate", nine years to "lower middle school graduate", six years to "primary school graduate", three years to "three years or more of primary school" and zero years to "less than three years of primary school".

[6] This is, admittedly, a simplistic approach to estimating the determinants of earnings. However, the primary interest here is in predicted earnings, rather than in these determinants. As discussed below, the predicted earnings comparisons in this paper are insensitive to elaborations in the estimation strategy.

[7] This earnings restriction removes approximately three percent of all observations reporting labor income.

yuan.[8]

[8] In 1988, on average, 3.73 Chinese yuan was equivalent to one American dollar (Economic Report of the President, 2010, table B-110). Therefore, the average monthly earnings in these data was equivalent to approximately $46.

Table 1

Earnings regressions by province, 1988

	Provinces									
Explanatory variables	Beijing	Shanxi	Liaoning	Jiangsu	Anhui	Henan	Hubei	Guangdong	Yunnan	Gansu
Intercept	-41.47	-40.60	-12.09	-18.33	**-47.50**	-23.22	**-48.18**	**-123.00**	-26.47	**-93.80**
p-value	0.0954	0.1560	0.4372	0.3304	0.0402	0.0920	0.0047	0.0013	0.2585	0.0007
Female	**-25.97**	**-17.36**	**-15.19**	**-22.89**	**-22.22**	**-16.57**	**-10.73**	**-39.60**	**-22.44**	**-26.71**
p-value	<.0001	0.0004	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Years of school	**2.50**	**2.73**	**2.75**	**2.80**	**3.20**	**2.86**	**3.45**	**3.52**	**2.61**	**6.05**
p-value	0.0007	0.0017	<.0001	<.0001	<.0001	<.0001	<.0001	0.0011	<.0001	<.0001
Age	**9.21**	**6.86**	**5.84**	**7.57**	**7.67**	**5.54**	**7.63**	**16.79**	**7.86**	**7.99**
p-value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
(Age/10) squared	**-8.63**	**-5.95**	**-4.32**	**-7.27**	**-6.89**	**-4.54**	**-7.40**	**-18.67**	**-7.04**	**-6.05**
p-value	<.0001	0.0026	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0162	0.0007
Observations	865	1,851	1,851	2,257	1,715	2,010	1,925	2,092	1,808	1,125
R-square	0.1993	0.0718	0.2407	0.1236	0.1294	0.2022	0.1499	0.0787	0.1439	0.2221
Adjusted R-square	0.1956	0.0698	0.2391	0.1221	0.1273	0.2006	0.1481	0.0769	0.1420	0.2193
F-statistic	**53.52**	**35.7**	**146.31**	**79.41**	**63.51**	**127.01**	**84.64**	**44.57**	**75.76**	**79.94**
p-value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Age of maximum age contribution	53.4	57.6	67.6	52.0	55.7	61.1	51.5	45.0	55.8	66.0

Table 1 presents these regressions. The 1988 CHIP urban survey sampled from ten provinces. Each column of table 1 presents the regression for one of these provinces.[9]

These ten regressions share some impressive regularities. Years of schooling contributes significantly to earnings in all ten provinces. The magnitude of that contribution varies from 2.50 to 6.05 yuan per month per year of schooling.

The linear and quadratic terms in age are also significant in the regressions for all ten provinces. The linear terms indicate returns to an additional year of age ranging from 5.54 to 16.79 yuan per year per month. These magnitudes suggest that returns to age were markedly greater than those to years of schooling. However, the negative quadratic terms imply that the maximum contribution of age to earnings occured between the ages of 45 and 66 across the ten provinces, after which earnings declined with age.[10]

Finally, women had significantly and substantially lower earnings than otherwise identical men in all ten provinces. The reductions in earnings associated with women varied from 10.73 to 39.60 yuan per month. They were equivalent to the differences in earnings associated with as few as three years of schooling in Hubei Province but as many as eleven years of schooling in Beijing and twelve years in Guangdong.

In general, the magnitudes of all coefficients are larger for Guangdong than for any of the other nine provinces. The returns to years of schooling in Guangdong are larger than in any province other than Gansu. The linear effect for age is much larger than elsewhere. However, the quadratic effect for age and the female effect are also larger than elsewhere, and negative. Therefore, while Guandong appears distinctive, the consequences of that distinction are not apparent in table 1.

Each of these regression equations predicts the earnings of each of the 17,499 members of the sample in the province to which it pertains. Table 2 compares these predicted earnings for each sample

---

[9] The provinces are ordered according to their ISO 3166-2 codes (https://www.iso.org/obp/ui/#iso:code:3166:CN, accessed 20 October 2014). Officially, Beijing is a "municipality" rather than a "province". Functionally, there is no important difference. Therefore, this paper refers to Beijing as a "province".

[10] The official age of retirement in China at this time was ... (find reference).

member across all of the ten provinces.[11] It then identifies the province in which each member would

[11] Xing (2014), Xing and Zhang (2013) and Zhang, et al. (forthcoming) are other examples of the use of regression-based counterfactuals. In particular, Zhang, et al. (forthcoming) estimate the effects of differences in population age structure across provinces on inequality in provincial per capita incomes.

Table 2

Province of maximum predicted labor earnings, 1988

Home province	Number of workers in home province	Share of all workers	Province of maximum predicted labor earnings: Beijing	Liaoning	Guangdong	Gansu
Beijing	865	4.94%	0.12%	0.23%	98.15%	1.50%
Shanxi	1,851	10.58%	0.05%	0.00%	99.68%	0.27%
Liaoning	1,851	10.58%	0.05%	0.00%	99.95%	0.00%
Jiangsu	2,257	12.90%	0.18%	0.04%	99.69%	0.09%
Anhui	1,715	9.80%	0.00%	0.17%	99.48%	0.35%
Henan	2,010	11.49%	0.10%	0.05%	99.15%	0.70%
Hubei	1,925	11.00%	0.05%	0.00%	99.69%	0.26%
Guangdong	2,092	11.95%	0.14%	0.00%	99.62%	0.24%
Yunnan	1,808	10.33%	0.06%	0.06%	99.72%	0.17%
Gansu	1,125	6.43%	0.18%	0.27%	99.02%	0.53%
Number of workers with maximum predicted labor earnings	17,499		16	11	17,413	59
Share of all workers	100.00%		0.09%	0.06%	99.51%	0.34%

attain the highest earnings.

The results are startling. Of the 17,499 sample members, 17,413, or 99.51%, attain their highest predicted earnings in Guangdong. In each of the other nine provinces, at least 98% of all workers attain their highest predicted earnings in Guangdong. No worker would attain highest predicted earnings in six of the provinces: Shanxi, Jiangsu, Anhui, Hennan, Hubei and Yunnan. Trivial numbers of workers attain maximum predicted earnings in the remaining three provinces: Beijing, Liaoning and Gansu.

Taken literally, these results imply that, if labor were freely mobile in urban China of 1988, virtually every worker would have migrated to Guangdong. Six provinces would have been entirely depopulated. Three would have been home to tiny bands of workers.

Obviously, this scenario cannot be understood as a plausible "prediction". First, residential location decisions respond to many location-specific attributes in addition to expected wages. These include familial and social relationships, local public goods and local institutions (Kanbur: 2006, 371).

Second, this scenario is essentially a partial equilibrium calculation of predicted earnings, based on the assumption that the returns to human capital were stable within province. Were anything like the suggested migrations to take place, those returns would change, perhaps radically. Consequently, the exercise here is properly construed as an "illustration" rather than a "projection".

Nevertheless, this illustration is suggestive of the costs imposed on Chinese urban workers, and on Chinese urban society, as a consequence or the failure to equate returns to human capital across provinces. Table 3 makes these suggestions concrete. It presents provincial-level estimates of average earnings and inequality, given the observed distribution of workers across provinces and in two alternative scenarios.

