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Inequality and Poverty in China during Reform

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Abstract

This paper provides an overview of the evolution of income inequality and poverty in China from 1987 to 2002, documenting significant increases of inequality within China's urban and rural populations. In rural areas, increased inequality is primarily related to the disequalizing role of non-agricultural self-employment income and the slow growth in agricultural income from the mid-1990s onward. Poverty persists, and tied in part to slow growth in agricultural commodity prices. In urban areas, the declining role of subsidies and entitlements, the increase in wage inequality, and the layoffs during restructuring have fueled the growth in inequality within urban areas. Poverty levels, however, are very low. China should give more emphasis on education, training, and other human development efforts in its poverty reduction strategy since return to education increased rapidly and became a major source of inequality. A nationwide "social safety net" and an effective redistributive taxation system should be adopted and implemented to ensure that the poor can benefit from the fruits of rapid economic growth.

1.   Introduction

The primary motivation for China's economic reforms was to increase economic growth, and raise average living standards after nearly twenty years of stagnation. Given the move to more market-based income determination, the reforms had the potential to conflict with inherited egalitarian-motivated, socialist institutions and rhetoric. To what extent have the reforms led to widening inequality? Who have been the winners and losers? Have the reductions in poverty that accompanied growth been sufficient to alleviate concerns over inequality? Do increases in inequality threaten the long-run sustainability of the reforms? Are there identifiable patterns in the evolution of the income distribution that suggest potential policy responses?

The objective of this paper is to document the evolution of inequality and poverty during the reform period, and where possible, to draw conclusions concerning the role that transition has played in increasing inequality or reducing poverty. The centerpiece of our paper is the assembly of three series of cross-section data sets that allow a relatively consistent calculation of inequality and poverty levels from the mid-1980s onwards. It turns out that establishing "first-order" facts about Chinese inequality is quite difficult, and that unfortunately, conclusions hinge on mundane (but important) issues of measurement and data quality. In this regard, we are handicapped by the fact that much of the household level survey data collected annually by China's National Bureau of Statistics are not in the public domain.

Several of our conclusions line up with the existing literature on inequality in China. First, overall inequality has unambiguously risen in China since 1987. This inequality has increased in both urban and rural China, though as far as we can tell, the increase is higher in urban China. But, most of our evidence also suggests that the "official" estimates of inequality are probably too low, with the true Gini probably in the 0.40-0.50 range for both urban and rural areas. The overall (combined urban-rural) Gini is about 0.46 (Khan and Riskin, 2005, Ravallion and Chen, 2004), which is comparable to levels observed in South America.

Second, in urban China, absolute living standards have risen so much that even with rising inequality, most of the poverty has been eliminated, at least if someone uses a "reasonable" benchmark. In rural China, significant gains in income growth during the late 1970s and early 1980s resulting from the introduction of the household responsibility system (HRS) pulled tens of millions out of poverty. Further reductions occurred through the early-to-mid 1990s, but there was deterioration during the last half of the 1990s that only the last year or two may have been reversed. There remain reasons for concern, at least as far as our data show: for a significant number of households, incomes have remained flat or fallen for a decade or more, and the very poor may be worse off.

In a number of key respects, however, our findings are at odds with some of the conventional wisdom. Overall, geography, as captured by the province or village/city one lives in, plays a much less important role than one might expect: at least half, and perhaps as much as two-thirds, of estimated inequality is driven by income differences between "neighbors" as opposed to income differences based on location (city or village). The role of provincial differences is even smaller.

The same is true for urban-rural differences. Although urban incomes may be on average two-thirds to three-quarters higher than rural incomes, these differences are the source of a relatively small proportion of overall inequality in China. More generally, great care must be taken when interpreting "urban-rural" income gaps, especially using official (National Bureau of Statistics, or NBS) data: the accelerating reclassification of rural areas as urban tends to exaggerate rural-urban income differences, as fast growing rural areas are re-labeled as urban. Moreover, significant differences in the cost of living between urban and rural dampen the raw income differentials.

Our findings regarding the role of geography and urban-rural differences suggest that we need to focus more attention on the institutions influencing the distribution of endowments, including both human and physical capital, the allocation of factors of production, and factor returns. In the countryside, most of the level and growth of inequality is due to unequal access to non-farm family business income in the countryside. In the cities, the decline in subsidies and unequal wage incomes are playing an increasing role in raising inequality. Increasing returns to higher education are very important in explaining growing dispersion of wage earnings. Our results from both urban and rural samples thus underscore the important role likely to be played by education in determining the future evolution of income distribution, even though the exact channels may be different in cities and the countryside.