The third column of table 3 presents the aggregate Gini coefficient for observed earnings, and province-specific Gini coefficients for the observed samples within each province. The aggregate Gini coefficient, .2308, indicates that urban China in 1988 was relatively egalitarian.[12] Inequality within Shanxi

[12] However, these calculations omit the implicit subsidies associated with housing allocations. Zax (2014) demonstrates that these subsidies were sizable and very inequitable. Zax (2014) estimates that, with these subsidies, the Gini coefficient for "total income" could have been 30% higher than that for "measured income". These subsidies are ignored here, first, because the 1988 CHIP survey did not identify the household member to whom the household's housing had been assigned. Therefore, housing subsidies can be attributed only to the household, not to the individual. Second, housing subsidies would be part of labor earnings only if the household occupied a residence provided by the

Table 3

Actual and predicted inequality, 1988

	Workers in home province				Workers in province of maximum predicted earnings			Workers in home province with maximum predicted earnings	
Province	Number of workers	Average earnings	Gini coefficient of actual earnings	Gini coefficient of predicted earnings	Number of workers	Average predicted earnings	Gini coefficient of predicted earnings	Average predicted earnings	Gini coefficient of predicted earnings
Beijing	865	189.3	0.1899	0.0946	16	192.9	0.0362	243.5	0.0850
Shanxi	1,851	146.6	0.2366	0.1102	0			241.4	0.0973
Liaoning	1,851	162.4	0.1773	0.0974	11	181.0	0.0255	243.7	0.0931
Jiangsu	2,257	172.0	0.1799	0.0910	0			239.6	0.0981
Anhui	1,715	154.8	0.2287	0.1186	0			237.2	0.1048
Henan	2,010	138.0	0.2053	0.1085	0			240.3	0.0989
Hubei	1,925	159.5	0.1780	0.0843	0			246.2	0.0920
Guangdong	2,092	240.9	0.2690	0.0961	17,413	241.9	0.0961	241.0	0.0959
Yunnan	1,808	179.6	0.2020	0.0938	0			244.1	0.0910
Gansu	1,125	168.3	0.2468	0.1488	59	240.0	0.0546	242.4	0.0980
Total	17,499	171.0	0.2308	0.1381	17,499	241.8	0.0961	241.8	0.0961

and Gansu provinces was slightly greater than in the sample as a whole. However, within-province inequality elsewhere was even less than in the aggregate. The aggregate Gini coefficient is greater than those in most provinces because differences across provinces in average earnings contribute to additional inequality.

The fourth column of table 3 presents Gini coefficients for predicted earnings in the provinces of residence. These coefficients are uniformly smaller than the Gini coefficients for actual earnings. This is the inevitable implication of regressions such as those in table 1, which do not fit the data perfectly. They allocate a large part of the variance in the dependent variable to the residual. What remains in the predicted value of the dependent variable must be less than that in the dependent variable, itself.

Consequently, the inequality in the predicted dependent variable must be less then that in the actual dependent variable, as well. As table 3 indicates, the replacement of actual with predicted earnings in the home province reduces the aggregate Gini coefficient from .2308 to .1381, or 40.2%. The analogous reductions are similar in each of the provinces.

The Gini coefficient for predicted earnings in the home province is the appropriate reference from which to assess the effects of differing returns to human capital across provinces on inequality. First, actual earnings in other provinces are not observable. Second, to the extent that the residuals in the regressions of table 1 can be thought of as capturing transitory components of earnings, predicted earnings can be thought of as estimating permanent earnings. Presumably, decisions such as the choice of province of residence would be based on permanent rather than transitory components of earnings.

The seventh column of table 3 presents the Gini coefficients for maximum predicted earnings. For the sample as a whole, this coefficient is .0961. This demonstrates that, if workers could earn their maximum predicted earnings rather than the earnings predicted for them in their home provinces, the aggregate Gini coefficient would decline from .1381 to .0961. This represents, itself, a decline of 30.4%.

In other words, the restrictions that prevented returns to human capital from equalizing across provinces were responsible for approximately 30% of inequality in urban China of 1988. They were also responsible for substantial reductions in individual welfare. As reported by the sixth column of table 3, the average of maximum predicted earnings was 241.8 yuan per month, 70.8 yuan per month greater than the average of predicted earnings in home provinces (and, of course, of actual earnings). This

represents a loss equal to 41.4% of actual average earnings.

Moreover, these restrictions were almost entirely responsible for inter-provincial inequality. The eighth column of table 3 reports average earnings by province, if workers residents in those provinces were able to earn the maximum earnings predicted for them in any province. Under this counterfactual, average earnings in the ten provinces would have been virtually identical. They would have ranged from a minimum of 237.2 yuan per month in Anhui to a maximum of 246.2 yuan per month in Hubei, a difference of only nine yuan per month.

Table 4

Location costs and predicted earnings, 1988

Province	Number of workers	Average earnings	Location cost: Predicted earnings in home province minus maximum predicted earnings	Location costs as proportion of average earnings	Correlation, location cost and predicted earnings in home province
Beijing	865	189.3	-54.2	-28.63%	-0.2071
Shanxi	1,851	146.6	-94.9	-64.73%	-0.6097
Liaoning	1,851	162.4	-81.3	-50.06%	-0.5132
Jiangsu	2,257	172.0	-67.5	-39.24%	-0.7841
Anhui	1,715	154.8	-82.3	-53.17%	-0.6194
Henan	2,010	138.0	-102.3	-74.13%	-0.6250
Hubei	1,925	159.5	-86.6	-54.29%	-0.7281
Guangdong	2,092	240.9	-0.05	-0.02%	0.0633
Yunnan	1,808	179.6	-64.5	-35.91%	-0.5644
Gansu	1,125	168.3	-74.1	-44.03%	0.2739
Total	17,499	171.0	-70.8	-41.40%	0.4184

Table 4 explores the distributional consequences of the failure to equilibrate human capital returns across provinces. The third column presents the average difference between the maximum predicted earnings for each worker resident in each province and the predicted earnings for those workers in their provinces of residence. This average difference represents the predicted earnings loss imposed on workers in each province by requiring them to accept their earnings as predicted in their

home province, rather than allowing them to earn the maximum earnings predicted for them in any province.

These losses are, of course, trivial for workers resident in Guangdong. According to table 2, 99.62% of Guangdong workers have their highest predicted earnings in Guangdong as well. The tiny aggregate losses for these workers in table 4 are entirely attributable to the small gains that would have been made by the eight Guangdong workers whose maximum predicted earnings occurred elsewhere.

In all other provinces, the average losses were substantial. They ranged from 54.2 yuan per month in Beijing to 102.3 yuan per month in Henan. They were equal to or greater than 50% of average earnings in Shanxi, Liaoning, Anhui, Henan and Hubei.

Moreover, average losses were heavily regressive. The greatest losses in absolute terms were in Henan, which also had the lowest average earnings among all ten provinces. The smallest losses in absolute terms were in Beijing, which had the highest average earnings apart from Guangdong. Over all ten provinces, the correlation between average earnings and average location costs is 0.9959. This implies that provinces with higher average earnings also had higher, meaning less negative, average location losses.

Within province, however, absolute losses were generally progressive. In all province except Guangdong and Gansu, the correlation between individual predicted earnings in the home province and the loss imposed by the inability to earn the maximum individual predicted earnings was large and negative. In other words, within province, those with higher predicted earnings in the home province also predicted the largest losses.

Nevertheless, the net distributional effect of rigidities in the urban labor markets was regressive. The combination of largely progressive losses within province and overwhelmingly regressive losses across provinces yields an aggregate correlation between predicted earnings in home provinces and losses of .4184. In the aggregate, higher earnings were associated with losses that were less negative, or smaller.[13] Workers who predicted lower incomes, and therefore were presumably of lower skill, also predicted greater gains were they able to earn the Guangdong returns to their human capital.

[13] This analysis measures losses in absolute yuan terms. If losses were measured instead as a proportion of predicted home province earnings, results might differ. This exercise will appear in the next draft of this paper.

Table 5

The value of Guangdong residence, 1988

Home province		Province of maximum predicted earnings: Guangdong	Other	Any
Guangdong	Observations	2,084	8	2,092
	Average predicted earnings in home province	241.1	200.8	240.9
	Average difference, predicted earnings in Guangdong and highest predicted earnings elsewhere	54.2	-14.3	53.9
	Average difference, as percent of predicted earnings in home province	22.5%	-7.1%	22.4%
Other	Observations	15,329	78	15,407
	Average predicted earnings in home province	161.4	187.7	161.5
	Average difference, predicted earnings in Guangdong and predicted earnings in home province	80.6	7.8	80.3
	Average difference, as percent of predicted earnings in home province	50.0%	4.2%	49.7%
	Average predicted earnings in province of maximum earnings other than Guangdong	187.4	224.6	187.6
	Average difference, predicted earnings in Guangdong and highest predicted earnings elsewhere	54.6	-29.1	54.1
	Average difference, as percent of predicted earnings in province with highest predicted earnings other than Guangdong	29.1%	-12.9%	28.9%
All	Observations	17,413	86	17,499
	Average predicted earnings in home province	170.9	188.9	171.0
	Average difference, predicted earnings in Guangdong and predicted earnings in home province	71.0	7.1	70.7
	Average difference, as percent of predicted earnings in home province	41.5%	3.8%	41.3%
	Average predicted earnings in province of maximum earnings other than Guangdong	187.3	223.7	187.5
	Average difference, predicted earnings in Guangdong and highest predicted earnings elsewhere	54.5	-27.7	54.1
	Average difference, as percent of predicted earnings in province with highest predicted earnings other than Guangdong	29.1%	-12.4%	28.9%

In sum, tables 1 through 4 demonstrate that, in terms of predicted earnings, Guangdong dominated every other province for almost every worker in 1988. Implicit in these tables are estimates of the actual value of the right to live in Guangdong at that time.