Finally, there appears to be significant differences in the inequality (and income growth) dynamics between interior and coastal provinces. Inequality increased more rapidly in the interior provinces, a product of a more rapid increase in rural income inequality, and a widening urban-rural income differential. As suggested by related research growth and structural transformation by Brandt, Hsieh and Zhu (2005), some of this can be linked to the more significant legacy of the state sector in the interior provinces, and urban bias. In the more dynamic coastal provinces, more rapid job growth in the non-state sector helped reduce urban-rural differentials by fostering more rapid rural income growth, and simultaneously helped to keep increases in rural inequality down.

Our paper is divided into five sections. In the next section (Section 2) we provide background discussion concerning the measurement of inequality. In section 3 we sketch the three data sets that we use. Our main empirical results are presented in sections 4 through 6. Throughout we provide separate evidence for urban and rural China, beginning with a discussion of the main trends in living standards in section 4. Section 5 focuses on the role of geography: how important are divergent incomes across provinces for driving rising inequality? Section 6 takes a closer look at the composition and changing structure of income, providing the greatest potential linkage with the factors that may be "causing" the increase in inequality, though attribution of any changes to a particular causal factor is almost impossible given the scope of change in China over this period.

2. Background and Conceptual Issues

2.1 Inequality on the Eve of Reform

The evolution of inequality over the course of China's economic reform cannot be analyzed without some sense of the inequality "before" reform. However, we are severely constrained in this exercise by data limitations, but we can sketch a picture of inequality and its likely sources in urban and rural areas separately, and overall.

Prior to reform, nearly eighty percent of China's population lived in rural areas and was primarily involved in agriculture. Land was collectively farmed, with income supplemented in some periods by income from small private plots.1 Income from collective farming was allocated at the level of the production team (25-30 households) on the basis of both household need and accumulated work points, with the weight between "distribution on the basis of need" and "basis of labor" differing across localities and shifting over time. Overall, differences within localities and between households were probably relatively small, and largely associated with differences among households in dependency ratios, i.e., the ratio of the number of individuals that worked to total household size. A host of services (health, education and welfare) were also collectively provided, which was probably equalizing.

However, there were some differences across localities and regions reflecting differences in endowments and natural conditions, which were exacerbated by policies of local grain self-sufficiency. Vermeer (1982) suggests that income differences (only the portion that was collectively distributed) between richest and poorest communes (townships) may have been as much as 6:1. There was also considerable poverty in rural areas, with as much as a quarter of the rural population living below an admittedly low government-defined

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[1] Very little information exists on differences between or within localities on income earned by households from their private plots.

poverty line prior to reform (1977 or so). There was a significant geographic component to this poverty as well. A majority of the poverty is located in the Huang-Huai-Hai region (border area of Shandong, Hebei, Henan, and Anhui) and the provinces situated in China's western provinces, running from Gansu and Ningxia, through Sichuan and to the Yunnan and Guizhou.

Incomes in urban areas consisted largely of wage earnings and a host of subsidies and entitlements that were publicly financed but allocated by work units. Differences in living standards among households in urban areas were limited by the rationing of many consumer goods (e.g. grain and housing) on the basis of need, and by relatively weak material incentives and low returns to human capital. Regional wage and income differences in the cities were reportedly modest and may have reflected differences in the cost of living, e.g. cost of living was reportedly higher in Shanghai. Like the countryside, some of the largest differences between households were related to differences across households in their demographic composition and dependency ratios.

There was however a sizeable urban-rural income gap that was enforced through strict restrictions on migration from the countryside. Through the last half of the 1960s and 1970s, the urban population did not grow much in absolute terms. Factoring in the value of a host of subsidies, Rawski (1982) suggests that on the eve of economic reform, average differences between the city and the countryside were on the order of 5-6:1, or twice that calculated excluding all of the subsidies. The gap with respect to rationed commodities was much smaller (Lardy, 1984), and a significant portion of the gap may have taken the form of higher urban savings.

In summary, our impression is that China had relatively low inequality within villages and cities, a stronger regional dimension to inequality in rural areas, and a pronounced urban-rural gap prior to government-led economic reform.

2.2   Transition versus Development

While we can notionally decompose the change in income distribution to changes in the distribution of productive factors and their rewards, it is also important to recognize there are two broad, somewhat distinct, sources of these changes: transition and development. As detailed above, prior to reform, prices - including wages - and resource allocation were primarily administratively determined. Household income was determined by a set of "local" socialist institutions that mapped a household's endowment (largely consisting of labor or human capital) into income. These same institutions affected the ownership, distribution, and accumulation of other forms of capital by households, such as land or physical capital.

Transition as a process entails moving to market determination of incomes. In a perfectly competitive world, incomes would be a simple product of a household's endowments and the market returns to these factors. The introduction of the market affects both the returns and rewards to the factors of production, (for example, entrepreneurial ability and human capital) as well as the distribution and accumulation of these same factors. The process of economic development and growth also affects the returns to and distribution of factors of production in a way that matters for income distribution i.e. by altering the returns to labor relative to capital, or by increasing the returns to human capital and other kinds of skills.

This discussion highlights the importance (in the conceptual sense at least) of distinguishing a "transition" effect from a development or growth effect. [2] In actuality, it is much more difficult to identify these effects separately. However, we can use it as an organizing principle for highlighting the factors we believe have been at play in three primary dimensions. These relate to the urban and rural sectors separately, and finally urban-rural income differences.

2.2.1 Urban Inequality

The evolution of income inequality in Chinese cities would have likely mirrored the experience in eastern European transition economies. First, liberalization in the labor market – even within the state sector – would have led to greater wage inequality. More successful enterprises could pass profits to workers through bonuses and higher base wages, so that wage inequality would rise across industrial sectors and across firms. Second, food and housing subsidies were slashed in the early 1990s. These important forms of in-kind income were likely distributed equally, especially compared to the straight wages that (in principle) replaced them. Third, restructuring of state-owned enterprises (SOEs) and the end of the "iron rice bowl" in the latter half of the 1990's led to significant layoffs, unemployment, and at least short-term inequality of access to jobs.

On top of these more transition-oriented changes, urban China was considerably affected by the development of a vibrant private industrial and service sector, with wage and employment determination entirely outside the old Socialist labor bureaus. As in any globalized developing economy experiencing significant technological change, we might expect dramatic changes in the returns to human capital and skill, which would transmit to higher inequality of earnings and income.

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[2] Also see the more detailed discussion in Benjamin and Brandt (1999)

2.2.2   Rural Inequality

The introduction of HRS immediately permitted households to retain a greater share of the returns to their own labor and entrepreneurial talent in managing their farms. Liberalization with respect to farm sidelines and the establishment of family run businesses provided another avenue for households to potentially earn more than their neighbors. At the same time, land remained owned by the village and was allocated to households on a fairly egalitarian basis, so there was a limit to how much inequality could arise from farm incomes. The establishment of Township and Village Enterprises (TVEs), and the development of off-farm opportunities would likely have also provided households a way to earn a living off the farm, potentially generating greater differences in income across villages. While it was difficult to move from the country to the city, it was easier to move shorter distances within the countryside. These opportunities for limited migration would also have significantly changed the structure of income for households. It is difficult to predict whether this would increase income inequality, as it would depend on whether these opportunities were available throughout the income distribution.

Alongside the transition from collectivized agriculture, households in rural China also faced increasing integration with the broader Chinese economy, as well as international markets. For farmers, this generated changing terms of trade between agricultural and non-agricultural goods. Over the period of reform, especially in the latter half of the 1990s, agricultural prices declined significantly, lowering the floor provided by crop incomes and potentially leading to a rise of inequality. Similar to the cities, industrialization and development would also have provided rising returns to human capital and skill, leading to higher income inequality. To the extent this development was uneven across provinces; it might also lead to widening income gaps across regions.

2.2.3   Urban-Rural Gap

What would we expect to happen to the ratio of urban to rural incomes? From a pure transition perspective, we might expect the gap to narrow. First, the declining support of the state sector and the end of urban food subsidies would potentially serve to reduce the heavy urban bias of government expenditure. However, these changes may have happened too slowly to matter before 2000. Through most of this period there also remained considerable restrictions on migration through the "*hukou*" system. While some of these restrictions were released recently, the constraints on mobility would have reduced the convergence of rural-urban incomes.

To a limited extent, however, improvements in product and factor market linkages should have served to reduce the urban-rural gap. In the end, the evolution of the rural-urban gap depends on the relative growth rates, or development, of industrial and service

sectors. To the extent that such development was concentrated in cities—possibly because of pre-existing or continuing advantages of infrastructure like schools and roads—we would expect average incomes of urban residents to grow faster than those of rural residents. Also, given that factor mobility remains imperfect, the urban-rural income gap could easily rise through the reform period.

In summary, there are several potential reasons why we would expect the overall level of income inequality in China to increase: It should increase within both the urban and rural sectors, and possibly across urban and rural sectors as well.