This valuation is most straightforward for the 2,084 workers in Guangdong whose highest predicted earnings were also in Guangdong. As given in the first column of the first panel in table 5, average predicted earnings in Guangdong for these workers were 241.1 yuan per month. On average, these exceeded the next highest predicted earnings for these workers by 54.2 yuan per month.

This difference represents the value of the Guangdong hukou to these workers. It is equivalent, on average, to 22.5% of their predicted earnings in Guangdong, or to 29.0% of their greatest predicted earnings elsewhere. This difference is interpretable as a rent, in the sense that it would almost surely have dissipated if workers from other provinces had been more free to migrate to Guangdong.

This rent was distributed regressively. Among these 2,084 workers, the correlation between the the Guangdong rent and predicted earnings in Guangdong was .6691. In other words, workers who predicted higher earnings in Guangdong also predicted a larger difference between those predicted earnings and their highest earning prediction in any of the other nine provinces.

The second column of the first panel in table 5 reports that the right to live in Guangdong actually carried a small penalty, averaging 14.3 yuan per month, for the eight Guangdong residents who predicted higher earnings elsewhere. However, this has negligible impact on the average value of Guangdong residence for all of its workers, as given in the third column of that panel.

The value of Guangdong residence to workers resident in other provinces is somewhat more complicated. The first complication replicates that associated with valuing Guangdong residence for Guangdong residents: the optimal province for a very small number of residents in other provinces was not Guangdong. The second complication arises out of alternative mobility assumptions: if Guangdong was the optimal province for a worker, that worker's next highest predicted earnings may have been in another province other than that in which the worker was resident.

The second panel of table 5 addresses these complexities. The first column presents results for the 15,329 workers resident in other provinces whose highest predicted earnings occurred in Guangdong. The next three rows of this panel assume that the workers alternative to relocating in

Guangdong was to remain in their home provinces. Their average predicted earnings there were 161.4 yuan per month. The average premium that they would have received, had they earned the returns available in Guangdong, would have been 80.6 yuan per month, or half of their predicted earnings in their home provinces.

The final three rows of the second panel of table 5 compare, instead, the earnings that workers would have received in Guangdong or in the province other than Guangdong offering the highest predicted earnings, regardless of home province. The latter earnings, on average, amounted to 187.4 yuan per month. The additional premium that these workers would have received, with their predicted earnings in Guangdong, would have been 54.6 yuan per month, or 29.1% of their greatest predicted earnings elsewhere.

The second column of the second panel of table 5 presents the same comparisons for the 78 residents of provinces other than Guangdong whose highest predicted earnings were not in Guangdong. On average, predicted earnings for these workers were higher in Guangdong than in their home provinces, by 7.8 yuan per month. However, their predicted earnings were higher still in other provinces, by 29.1 yuan. Nevertheless, there are so few of these workers that the aggregate comparisons for all workers resident outside of Guangdong, in the third column of the second panel of table 5, are virtually identical to those for workers whose highest predicted earnings were in Guangdong.

The third panel of table 5 presents the same comparisons for the sample, aggregated over province of residence. The first and second columns are most similar to those in the second panel, because the number of workers resident in Guangdong is only approximately 12% of the entire sample. More importantly, though, for workers whose highest predicted earnings were in Guangdong, the absolute premium associated with those earnings was nearly identical for residents of other provinces when compared to their maximum predicted earnings elsewhere, and for Guangdong residents, themselves. The average value of this premium is essentially unaffected by the incorporation of the small number of workers whose maximum predicted earnings were not in Guangdong.

Consequently, the value of the Guandong hukou in 1988 appears to have been approximately 50 yuan per month. This represented approximately one-fourth of alternative predicted earnings elsewhere.

Table 6

Robustness checks. 1988

Province	Sample	Workers reallocated to province of maximum predicted earnings	Workers reallocated to province of maximum predicted earnings if maximum is at least 30% greater than predicted earnings in home province	Workers reallocated to province of maximum predicted earnings, earnings regressions include quadratic term in years of schooling	Workers reallocated to province of maximum predicted earnings, returns to education and age reduced by 30% in Guangdong
Beijing	865	16	314	5	15,496
Shanxi	1,851	0	9	0	0
Liaoning	1,851	11	84	19	11
Jiangsu	2,257	0	265	0	910
Anhui	1,715	0	40	0	0
Henan	2,010	0	4	0	0
Hubei	1,925	0	20	0	0
Guangdong	2,092	17,413	16,243	17,416	0
Yunnan	1,808	0	311	0	0
Gansu	1,125	59	209	59	1,082

Table 6 presents the results of three alternative comparisons, in order to verify the robustness of the results in tables 1 through 5. The second column reproduces the reallocation of workers from table 3, for the purpose of comparison. Each of the subsequent columns presents the numbers of workers who predict maximum earnings in each of the provinces, under the methodological variations described in the column headings.

The third column presents an illustrative reallocation, incorporating moving costs. Here, predicted earnings in provinces other than the home province must exceed predicted earnings in the home province by 30% in order to compensate for the costs of relocating. This restriction naturally prevents some reallocations that appeared in table 3. However, the returns to human capital in Guangdong were so high that predicted earnings there usually exceeded predicted earnings in home provinces by more than the 30% threshold.

Consequently, the overall pattern of reallocations in this column and in table 3 are very similar. Here, 16,243 of all workers, or 92.8% of the sample, predict earnings in Guangdong that are higher than in any other province, and at least 30% higher than predicted earnings in home provinces.

The fourth column of table 6 presents the distribution of maximum predicted earnings across provinces when the basic human capital regressions of table 1 are augmented by a quadratic term in years of school. In this respecification, the individual coefficients on the linear and quadratic terms in years of school are not consistently significant. Regardless, the distribution of maximum earnings across provinces in this respecification is virtually identical to that of the original specification.[14]

The fifth column presents the distribution of of maximum predicted earnings across provinces if Guangdong is omitted from the comparison. The intent here is to test whether returns to human capital are relatively similar across the other nine provinces. This test fails dramatically. In the absence of Guangdong, 15,496 of the 17,499 workers, or 88.6% of all workers, predict their highest earnings in Beijing.

This implies that, while returns to human capital in Guangdong dominate those in the other nine provinces, returns in Beijing dominate those in the remaining eight. Apparently, the spatial inequality

[14] Subsequent drafts will augment the regression further with dummy variables for occupation and Communist Party membership.

that arose from the failure to equilibrate returns to human capital across provinces created rents for those who resided in Beijing as well as for those who reside in Guandong. Section 5 examines this implication in greater detail.

3. Earnings and inequality by province in 1995

By 1995, the reform process in urban China had simplified labor compensation considerably, principally by eliminating many of the subsidies. The components of labor compensation measured by the 1995 CHIP urban survey include ''wages", "other income from work unit", "income of employees of individual enterprise", "income of re-employed retired member", "other employee income", "other income generated from labor", "private enterprise proprietor's pre-tax net income", "individual enterprise proprietor's pre-tax net income" and ""income from household sideline production". The sum of these components constitutes labor earnings for the purposes of the analysis in this section.

As in the previous section, the analysis here addresses only workers aged greater than 14. In contrast to the 1988 urban CHIP survey, the 1995 urban CHIP survey records work hours per day and work days per week. However, in order to maintain consistency with the 1988 analysis, this analysis imposes the restriction to arguably full-time workers by again eliminating the approximately three percent of the original sample with the lowest reported labor earnings. In this sample, the requisite threshold is below 100 yuan per month. Across the remaining observations, average monthly earnings were 527.4 yuan.[15]

The analysis here again begins with simple province-specific regressions of monthly earnings in yuan on the three human capital characteristics, sex, years of schooling[16] and age, augmented with a quadratic term in age. monthly earnings in yuan. The 1995 CHIP urban survey sampled from eleven provinces, those analyzed in the previous section and Sichuan. Table 7 presents the earnings regressions

[15] In 1995, on average, 8.37 Chinese yuan was equivalent to one American dollar (Economic Report of the President, 2010, table B-110). Therefore, the average monthly earnings in these data was equivalent to approximately $63. Hours of work per day and days of work per week may have been reported only sporadically. This will be checked in the next draft.

[16] The 1995 CHIP urban survey records the same levels of educational attainment as does the 1988 CHIP survey. This section employs the same conversion between level of educational attainment and years of schooling as adopted in the previous section. See footnote 3.