3.   Data

3.1   The data sources

Access to well-designed, nationally representative household survey data is essential to measuring changes in the level and distribution of economic welfare. Lacking such a single data set, we draw heavily on three primary household level data sets in our analysis. For the urban areas, we obtained the National Bureau of Statistics (NBS) urban household surveys for a sub-sample of provinces including Jilin, Henan, Shaanxi, Sichuan, Hubei, Shangdong, Shanghai, and Guangdong. This survey has comparably defined income and consumption measures for all years. We use the "income" and "consumption" variables as defined by the NBS, and included in the micro-data. However, these data are not without serious shortcomings. On the income side, the implicit value of subsidies associated with, for example, food coupons, is missing. These were especially important through the 1980s, but were eliminated in the early 1990s. On the consumption side, the data do not provide an easy way to measure the value of services from consumption durables, notably housing. One other issue worth noting is that the urban data are sampled on the basis of urban household registration. This means that rural-registered migrants living in the cities are not enumerated, and this may have significant consequences for interpretation of urban incomes and inequality.

Our primary rural data are a series of annual household surveys conducted by the Survey Department of the Research Center for Rural Economy (RCRE) in Beijing. We use household-level surveys covering over 100 villages in nine provinces, namely: Jilin, Shanxi, Henan, Hunan, Anhui, Jiangsu, Guangdong, Sichuan, and Gansu. The survey spans the period 1986 to 2003, and includes between 7,000 and 8,000 households per year. The RCRE was originally intended as a longitudinal survey, following the same households over time. While there is a household-level panel dimension to our sample, we observe considerable attrition of households over the 1986-2002 period, especially after the years when there was no survey. The RCRE was unable to conduct the survey in 1992 and 1994

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because of funding difficulties. Households lost through attrition were replaced on the basis of random sampling.

The survey collected detailed household-level information on incomes and expenditures, education, labor supply, asset ownership, land holdings, savings, formal and informal access to credit, and remittances. That said, the construction of consistent income and consumption measures is quite tricky, especially when calculating self-supplied consumption and the implicit flow of durables and housing consumption. Of particular importance for our purposes, especially in investigating the role of geographic factors for inequality, we are able to track a panel of villages even where there has been household attrition. This allows us to maintain geographic comparability over the complete time period.

The China Health and Nutrition Study (CHNS) data uniquely allow us to pool urban and rural households. This survey covers the provinces of Liaoning, Heilongjiang, Henan, Hubei, Hunan, Shandong, Jiansu, Guangxi, and Guizhou for five years: 1989, 1991, 1993, 1997, and 2000. Because of some non-comparability issues with the 1989 survey, we only use the 1991, 1993, 1997, and 2000 data. The CHNS survey is more intensive than either the NBS or RCRE surveys. The survey provides better coverage of urban subsidies, and we believe that some sources of income – especially from non-farm self-employment – are better measured than the other surveys. Certainly, there is more detail that can be exploited when exploring the robustness of conclusions to definitions of "income." The CHNS does not have consumption or expenditure data, however. One especially important feature of the CHNS is that it follows a panel of cities and villages across the survey years. We are also able to evaluate the sensitivity of urban-rural differences to the definition of "urban." This is potentially very important when interpreting "urban and rural" results based on NBS data, where fast growing and industrializing rural areas are re-classified as urban over the transition period.

3.2   Issues Common to All Data Sets

There are a number of important measurement issues that need to be discussed when looking at any series of inequality measures. The estimated level of inequality can be sensitive to the definitions of income and consumption, even from perfectly implemented and comparable household surveys. Once we admit that surveys are neither perfectly implemented nor perfectly comparable, it becomes even more important to be clear how income and consumption are defined and measured. Even a simple question of how to turn household income into per capita measures can be problematic: who is a household member? In the Chinese context, should the member be defined on the basis of his or her registration status, or on the basis of economic attachment to the household, like the World

Bank Living Standard Measurement Surveys? Should adjustments be made for the age composition of the household, i.e., should we convert household size into adult equivalents?

In the numbers that follow, we use the "best" available measure from each survey. For urban households in the NBS survey, income is defined as income earned from all enumerated sources, and household size is based on registration. For the rural RCRE households, we calculate income from all sources, including the implied market value of home-produced grain. Measurement of farm incomes in China can be highly sensitive to a battery of assumptions concerning valuation, and we discuss these issues more thoroughly elsewhere (Benjamin, Brandt, and Giles 2005). These measurement issues become especially important when comparing RCRE-based results to those from the NBS, such as those reported by Ravallion and Chen (2004). Household membership in the RCRE is also based on registration. For the CHNS, we construct incomes along similar lines to the respective urban and rural surveys. For the CHNS we are also able to "value" the implicit rents associated with access to food and housing at below-market prices for urban households. With the CHNS, however, household membership is defined more on the basis of economic attachment (residency) than registration. Household members other than the head who work and live outside much of the year may not be included (though their remittances would be).