Table 7

Earnings regressions by province, 1995

Explanatory variables	Provinces										
	Beijing	Shanxi	Liaoning	Jiangsu	Anhui	Henan	Hubei	Guangdong	Sichuan	Yunnan	Gansu
Intercept	**-484.4**	**-188.7**	**-289.5**	**-770.8**	**-407.7**	**-257.1**	**-522.6**	**-1143.5**	-164.1	-161.3	**-429.9**
p-value	0.0022	0.0078	0.0012	<.0001	<.0001	0.0002	<.0001	<.0001	0.0930	0.0816	<.0001
Female	**-106.7**	**-80.3**	**-77.5**	**-63.8**	**-71.2**	**-47.7**	**-23.4**	**-125.9**	**-56.8**	**-34.4**	**-36.8**
p-value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0419	0.0003	<.0001	0.0021	0.0005
Years of school	**30.6**	**16.3**	**18.3**	**30.2**	**19.6**	**23.8**	**24.7**	**53.6**	**19.7**	**16.1**	**20.0**
p-value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Age	**38.8**	**17.0**	**24.9**	**48.7**	**29.6**	**14.6**	**31.0**	**74.8**	**17.0**	**17.9**	**23.7**
p-value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	0.0003	<.0001	<.0001
(Age/10) squared	**-40.4**	**-12.4**	**-23.7**	**-54.0**	**-31.5**	**-9.7**	**-29.6**	**-85.6**	**-13.1**	**-13.7**	**-18.8**
p-value	<.0001	0.0046	<.0001	<.0001	<.0001	0.0219	<.0001	<.0001	0.0271	0.0162	<.0001
Observations	863	1,089	1,231	1,335	833	958	1,240	1,009	1,441	1,134	642
R-square	0.1188	0.2249	0.1497	0.2050	0.2007	0.2623	0.1926	0.1217	0.1183	0.1492	0.3755
Adjusted R-square	0.1147	0.2220	0.1469	0.2027	0.1968	0.2592	0.1900	0.1182	0.1159	0.1461	0.3716
F-statistic	**28.92**	**78.62**	**53.96**	**85.76**	**51.98**	**84.73**	**73.66**	**34.78**	**48.17**	**49.48**	**95.76**
p-value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Age of maximum age contribution	48.0	68.5	52.6	45.1	46.9	75.3	52.4	43.7	65.0	65.4	62.9

for each.

As in 1988, years of schooling had a significant positive effect in each of the provinces. However, the magnitudes are much larger. In 1995, these effects ranged from 16.1 yuan per month in Yunnan to 53.6 yuan per month in Guangdong. These are nearly an order of magnitude larger than the 1988 effects. The change in the scale of the dependent variable is responsible for some of this difference, and inflation for perhaps somewhat more.[17] However, it appears that years of schooling became a more important determinant of earnings between 1988 and 1995.

The linear and quadratic terms in age are also statistically significant in all eleven provinces. The positive linear and negative quadratic terms imply that the maximum contribution of age to earnings occured at somewhere between the ages of 43 and 75. This range is roughly similar to that of 1988. The magnitudes of the 1995 age effects are several times as large as those of 1988, but these changes are probably commensurate with the inflation-adjusted change in average earnings.

The effects associated with women were, once again, negative and statistically significant in all provinces. They were substantially larger than in 1988 for Beijing, Shanxi, Liaoning and Guangdong. The changes in the female effect between 1988 and 1995 were disproportionately small In Henan, Hubei, Yunnan and Gansu, relative to the change in average earnings.

For 1995, the coefficients on all explanatory variables are larger for Guangdong than for any other province. However, the Guangdong intercept is negative, significant and also larger than any other in magnitude. Consequently, the direction of any comparisons between predicted earnings in the different provinces for any worker are not necessarily apparent in table 7. They are explicit in table 8 which, like table 2, identifies the distribution of the province of maximum predicted earnings for the workers from each province.

Table 8 demonstrates that Guangdong dominates this exercise in 1995 as it did in 1988. Once again, more than 99% of the sample predicts maximum earnings in Guangdong. Of 11,775 workers in the sample, only 45 attained their maximum predicted earnings elsewhere, in Beijing, Sichuan or Yunnan.

[17] There is considerable uncertainty regarding the correct adjustments for inflation in China during the 1990s. See Zax (2014) for a discussion.

Table 8

Province of maximum predicted labor earnings, 1995

Home province	Number of workers in home province	Share of all workers	Province of maximum predicted labor earnings: Beijing	Guangdong	Sichuan	Yunnan
Beijing	863	7.33%	0.23%	99.30%	0.12%	0.35%
Shanxi	1,089	9.25%	0.28%	99.45%	0.00%	0.28%
Liaoning	1,231	10.45%	0.00%	99.84%	0.00%	0.16%
Jiangsu	1,335	11.34%	0.00%	99.55%	0.00%	0.45%
Anhui	833	7.07%	0.24%	99.64%	0.00%	0.12%
Henan	958	8.14%	0.10%	99.37%	0.00%	0.52%
Hubei	1,240	10.53%	0.08%	99.60%	0.00%	0.32%
Guangdong	1,009	8.57%	0.10%	99.70%	0.00%	0.20%
Sichuan	1,441	12.24%	0.07%	99.79%	0.07%	0.07%
Yunnan	1,134	9.63%	0.00%	100.00%	0.00%	0.00%
Gansu	642	5.45%	0.16%	99.22%	0.00%	0.62%
Number of workers with maximum predicted labor earnings	11,775		12	11,730	2	31
Share of all workers	100.00%		0.10%	99.62%	0.02%	0.26%

Table 9

Actual and predicted inequality, 1995

	Workers in home province				Workers in province of maximum predicted earnings			Workers in home province with maximum predicted earnings	
Province	Number of workers	Average earnings	Gini coefficient of actual earnings	Gini coefficient of predicted earnings	Number of workers	Average predicted earnings	Gini coefficient of predicted earnings	Average predicted earnings	Gini coefficient of predicted earnings
Beijing	863	714.7	0.2385	0.0882	12	574.5	0.0380	1000.6	0.0913
Shanxi	1,089	411.6	0.2534	0.1270	0			941.9	0.1114
Liaoning	1,231	477.9	0.2519	0.1025	0			962.9	0.1039
Jiangsu	1,335	561.9	0.2573	0.1219	0			931.7	0.1191
Anhui	833	419.8	0.2497	0.1190	0			928.9	0.1211
Henan	958	401.5	0.2592	0.1352	0			942.4	0.1176
Hubei	1,240	498.8	0.2354	0.1058	0			986.0	0.1036
Guangdong	1,009	937.9	0.3069	0.1193	11,730	956.7	0.1098	938.2	0.1190
Sichuan	1,441	491.4	0.2480	0.0976	2	692.4	0.0008	960.6	0.1069
Yunnan	1,134	485.5	0.2027	0.0876	31	471.2	0.0688	962.0	0.1078
Gansu	642	388.6	0.2328	0.1453	0			942.3	0.1141
Total	11,775	527.4	0.2872	0.1816	11,775	954.9	0.1109	954.9	0.1109

Table 9 replicates table 3 for 1995. All average earnings values were larger for 1995 than for 1988. Inequality was also greater in 1995. In 1988, average earnings in Guangdong, the richest province, were less than twice average earnings in the poorest, Henan. The second column of table 9 demonstrates that average earnings across provinces varied by a factor of more than two in 1995.

More precisely, the Gini coefficient for actual earnings increased from .2308 in 1988 to .2872 in 1995. That for predicted earnings increased from .1381 to .1816. Finally, the Gini coefficient for maximum predicted earnings increased from .0961 to .1109.

Nevertheless, the important comparisons among the distributions of predicted earnings in home provinces and in provinces of maximum predicted earnings in 1995 are nearly identical to those comparisons in 1988. The first is already apparent: the inequality in maximum predicted earnings, .1109, was 38.9% lower than the inequality in predicted earnings, .1816. As in 1988, interpersonal inequality was substantially exacerbated by the failure to equilibrate returns to human capital across provinces.

This failure also exacerbated regional inequality. If workers were able to earn their maximum predicted earnings in their home provinces, the smallest average provincial income would have been 928.9 yuan per month in Anhui. The largest would have been 1000.6 yuan per month, in Beijing. The difference between them would have been only 71.7 yuan per month, or 7.7% of the Anhui average.

However, the most dramatic consequence of this failure may have been in average levels of welfare. Average maximum predicted incomes were 954.9 yuan per month, 81.0% greater than average actual earnings. The analogous gap in 1988 was only 41.4%. In other words, the "opportunity cost" of the failure to equilibrate returns to human capital across provinces was approximately equal to four-fifths of average earnings.

Table 10 demonstrates that, as in 1988, the costs of differences across provinces in returns to human capital were distributed progressively within province, regressively across provinces and regressively over all. In all provinces except Guangdong, workers with higher predicted earnings also predicted larger negative losses. However, across provinces, average losses were larger in magnitude for provinces with lower average predicted earnings.[18] In the sample as a whole, then, the correlation between predicted earnings and predicted losses was .4720.