In principal, households to be surveyed are to be drawn from a representative cross-section of the population. If not, the researcher must know the sampling weights for purposes of making inferences about the population. In the case of the surveys carried out by both the NBS and RCRE, there is reason to believe that a disproportionate number of households at both ends of the income distribution, i.e. the very rich and the very poor, are being excluded. In part, this reflects the fact that survey protocol requires households to maintain diaries of their income and expenditures. This makes participation by illiterate households difficult, and the costs associated with record keeping for the rich high. Truncation of this sort likely leads to an underestimation of income inequality and poverty. [3]

A final issue worth mentioning concerns the conversion of nominal values into constant-dollar (yuan) prices. We use the official provincial CPI's to convert all nominal values into 1990 yuan.[4] Especially for making welfare comparisons across heterogeneous provinces, it may also be advantageous to control for differences in the cost of living. To accomplish this we use a newly constructed set of spatial price deflators, documented in

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[3] Benjamin et. al. (2005) document this in the case of a comparison of estimates of rural inequality using the RCRE data, and several other surveys in which household selection was known to be random.

[4] To help the reader put these real figures into current nominal estimates, the CPI roughly doubled between 1990 and 2003.

Brandt and Holz (2004). These deflators allow us to adjust for cross-sectional differences in urban and rural prices across provinces, and between rural and urban areas. In general, we expect incomes and price levels to be positively correlated. In urban areas, for example, the cost of the same basket of goods is more than fifty percent higher in Guangdong than it is in Sichuan. Failure to control for these differences can lead to an overestimate of inequality, and the contribution of key sources, e.g. inter-provincial or urban-rural differences.

4. The Evolution of Inequality

Table 1 reports the levels and growth of real mean per capita income from 1987 to the most recent year for which we have survey data. For urban areas, both the NBS and CHNS suggest fairly rapid growth in real incomes over an extended period of almost 6 percent per annum. These rates of growth imply a doubling in real incomes every twelve years or so. The NBS consistently shows slightly higher per capita incomes than the CHNS of roughly twenty percent. This could be a product of provinces covered, households selected, as well as definition of incomes. As described below, the CHNS urban sample includes a small number of households that are in farming.

For rural areas, there is a sharp discrepancy in the rates of growth between the RCRE and CHNS samples, with RCRE showing much lower growth.[5] The CHNS data imply a rate of increase in rural incomes on par with that observed in urban areas, while the RCRE growth rate is significantly lower. Noteworthy, a good portion of this difference arises only after the mid-1990s, and is largely attributable to differences between the RCRE and CHNS surveys in the growth rate of farm income. Some of this may reflect the kinds of villages that were selected, with more "suburban" villages possibly included in the CHNS, as well in how farm output is being valued. These villages may have had more acreage in vegetables and other cash crops, and been less exposed to a sharp drop in grain prices that occurred after 1995.

Table 2 documents the evolution of various measures of inequality, or dispersion, of the income distribution for urban China from 1987 onwards using both the NBS and CHNS data. We report the Gini, Theil, Atkinson, and the 90-10 ratio, which measures the income of an individual in the 90th percentile of the distribution relative to that of an individual in the 10th percentile. For the NBS, we also report estimates of inequality with and without adjustments for differences across provinces in the urban cost of living, and estimates for consumption inequality. Figures 1 and 2 provide non-parametric plots of the Lorenz curves.

There are significant increases in urban inequality as captured by NBS, with the Gini coefficient for incomes increasing by almost two-thirds from 0.22 to 0.34 over this fourteen-

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[5] For a reconciling of the RCRE and NBS estimates see Benjamin, Brandt and Giles (2005).

year period.[6] The 90-10 ratio also rises pronouncedly by nearly eighty percent, from 2.64 to 4.77. Spatially deflating the NBS urban household data leads to slightly lower measured levels of inequality, but a similar increase over time. To help put the rise in inequality after 1987 in perspective, Gini coefficients reported by the NBS for their entire urban sample for the period between 1978 and 1986 show an increase from 0.16 to 0.20.[7] On the other hand, the CHNS estimates consistently imply higher levels of inequality than do the NBS (0.38 versus 0.34 in 2000, for example), but a similar increase (in absolute terms) over years in common between the two surveys. Spatially deflating the CHNS data (not reported) makes no difference, which may be a product of the provinces sampled by the CHNS, and the fact that the spatial differences in prices across these provinces are not very great. Estimates from the China Income Project for 1988 and 1995, which address a number of important weaknesses in the NBS household survey, also reveal significantly higher levels of inequality, but a similar increase over this seven-year period.