[18] The correlation between average earnings and average location costs is 0.9904

Table 10

Location costs and predicted earnings, 1995

Province	Number of workers	Average earnings	Location cost: Predicted earnings in home province minus maximum predicted earnings	Location costs as proportion of average earnings	Correlation, location cost and predicted earnings in home province
Beijing	863	714.7	-285.9	-40.00%	-0.6375
Shanxi	1,089	411.6	-530.3	-128.84%	-0.4652
Liaoning	1,231	477.9	-485.1	-101.51%	-0.7232
Jiangsu	1,335	561.9	-369.8	-65.81%	-0.9188
Anhui	833	419.8	-509.1	-121.27%	-0.9085
Henan	958	401.5	-540.9	-134.72%	-0.6001
Hubei	1,240	498.8	-487.3	-97.69%	-0.6844
Guangdong	1,009	937.9	-0.3	-0.03%	0.1360
Sichuan	1,441	491.4	-469.3	-95.50%	-0.6621
Yunnan	1,134	485.5	-476.5	-98.15%	-0.6004
Gansu	642	388.6	-553.7	-142.49%	-0.4556
Total	11,775	527.4	-427.5	-81.06%	0.4720

Table 11 attempts to estimate the 1995 value of Guangdong residency. This value is unambiguous for the 1,006 Guangdong residents whose highest predicted earnings were also in Guangdong. As given in the first column of the first panel of table 11, their average predicted earnings were 939.4 yuan per month. That exceeded the average of their maximum predicted earnings elsewhere by 265.7 yuan per month, or 28.3% of their predicted Guangdong earnings. This is the premium that these workers would have been forced to forgo if they were relocated to the province offering them the highest alternative earnings.

The second column of the first panel in table 11 reports that only three Guangdong workers predicted higher earnings in some other province.[19] Consequently, the average premium for the entire province, in the third column, is virtually identical to that in the first column.

The first column of the second panel in table 11 reports that, of the 10,766 sampled workers resident in provinces other than Guangdong, 10,724 had maximum predicted earnings in Guangdong. The average excess of their Guangdong predicted earnings over predicted earnings in their home provinces was 468.9, or an increase of 95.8%. This would represent the Guangdong premium for these workers if their only options were to remain in their home province or to move to Guangdong. However, many of these workers also predicted higher earnings in other provinces than in that of their homes. Therefore, this probably overstates the Guangdong premium for these workers.

In contrast, the minimum premium would be the earnings lost to these workers if they were able to move to the province other than Guangdong offering them the highest predicted earnings, but not to Guangdong, itself. Table 11 reports that, on average, these lost earnings would have amounted to 275.3 yuan per month, or 40.3% of maximum predicted earnings in any province other than Guangdong.

In sum, these two estimates provide bounds on the Guangdong premium for these workers, with the true value dependent on the extent of the mobility options notionally available to them. The lower bound of 275.3 yuan per month is very close to the premium for all Guangdong residents, 264.6 yuan per month. However, this represents a noticeably smaller proportion of predicted earnings for residents of Guangdong than for those resident elsewhere.

---

[19] These workers were apparently of very low skill, relative to the Guangdong workforce. Their predicted earnings in Guangdong were less than half of the average predicted earnings in that province for workers resident there.

Workers who were not resident in Guangdong but who predicted their maximum earnings in Guangdong represent 91.1% of the entire sample. Consequently, premium estimates for the sample as a whole, in the third column of the third panel of table 11, are very similar to those for this subset. The average predicted loss associated with home province predicted earnings was 427.0 yuan per month. In other words, the predicted earnings of the average worker in the home province was barely half of maximum predicted earnings. On average, returns to human capital in Guangdong predicted earnings that exceeded the next highest prediction of earnings by 272.9 yuan per month, or 40.0% of that next highest prediction.

Table 12 replicates the robustness checks of table 6, with the same results. Guangdong retains its dominance over predicted earnings if predicted earnings elsewhere must exceed those in the home province by at least 30% in order to induce a move, or if the regression specification includes a quadratic term in years of schooling. As in 1988, in the absence of Guangdong, returns to human capital in Beijing dominate those in any other province for almost all workers.

Table 11

The value of Guangdong residence, 1995

Home province		Province of maximum predicted earnings: Guangdong	Other	Any
Guangdong	Observations	1,006	3	1,009
	Average predicted earnings in home province	939.4	449.3	937.9
	Average difference, predicted earnings in Guangdong and highest predicted earnings elsewhere	265.7	-98.9	264.6
	Average difference, as percent of predicted earnings in home province	28.3%	-22.0%	28.2%
Other	Observations	10,724	42	10,766
	Average predicted earnings in home province	489.3	393.1	489.0
	Average difference, predicted earnings in Guangdong and predicted earnings in home province	468.9	-25.1	467.0
	Average difference, as percent of predicted earnings in home province	95.8%	-6.4%	95.5%
	Average predicted earnings in province of maximum earnings other than Guangdong	683.0	505.7	682.3
	Average difference, predicted earnings in Guangdong and highest predicted earnings elsewhere	275.3	-29.1	273.7
	Average difference, as percent of predicted earnings in province with highest predicted earnings other than Guangdong	40.3%	-5.7%	40.1%
All	Observations	11,730	45	11,775
	Average predicted earnings in home province	527.9	396.8	527.4
	Average difference, predicted earnings in Guangdong and predicted earnings in home province	428.7	-23.4	427.0
	Average difference, as percent of predicted earnings in home province	81.2%	-5.9%	81.0%
	Average predicted earnings in province of maximum earnings other than Guangdong	682.2	508.6	681.5
	Average difference, predicted earnings in Guangdong and highest predicted earnings elsewhere	274.5	-135.1	272.9
	Average difference, as percent of predicted earnings in province with highest predicted earnings other than Guangdong	40.2%	-26.6%	40.0%

Table 12

Robustness checks. 1995

Province	Sample	Workers reallocated to province of maximum predicted earnings	Workers reallocated to province of maximum predicted earnings if maximum is at least 30% greater than predicted earnings in home province	Workers reallocated to province of maximum predicted earnings, earnings regressions include quadratic term in years of schooling	Workers reallocated to province of maximum predicted earnings, returns to education and age reduced by 30% in Guangdong
Beijing	863	12	70	58	10,161
Shanxi	1,089	0	8	0	14
Liaoning	1,231	0	3	0	10
Jiangsu	1,335	0	0	0	1,190
Anhui	833	0	0	0	0
Henan	958	0	2	0	5
Hubei	1,240	0	2	0	135
Guangdong	1,009	11,730	11,651	11,701	0
Sichuan	1,441	2	10	5	98
Yunnan	1,134	31	25	11	156
Gansu	642	0	4	0	6

4. Earnings and inequality by province in 2002

By 2002, many of the subsidies and alternative payments common in Chinese urban labor markets in earlier years had disappeared. The components of labor compensation recorded by the 2002 urban CHIP survey consisted of "total income", "subsidy for minimum living standard", "living hardship subsidies from work unit", "second job and sideline income" and "monetary value of income in kind". The sum of these components constitutes earnings for the purpose of this sample. The average value of earnings was 1079.3 yuan per month.[20]

The 2002 urban CHIP survey provides more of the information necessary to ensure that the sample is restricted to those who were arguably fully engaged in the labor market. In addition to age and earnings, the primary selection criteria for the 1988 and 1995 samples, this 2002 survey recorded months worked, working days per month and hours per working day. Consequently, as for 1988 and 1995, the sample here excludes those aged 14 or younger and those with monthly earnings below a minimal threshold, here 150 yuan. In addition, this sample excludes those who reported fewer than 15 work days per month or fewer than six work hours per day.[21]

Table 13 presents the regressions of earnings on human capital characteristics for 2002. These regressions differ noticeably from those of 1988 and 1995, principally in the diminished role of age. The linear terms for age are positive for all twelve provinces but insignificant for four. The quadratic terms are insignificant for eight provinces. Moreover, the magnitudes of the age coefficients relative to those for other explanatory variables are smaller than in the earlier samples.

In 2002, as in 1988 and 1995, years of schooling has positive significant coefficients for all provinces. However, the absolute magnitudes of these coefficients are noticeably greater for 2002. More importantly, they are generally larger than the linear terms for age. In contrast, they are of approximately the same magnitude as the age coefficients for the 1995 sample and noticeably smaller

[20] In 2002, on average, 8.28 Chinese yuan was equivalent to one American dollar (Economic Report of the President, 2010, table B-110). Therefore, the average monthly earnings of 1079.3 yuan was equivalent to approximately $130.4.