To gauge potential trends in poverty, our final distributional measure is the proportion of households whose income falls below one-half the 1987 median income. This line is fixed through time, providing a benchmark of how many households are raised out of "poverty," if the poverty line were set at 50 percent of 1987 median income. For 1987, we see a very low proportion of so-defined "poor" households, with only 4 percent of households with low income. This proportion declines to only one percent by 2001. In figure 3 we plot the Cumulative Distribution Functions (CDFs) for household income. On the horizontal axis we show the level of real income, while the vertical axis shows the proportion of individuals in households with an income level below that on the horizontal axis. Thus, for any "poverty line" we can estimate the proportion of poor. For example, if the "poverty line" was a very high 2,000 yuan (higher than mean incomes in 1987) we would see that fewer than 40 percent had incomes below this level in 2001, compared to over 80 percent in 1987. The bottom panel focuses on the bottom part of the distribution where we can select more reasonable poverty lines. Half the 1987 median per capita income level is approximately 700 yuan. Significantly fewer than 5 percent of individuals had incomes below this level in any of the years, and we can see the fraction steadily declining in each year (as shown in Table 2). Higher poverty lines would show similar progress over time.

This finding can be compared with more thorough examinations of urban poverty trends by Meng, Gregory, and Wang (2005) and Ravallion and Chen (2004), which use the

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[6] In contrast to what is typically found in survey data, the Gini for consumption is actually slightly higher than that for income. One possibility is that income or certain kinds of income are being underestimated by the NBS, with true income inequality also being underestimated.
[7] The Gini coefficients we report are in line with those calculated by the NBS using their entire urban sample, which show a rise from 0.20 to 0.32 between 1986 and 2000. See Meng et. al. (2005) and Ravallion and Chen (2004).

entire NBS sample for the period between 1986 and 2000, and calculate poverty lines using alternative procedures.[8] The estimates of Meng, Gregory, and Wang show an uneven rise in the percentage living under poverty from two percent to about five percent in 1993, which then declines slowly through 2000. Ravallion and Chen's estimate also show a downward trend, but slightly more volatility. Despite some differences, there is general agreement on the relatively low levels of urban poverty in China based on the NBS estimates.

Table 3 presents the corresponding inequality results for rural China. Our estimates reveal that inequality is slightly higher in rural than in urban areas, but that rural inequality experienced slightly smaller increases over time. As in our examination of urban inequality, spatially deflating incomes leads to lower overall inequality, but a similar trend. The CHNS data suggest slightly higher inequality than do the RCRE data (0.46 in 2000 versus 0.38 in 1999 or 0.39 in 2002, for example), but imply a similar absolute increase over the years in common between the two surveys. A comparison with NBS-based rural inequality estimates (Ravallion and Chan, 2004) shows similar trends, but systematically higher levels of inequality in our two surveys. Using the NBS estimates to extrapolate would also put the Gini coefficient for rural inequality in 1980 in the vicinity of 0.30.

Much of the increase in rural inequality in the two rural data sets occurs in the late 1980s to early 1990s, and then again resuming in the late 1990s, with inequality actually falling in between[9]. An important reason for this is the behavior of farm prices. Between 1993 and 1995, farm procurement prices doubled in nominal terms, and by fifty percent relative to the rural CPI. This disproportionately benefited low-income rural households for whom farming was an important source of income, and helped to offset the impact on inequality of the rapid growth of non-agricultural incomes. Without this increase in farm prices we would have observed a more sustained increase in rural inequality. There was a reversal of fortune for the poorest households in the last half of the 1990s, which can be linked to falling farm prices and the behavior of farm incomes. Not until 2002-2003 did farm prices and incomes begin to recover.

Thus, a crucial question for welfare analysis is whether the increase in mean incomes was high enough to offset the increased dispersion of incomes. While the rich got unambiguously richer, what happened to the poor? At the bottom of table 3 we report the

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[8] Ravallion and Chen (2004), for example, use the "official" poverty line of 300 yuan per person per year (in 1990 prices), as well as a more recently constructed poverty line based on updated minimum consumption bundles: 850 yuan for rural, and 1,200 yuan for urban (in per capita terms). Meng, Gregory, and Wang (2005) also choose poverty lines based on minimum consumption bundles, as opposed to our more arbitrary – but still constant – half the 1987 median income.
[9] Using a data set from Chinese Academy of Social Sciences for two years, Khan and Riskin (2005) find that there are some decline in income inequality in both rural and urban China between 1988 and 2002. Their calculation of income includes rental value of owned housing which doses not exist in our data.

percentage of households below the 1987 median. These estimates show uneven progress, with a rise in the late 1980s followed by a sharp drop through the mid-1990s, and another increase through the end of the decade. By 2002 only 8 to 9 percent of households had incomes below one-half the 1987 median income, compared to 14 to 16 percent in 1987. Given the perception of rapid growth in the countryside, this decline in "poverty" seems disappointing. The stagnation in this dimension is a feature of the late 1990s. Figure 3 shows the CDFs for rural areas for three selected years. Lower CDFs correspond to relatively better income distributions, with fewer individuals having incomes below any given level. The 1987 CDF is clearly highest over most levels of income.

As seen in the bottom panel, however, the CDFs for all three years are indistinguishable below incomes of 200 yuan. There are similar – very low – percentages of individuals with incomes this low. The income distribution has thus generally improved since 1987. It is less clear comparing the present to 1995. The top panel shows that the CDFs for 1995 and 2001 cross below incomes of 2,000 yuan. For incomes below 1,000 yuan per year, the 1995 CDF is lower than for 2001. Thus, even for a very high poverty line or benchmark, the 1995 income distribution dominates the 2001 distribution. The increase in inequality over the 1990s thus has the poor getting poorer, with a decline in absolute living standards. These results are not simply an artifact of the RCRE. The CHNS-based numbers in table 3 confirm the stagnation of incomes of the poor since 1997.

It would be a mistake, however, to conclude that economic reforms have entirely missed the poor. Part of the problem stems from our use of the RCRE data which only begin in 1986, and fail to capture the enormous gains in reducing poverty in the late 1970s and early 1980s following the introduction of the Household Responsibility System, and rural reform. Subject to limitations in the NBS data, especially for the pre-1984 period, Ravallion and Chen's (2004) estimates show the percentage of rural residents living under poverty fell from 76 percent in 1980 to 22 percent by 1987. Most of the gains made by the poor thus occurred before the first observation of our RCRE sample. With sixty percent of China's population still classified as rural, these estimates also highlight that much of China's poverty remains in the countryside. And the clear stagnation of rural incomes, especially for those in the bottom half of the distribution, suggests little positive news for the short-run prospects for rural poverty alleviation[10].

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[10] Gustafsson and Li (2004) argue that household expenditures on education and health care increased greatly in the early 1990s. Controlling for education and health care expenditures, poverty may have not decreased. Because we do not have education and health care expenditure data, we cannot verify this argument.

5.   A Geographical decomposition of inequality

The role of widening regional income differences and their contribution to increasing inequality is a common theme in the literature on inequality in China.[11] Rising disparities between localities, especially provinces (inland versus coastal, for example) are often seen as the most important source of rising income differences, as some provinces are better situated to take advantage of market liberalization and foreign trade and investment reforms. In rural areas, spatial differences may have also been present due to differences in per capita land endowments, access to urban markets, and the level of development of commune and brigade-run enterprises at the time of the reform. With the decline in the importance of restrictions on migration enforced by China's residential registration system (the *hukou* system) and opening up of markets for migrant labor, however, we expect a decline in the contribution of regions in overall inequality. Our samples, which include the rapidly growing coastal provinces of Guangdong and Jiangsu and the relatively slow-growing interior provinces of Sichuan and Gansu, seem reasonably well suited to look for these differences and their trends.

5.1   Spatial Income Decompositions

There are a number of approaches we can take in decomposing inequality across regions. Unfortunately, the Gini coefficient is not readily (or neatly) decomposed. A simple strategy entails decomposing the variance of log income inequality index, which can be carried out by estimating the following regression:

$$\ln y_i = D_L^{'}\gamma + u_i$$

where D_L is a vector of dummy variables indicating the location of individual *i*. The R-squared from this regression indicates the proportion of the variation (or variance) of $\ln y_i$ that is explained by the location dummies. The remainder is the (within-location) residual variance of log income, and a measure of the degree to which household income cannot be explained by the average income of its neighbors.[12] We carry out this exercise separately for urban and rural households.

Table 4 reports the results of this exercise for income and consumption per capita using the NBS urban data with location defined at two-levels of aggregation, the city and province. We estimate the equation above separately with province and city-level dummies (beginning in 1993), and also distinguish between spatially deflated and spatially un-deflated

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[11]Kanbur and Zhang (1999) provide an excellent overview of the literature on regional inequality, highlighting inland versus coastal, and urban versus rural dimensions. See also Gustaffson and Li (2002).
[12] For comparability, we also decomposed the Theil, which produces similar results.

household income and consumption per capita. We also report comparable estimates using the CHNS. Our estimates suggest an increase in the role of province up through the mid-1990s, followed by a decline. The sharp increase in the first half of the 1990s may be linked to the elimination of numerous subsidies enjoyed by households, which were less than fully compensated in some provinces by an increase in cash wages (Meng et. al, 2005).[13] Unexpectedly, the massive layoffs in the SOEs, which began in the mid-1990s and had a significant regional component, did not result in an increase in the role of spatial differences. Spatially deflating the data lowers the contribution of location, but the trend is otherwise very similar. Overall, a quarter to a third of urban inequality can be linked to the province in which a household lives, with a slightly higher percentage attributable to the city. In the CHNS data, the city and especially the province play a less prominent role, with the city's role declining over time.