[21] These additional restrictions affected relatively few observations. The next draft will enumerate them.

for the 1988 sample.[22] This indicates that, over the period spanned by these data, age has become less important in the determination of earinngs and education has become moreso.

The increased influence of education has also reduced, at least in relative terms, the influence of sex. As in 1988 and 1995, the coefficients for women are negative and significant in all twelve provinces for 2002. They are of roughly similar magnitudes, compared to the coefficients for age, as in 1988 and in 1995. However, in 2002 the earnings deficits associated with sex was less than the earnings effect of three years of additional schooling in ten of the twelve provinces. In 1998, this deficit was less than the earnings effect of three years of schooling in only seven of the eleven provinces.[23]

In table 13, the coefficients on years of schooling, age and age squared for Guangdong are all larger in absolute value than the corresponding coefficients for the other provinces. The coefficient for sex in Guangdong is nearly as large in absolute value as the largest, that for Beijing. These comparisons might suggest that returns to human capital continued to dominate in Guangdong in 2002, as they had in previous years.

However, Guangdong also has a negative and significant intercept. It is more than twice as large in absolute value as any other intercept. At the estimated return to years of schooling in Guangdong, nearly twenty years of schooling would be necessary to merely counteract the contribution of this intercept. Consequently, the 2002 comparisons between predicted earnings in different provinces are not obvious in the regression results, themselves.

Table 14 tabulates these comparisons. In practical terms. Guangdong was still the province of maximum predicted earnings for the vast majority of workers in 2002. However, in contrast to 1988 and 1995, in 2002 only 86.08% of all workers predicted their highest earnings in Guangdong. Furthermore, 12.89% of all workers predicted their maximum earnings in Beijing. As in 1988 and 1995, all other

---

[22] In all three years, the coefficients on the linear and quadratic terms for age are of approximately the magnitudes in absolute value.

[23] In 1988 Hubei required less than four years of schooling; Gansu required less than five; Henan and Liaoning required less than six; Shanxi and Anhui required less than seven; Yunnan and Jiangsu required less than nine; Beijing required less than 11 and Guangdong required less than 12. In 1995, Hubei required less than one year; Gansu required less than two years; Jiangsu, Henan, Guangdong, Sichuan and Yunnan required less than three years; Beijing and Anhui required less than four years; Shanxi and Liaoning required less than five years. In 2002, Sichuan, Yunnan and Gansu required less than two years; Beijing, Jiangsu, Anhui, Henan, Hubei, Guangdong and Chongqing required less than three years; Shanxi required less than four years and Liaoning required less than five.

Table 13

Earnings regressions by province, 2002

Explanatory variables	Province											
	Beijing	Shanxi	Liaoning	Jiangsu	Anhui	Henan	Hubei	Guangdong	Chongqing	Sichuan	Yunnan	Gansu
Intercept	-295.6	**-761.5**	**-806.9**	**-1287.5**	-231.3	-390.3	-527.1	**-2340.6**	-938.8	**-862.9**	**-949.7**	**-932.5**
p-value	0.5471	0.0008	0.0154	0.0136	0.5238	0.1885	0.0746	0.0008	0.1591	0.0037	0.0008	0.0101
Female	**-299.1**	**-178.4**	**-279.3**	**-198.3**	**-163.3**	**-120.0**	**-131.1**	**-280.9**	**-197.8**	**-92.4**	**-71.6**	**-105.7**
p-value	<.0001	<.0001	<.0001	0.0011	0.0002	0.0014	<.0001	0.0008	0.0189	0.0144	0.0165	0.0148
Years of school	**128.3**	**54.7**	**62.1**	**88.8**	**62.6**	**50.5**	**49.1**	**130.0**	**96.0**	**65.3**	**48.1**	**67.8**
p-value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Age	6.1	**44.6**	**49.6**	**57.9**	7.0	23.9	**35.1**	**127.1**	27.0	**39.5**	**61.1**	**36.6**
p-value	0.7895	<.0001	0.0023	0.0216	0.6944	0.1004	0.0162	0.0002	0.4049	0.0042	<.0001	0.0331
(Age/10) squared	13.5	**-39.5**	**-47.7**	-48.4	13.0	-16.0	-27.3	**-142.7**	-4.8	-30.2	**-59.7**	-24.5
p-value	0.6315	0.0007	0.0204	0.1184	0.5558	0.3713	0.1381	0.0008	0.9063	0.0691	0.0006	0.2477
Observations	841	852	1,076	979	665	942	994	940	418	833	880	564
R-square	0.1287	0.1559	0.1146	0.1101	0.1768	0.0944	0.1095	0.0979	0.1378	0.1663	0.1603	0.1683
Adjusted R-square	0.1245	0.1519	0.1113	0.1064	0.1718	0.0906	0.1058	0.0941	0.1294	0.1623	0.1565	0.1623
F-statistic	**30.87**	**39.10**	**34.67**	**30.12**	**35.43**	**24.43**	**30.39**	**25.38**	**16.50**	**41.29**	**41.77**	**28.27**
p-value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Age of maximum age contribution	-22.5	56.4	51.9	59.8	-26.8	74.5	64.3	44.5	281.3	65.3	51.1	74.9

Table 14

Province of maximum predicted labor earnings, 2002

Home province	Number of workers in home province	Share of all workers	Province of maximum predicted labor earnings: Beijing	Anhui	Hubei	Guangdong	Yunnan
Beijing	841	8.42%	18.79%	0.00%	0.00%	81.09%	0.12%
Shanxi	852	8.53%	14.08%	0.00%	0.00%	85.56%	0.35%
Liaoning	1,076	10.78%	16.73%	0.00%	0.00%	82.34%	0.93%
Jiangsu	979	9.81%	14.40%	0.00%	0.00%	84.58%	1.02%
Anhui	665	6.66%	12.33%	0.00%	0.00%	87.07%	0.60%
Henan	942	9.44%	10.51%	0.21%	0.11%	88.32%	0.85%
Hubei	994	9.96%	9.66%	0.00%	0.00%	89.64%	0.70%
Guangdong	940	9.42%	12.13%	0.00%	0.00%	87.02%	0.85%
Chongqing	418	4.19%	12.20%	0.00%	0.00%	86.84%	0.96%
Sichuan	833	8.34%	11.88%	0.48%	0.00%	85.59%	2.04%
Yunnan	880	8.81%	8.30%	0.00%	0.00%	89.09%	2.61%
Gansu	564	5.65%	13.12%	0.00%	0.00%	86.70%	1.04%
Number of workers with maximum predicted labor earnings	9,984	1	1,287	6	1	8,594	96
Share of all workers	100.00%		12.89%	0.06%	0.01%	86.08%	0.96%

provinces predicted maximum earnings for either no or negligible numbers of workers in the earlier years.

Nevertheless, tables 15 and 16 demonstrate that the distributional consequences of differential returns to human capital were essentially the same in 2002 as they had been in 1988 and 1995. Once again, inequality increased between surveys. Across the entire sample, the Gini coefficient for observed earnings increased from .2872 in 1995 to .3419 in 2002. That for predicted earnings in the home province increased from .1816 to .1949 and that for predicted maximum earnings increased from .1109 to .1354.

The continued failure to equilibrate returns to human capital across provinces had similar implications in 2002 as in 1988 and 1995. According to table 15, if workers in 2002 had earned their maximum predicted earnings, the Gini coefficient would have been only 69.5% of the Gini coefficient for predicted home province earnings. Moreover, had workers been able to earn their maximum predicted earnings in their home provinces, average earnings across provinces would have varied by little.

Again, of probably greatest importance, levels of welfare were dramatically reduced. Table 15 reports that average predicted earnings were 1,079.3 yuan per month. Average predicted maximum earnings were 1,729.6 yuan per month. If workers had been able to attain the maximum returns to their human capital, average earnings would have been 60.3% higher.

Table 16 demonstrates that the distribution of locational losses was similar in 2002 to those in 1988 and 1995. Within all provinces with the exceptions of Guangdong and Beijing, workers with higher predicted earnings also predicted larger losses associated with the inability to receive their maximum predicted earnings. However, across provinces, those with the greatest average predicted locational losses had the lowest average earnings.[24] On net, locational losses were distributed regressively, as indicated by the aggregate correlation of .3717 between individual predicted home province income and individual predicted locational losses.

[24] The correlation between average earnings and average location costs across provinces is 0.9852.

Table 15

Actual and predicted inequality, 2002

	Workers in home province				Workers in province of maximum predicted earnings			Workers in home province with maximum predicted earnings	
Province	Number of workers	Average earnings	Gini coefficient of actual earnings	Gini coefficient of predicted earnings	Number of workers	Average predicted earnings	Gini coefficient of predicted earnings	Average predicted earnings	Gini coefficient of predicted earnings
Beijing	841	1,659.2	0.2953	0.1203	1,287	1,655.5	0.1533	1,831.9	0.1125
Shanxi	852	913.0	0.2917	0.1292	0			1,752.2	0.1392
Liaoning	1,076	964.7	0.3336	0.1401	0			1,714.2	0.1259
Jiangsu	979	1,136.8	0.3587	0.1584	0			1,704.9	0.1397
Anhui	665	935.8	0.3062	0.1478	6	757.1	0.1216	1,773.5	0.1335
Henan	942	800.2	0.3099	0.1271	0			1,694.2	0.1401
Hubei	994	937.5	0.2743	0.1078	1	90.5		1,768.6	0.1301
Guangdong	940	1,669.9	0.3557	0.1352	8,594	1,754.9	0.1261	1,686.9	0.1299
Chongqing	418	1,099.6	0.3321	0.1680	0			1,744.8	0.1315
Sichuan	833	878.9	0.3315	0.1473	0			1,635.3	0.1494
Yunnan	880	1,014.4	0.2525	0.1036	96	537.1	0.1419	1,730.8	0.1541
Gansu	564	867.1	0.3204	0.1428	0			1,750.9	0.1236
Total	9,984	1,079.3	0.3419	0.1949	9,984	1,729.6	0.1354	1,729.6	0.1354

Table 16

Location costs and predicted earnings, 2002

Province	Number of workers	Average earnings	Location cost: Predicted earnings in home province minus maximum predicted earnings	Location costs as proportion of average earnings	Correlation, location cost and predicted earnings in home province
Beijing	841	1,659.2	-172.7	-10.41%	0.0986
Shanxi	852	913.0	-839.2	-91.92%	-0.7930
Liaoning	1,076	964.7	-749.5	-77.69%	-0.6697
Jiangsu	979	1,136.8	-568.1	-49.97%	-0.5797
Anhui	665	935.8	-837.7	-89.52%	-0.5859
Henan	942	800.2	-894.0	-111.72%	-0.8864
Hubei	994	937.5	-831.0	-88.64%	-0.7750
Guangdong	940	1,669.9	-16.9	-1.01%	0.3058
Chongqing	418	1,099.6	-645.1	-58.67%	-0.3077
Sichuan	833	878.9	-756.4	-86.06%	-0.7796
Yunnan	880	1,014.4	-716.4	-70.62%	-0.8338
Gansu	564	867.1	-883.8	-101.93%	-0.6365
Total	9,984	1,079.3	-650.3	-60.25%	0.3717

Table 17 reports that the relative magnitudes of these losses was smaller in 2002 than they had been in 1995. In absolute terms, the average value of Guangdong residence to Guandong residents with their maximum predicted earnings in Guangdong was 234.6 yuan per month. This was 31.1 yuan per month less than the corresponding value in 1995. The average value to workers resident in other provinces with maximum predicted earnings in Guangdong, relative to their next best alternative, was nearly identical, 238.7 yuan per month. This was 36.6 yuan per month less than the corresponding value in 1995.

Moreover, average predicted earnings in the home province had increased for the first group from 939.4 to 1,713.4 yuan per month. For the second group, they had increased from 489.3 to 1,017.2 yuan per month. Consequently, the implicit value of Guangdong residence was a much smaller fraction of earnings in 2002 than in 1995.

The reduction in this value reflects, to some degree, equilibration of returns to human capital. The average home province predicted earnings for workers not resident in Guangdong but with maximum predicted earnings in Guangdong were 742.0 yuan per month below average maximum predicted earnings. This difference represented 73.0% of average predicted home province earnings. This gap is substantial, but noticeably less than the corresponding 95.8% gap in 1995.

The reduction also seems to reflect the emergence of Beijing as a plausible alternative for more workers. Beijing. For workers not resident in Guangdong but with maximum predicted earnings in Guangdong, their average earnings in the province offering them the next highest predicted earnings were 1520.5 yuan per month, or 49.4% higher than average home province predicted earnings. The corresponding gap in 1995 was only 39.6%.

The increased returns to human capital in Beijing are more readily apparent for those with maximum predicted earnings in provinces other than Guangdong. As given in table 2, these workers were much more numerous in 2002 than previously. They constituted 13.9% of the 2002 sample, as compared to less than 1% of the 1988 and 1995 samples. Most of this increase was attributable to increased returns to human capital in Beijing. Of those with maximum predicted earnings in provinces other than Guangdong, 92.6% predicted their maximum earnings in Beijing.

Among those of these workers who predicted maximum earnings in provinces other than

Guangdong, 122 were resident in Guangdong. Their maximum predicted earnings exceeded predicted earnings in Guangdong by 130.6 yuan per month. Among the 1,268 resident elsewhere, their maximum predicted earnings exceeded their predicted earnings in Guangdong by 164.6 yuan per month.

Table 18 demonstrates that, as in 1988 and 1995, the results of this section are insensitive to the requirement that predicted earnings outside the home province exceed those in the home province by 30% in order to compensate for moving costs, and to the inclusion of a quadratic term in years of schooling in the regression specification. As in past years, if returns to human capital in Guangdong are reduced by 30%, the vast majority of the sample predicts maximum earnings in Beijing. This majority was even vaster in 2002, at 97.4% of the sample, then it was in 1988, at 88.6%, and in 1995, at 86.3%. This reinforces the impression that returns to human capital in Beijing were much higher in 2002, relative to the other provinces, than in previous years.

Table 17

The value of Guangdong residence, 2002

Home province		Province of maximum predicted earnings: Guangdong	Other	Any
Guangdong	Observations	818	122	940
	Average predicted earnings in home province	1713.4	1378.7	1669.9
	Average difference, predicted earnings in Guangdong and highest predicted earnings elsewhere	234.6	-130.6	187.2
	Average difference, as percent of predicted earnings in home province	13.7%	-9.5%	11.2%
Other	Observations	7,776	1,268	9,044
	Average predicted earnings in home province	1017.2	1022.1	1017.9
	Average difference, predicted earnings in Guangdong and predicted earnings in home province	742.0	392.7	693.1
	Average difference, as percent of predicted earnings in home province	73.0%	38.4%	68.1%
	Average predicted earnings in province of maximum earnings other than Guangdong	1520.5	1579.4	1528.8
	Average difference, predicted earnings in Guangdong and highest predicted earnings elsewhere	238.7	-164.6	182.2
	Average difference, as percent of predicted earnings in province with highest predicted earnings other than Guangdong	15.7%	-10.4%	11.9%
All	Observations	8,594	1,390	9,984
	Average predicted earnings in home province	1083.4	1053.4	1079.3
	Average difference, predicted earnings in Guangdong and predicted earnings in home province	671.4	358.3	627.8
	Average difference, as percent of predicted earnings in home province	62.0%	34.0%	58.2%
	Average predicted earnings in province of maximum earnings other than Guangdong	1516.5	1573.2	1524.4
	Average difference, predicted earnings in Guangdong and highest predicted earnings elsewhere	238.2	-161.6	182.7
	Average difference, as percent of predicted earnings in province with highest predicted earnings other than Guangdong	15.7%	-10.3%	12.0%

Table 18

Robustness checks. 2002

Province	Sample	Workers reallocated to province of maximum predicted earnings	Workers reallocated to province of maximum predicted earnings if maximum is at least 30% greater than predicted earnings in home province	Workers reallocated to province of maximum predicted earnings, earnings regressions include quadratic term in years of schooling	Workers reallocated to province of maximum predicted earnings, returns to education and age reduced by 30% in Guangdong
Beijing	841	1,287	1,797	1,410	9,723
Shanxi	852	0	1	59	0
Liaoning	1,076	0	3	0	0
Jiangsu	979	0	33	0	0
Anhui	665	6	12	0	6
Henan	942	0	0	0	0
Hubei	994	1	9	0	1
Guangdong	940	8,594	7,989	8,512	0
Chongqing	418	0	34	3	0
Sichuan	833	0	0	0	0
Yunnan	880	96	106	0	254
Gansu	564	0	0	0	0

5. The evolution of the Guangdong and Beijing premia

Several important themes emerge from sections 2, 3 and 4 of this paper. First, human capital has been especially privileged in Guangdong throughout the period under study. Nearly all workers, in all years, predict higher earnings in Guangdong than in any other province. Depending on the measure and year, the premium associated with Guangdong residence has been anywhere from substantial to huge.

Second, the premium associated with Guangdong residence has evolved over time. The most dramatic example of this evolution is In terms of the earnings that would be lost by residents of provinces other than who predict their maximum incomes in Guangdong, if they were forced to accept their the next-highest predicted earnings. The Guangdong premium, measured in this way was 29.1% of maximum predicted earnings in 1988, 40.3% in 1995 and 15.7% in 2002 (tables 5, 11 and 17). However measured, this premium was largest, in relative terms, in 1995. It declined markedly through 2002.[25] This pattern may reflect the diffusion of economic reform, first concentrated in provinces such as Guangdong but later introduced elsewhere.

However, diffusion, such as it was, seems to have raised returns to human capital in Beijing disproportionately to those in other provinces apart from Guangdong. Table 19 illustrates this evolution. The third row reports that, as this period progressed, the excess of average predicted earnings in Beijing over average predicted earnings in other provinces increased. The sixth row reports that the excess of average predicted earnings in Guangdong over average predicted earnings in Beijing increased between 1988 and 1995 as well, but declined sharply from 1995 to 2002.

Table 20 examines the relationships between predicted earnings in Guangdong and Beijing more closely. It presents descriptive regressions in which the dependent variable is predicted earnings in Beijing and the explanatory variable is predicted earnings in Guangdong. In general, these regressions fit very well. However, the fit is weakest in 2002, when a noteworthy minority of workers predicted higher earnings in Guangdong than in Beijing.

The coefficients on predicted earnings in Guangdong are all positive and estimated with great

[25] The simplest measure of this premium is In terms of the earnings that would be lost by Guangdong residents who predict their maximum incomes in Guangdong, if they were forced to accept their the next-highest predicted earnings. This measure was 22.5% of maximum predicted earnings in 1988, 28.3% in 1995 and 13.7% in 2002 (tables 5, 11 and 17).

Table 19

Evolution of the Beijing premium, 1988-2005

	1988	1995	2002
Average predicted earnings in Beijing	196.9	681.4	1519.6
Average earnings, all provinces except Guangdong and Beijing	159.8	469.3	952.1
Average predicted earnings in Beijing-average predicted earnings in provinces other than Guangdong and Beijing	37.1	212.1	567.4
Average predicted earnings in Beijing-average predicted earnings in provinces other than Guangdong and Beijing as percent of average earnings in Beijing	18.8%	31.1%	37.3%
Average predicted earnings in Guangdong	241.6	954.4	1707.1
Average, predicted earnings in Guangdong-predicted earnings in Beijing	44.7	273.1	187.5
Average, predicted earnings in Guangdong-predicted earnings in Beijing as percent of average predicted earnings in Beijing	22.7%	40.1%	12.3%

Table 20

Regression comparisons of predicted earnings in Guangdong and Beijing, 1988-2005

Dependent variable: Predicted earnings in Beijing

Explanatory variables	1988	1995	2002
Intercept	**2.487**	**75.398**	**-14.836**
p-value	<.0001	<.0001	0.0280
Predicted earnings in Guangdong	**0.7633**	**0.6349**	**0.8988**
p-value	<.0001	<.0001	<.0001
R-square	0.9122	0.9283	0.8463
Adjusted R-square	0.9122	0.9283	0.8463
F-value	**181,837.0**	**152,404.0**	**54,957.7**
p-value	<.0001	<.0001	<.0001
Number of observations	17,498	11,775	9,984
Predicted earnings level in Guangdong above which predicted earnings in Guangdong exceed predicted earnings in Beijing	10.5	206.5	-146.7

precision. They are also all less than one, with high statistical significance for the difference. In other words, in each of the three sample years, one additional yuan of predicted earnings in Guangdong was associated with less than one additional yuan of predicted earnings in Beijing. As predicted earnings in Guangdong increased, the excess of those predicted earnings over those predicted for Beijing increased.

However, the magnitudes of these slopes demonstrate that the gap between predicted earnings for Guangdong and Beijing was greatest in 1995. In that year, each additional yuan of predicted earnings in Guangdong contributed .375 yuan to the gap between predicted earnings there and in Beijing. By 2002, each additional yuan of predicted earnings in Guangdong was matched by almost .9 of one yuan in additional predicted earnings in Beijing.

6. Conclusion

This paper demonstrates that returns to human capital varied greatly across urban China throughout this period. That variance, while persistent, was not immutable. In relative terms, human capital in Guangdong lost some of its advantages between 1995 and 2002. Human capital in Beijing gained relatively greater returns during that period. However, returns in the remaining provinces were consistently lower than in these two provinces, often by substantial amounts.

Variations in returns to human capital imposed substantial costs on Chinese workers. For most, predicted earnings in their home provinces were much lower than predicted earnings elsewhere. This difference is the implicit tax imposed by the rigidities in Chinese labor markets and differential policy treatments across provinces.

Variations in returns to human capital also imposed substantial costs on Chinese society. Interpersonal earnings would have been much more equally distributed if workers had been able to earn their maximum predicted earnings, rather than the earnings predicted for them in their home province. Moreover, inter-provincial inequality would have essentially vanished if workers had been able to earn their maximum predicted earnings in their home provinces.

Kanbur (2006) observes that, generically, between-group inequality is small relative to within-group inequality. Nevertheless, there are at least four circumstances in which policies devoted to addressing between-group inequality may be justified: when between-group distinctions are

normatively unacceptable, when within-group transfers mitigate measured within-group inequality, when group identity is relatively inflexible and when policies addressing between-group inequality are relatively inexpensive and effective. The only circumstance that is relevant here is the inflexibility of group identity, because of the restrictions on inter-regional migration.[26] However, the cost of reducing differences in provincial-level average incomes in the presence of such restrictions could easily be greater, at least in narrow economic terms, than the cost of simply removing those restrictions.

[26] Xing and Zhang (2013, 30) also conclude that the *hukou* system is inefficient.

References

Barro, Robert J. and Xavier Sala-I-Martin (1991) "Convergence across states and regions", Brookings Papers on Economic Activity, Vol. 1, 107-182.

Barro, Robert J. and Xavier Sala-I-Martin (1992a) "Convergence", Journal of Political Economy, Vol. 100, No. 2, 223-251.

Barro, Robert J. and Xavier Sala-I-Martin (1992b) "Regional growth and migration: A Japan-United States comparison", Journal of the Japanese and International Economiesy, Vol. 6, December, 312-346.

Barro, Robert J. and Xavier Sala-I-Martin (1995) Economic Growth, McGraw Hill, New York.

Economic Report of the President, 2010, http://www.gpo.gov/fdsys/pkg/ERP-2010, accessed 20 October 2014.

Fleisher, Belton, Haizheng Li and Min Qiang Zhao (2010) "Human capital, economic growth, and regional inequality in China", Journal of Development Economics, Vol. 92, 215-231.

Jian, Tianlun, Jeffrey D. Sachs and Andrew M. Warner (1996) "Trends in regional inequality in China", China Economic Review, Vol. 7, No. 1, 1-21.

Kanbur, Ravi (2006) "The policy significance of inequality decompositions", Journal of Economic Inequality, Vol. 4, 367-374.

Kanbur, Ravi and Xiaobo Zhang (1999) "Which regional inequality? The evolution of rural-urban and inland-coastal inequality in China from 1983 to 1995", Journal of Comparative Economics, Vol. 27, 686-701.

Kanbur, Ravi and Xiaobo Zhang (2005) "Fifty years of regional inequality in China: a journey through central planning, reform, and openness", Review of Development Economics, Vol. 9, No. 1, 87-106.

Lau, Chi Keung Marco (2010) "New evidence about regional income divergence in China", China Economic Review, Vol. 21, 293-309.

Lin, Justin Y., Gewei Wang and Yaohui Zhao (2004) "Regional inequality and labor transfers in China", Economic Development and Cultural Change, Vol. 52, No. 3, April, 587-603.

Pedroni, Peter and James Yudong Yao (2006) "Regional income divergence in China", Journal of Asian Economics, Vol. 17, 294-315.

Tsui, Kai Yuen (1991) "China's regional inequality, 1952-1985", Journal of Comparative Economics, Vol. 15, 1-21.

Tsui, Kai-yuen (1996) "Economic reform and interprovincial inequalities in China", Journal of Development Economics, Vol. 50, 353-368.

Xing, Chunbing (2014) "Migration, self-selection and income distributions", Economics of Transition, Vol. 22, No. 3, 539-576.

Xing, Chunbing and Junfu Zhang (2013) The Preference for Larger Cities in China: Evidence from Rural-Urban Migrants, IZA Working Paper No. 7562, August.

Yang, Dennis Tao (1999) "Urban-biased policies and rising income inequality in China", American Economic Review: Papers and Proceedings, Vol. 89, No. 2, May, 306-310.

Yang, Dennis Tao (2002) “What has caused regional inequality in China?”, China Economic Review, Vol. 13, 331-334.

Zax, Jeffrey S. (2014) “Housing allocations, welfare and inequality in early and mid-reform urban China”, Working paper, October.

Zhang, Haifeng, Hongliang Zhang and Junsen Zhang (forthcoming) “Demographic age structure and economic development: Evidence from Chinese provinces”, Journal of Comparative Economics.