We report comparable estimates for the rural sector in table 5 using both the RCRE and CHNS surveys. Aside from a slight increase in the early 1990s, the RCRE data imply a fairly steady decline in the role of location in overall inequality. Spatially deflating has an effect similar to that we observed in the urban data, and lowers considerably the role of location. By the end of the period we are analyzing, both the RCRE and CHNS data suggest that the province explains only about 10 percent, and the village between 30-40 percent of rural inequality. Most of the inequality in China is within the villages and cities in which Chinese households live and work[14].

5.2   Urban and Rural Inequality

So far we have looked at rural and urban inequality in isolation. Yet one important dimension of rising inequality may be a widening gap between urban and rural incomes. Lacking access to the NBS rural household survey data, the CHNS is the only data set that allows us to explore "overall inequality", pooling urban and rural areas. It thus permits a formal decomposition of spatial inequality that includes allowance for provincial or urban-rural income gaps. Widening urban-rural income differences have figured prominently in much of the literature on rising inequality.

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[13] An alternative possibility is that the NBS data do not fully capture differences across provinces in earlier years in these subsidies, which would have led to an underestimation in the role of province in the decompositions.

[14] Using an inter-temporal decomposition of aggregate inequality, Wu and Perloff (2005) reveal that the change in within inequality accounts for 52 percent of the increase in total inequality from 1985 to 2001 even though between inequality increases faster. UNDP (2005) also reports that within inequality accounts for 61.8 percent in 1988 and 57 percent in 2002 of total inequality. Khan and Riskin (2005) find that the fall in rural and urban inequality between 1995 and 2002 is connected to a marked decline in regional (inter-provincial) inequality.

We report summary statistics for the pooled urban and rural sample in table 6. Between 1991 and 2000, real per capita income rose from 1,121 RMB (in 1990 prices) to 1,912 RMB, which implies an annual increase of just slightly less than 6 percent per annum. By all measures, inequality also increased considerably, with the Gini coefficient increasing from 0.37 to 0.44, and the 90-10 ratio rising from 6.93 in 1991 to 11.04 in 2000. The absolute increase in inequality is the same as estimated for the rural sector alone, but slightly smaller than the increase occurring in the urban sector. The behavior of the Gini coefficient for this sub-sample of provinces is actually identical to that calculated by Ravallion and Chen (2004) using the entire NBS sample.

In the bottom half of table 6 we report the results for spatial decompositions that provide estimates of the contribution of location and urban-rural differences to overall inequality. The role of the province and the city (village) in overall inequality is similar to our estimates for the urban and rural sectors separately using the CHNS. By the end of the period we are analyzing, the city or village that a household lives in only explains about a sixth of the inequality, and the province only five percent.

Controlling for the role of provincial differences in mean incomes, we also look at the contribution of urban-rural income differences to overall inequality. To help in the interpretation, recall that the average urban-rural income gap in the CHNS sample is 1.6. Combined, the province plus the urban-rural distinction explains about fifteen percent of total inequality, or an increase of ten percent over that explained by the province alone. The contribution of these two factors to total inequality is also relatively constant over the period. These estimates imply that an average urban-rural income gap of 1.6 is actually responsible for only a small part of the inequality in incomes. These results once again point to the significant contribution of differences within urban areas and the countryside to the current inequality in China.

Interpreting the behavior of urban-rural income differences can be tricky however, largely because of their sensitivity to the definition of rural. This is especially important in the Chinese context because the NBS-based urban-rural comparisons allow for rural areas to be reclassified as urban. Since the late 1970s, the share of the Chinese population that is urban has roughly doubled, a major portion of which is the result of the reclassification of rural areas to urban. We use the CHNS to illustrate these points in table 7, comparing the levels and growth rates of incomes in rural and urban areas across alternative definitions of urban/rural.

The first definition holds constant a location's rural-status throughout the period. We use the CHNS designation of "rural," plus "suburban" clusters to construct our first rural

indicator. This approximately corresponds to a definition based on household registration, i.e. in 1990, households in these clusters had rural registration. One important feature of this definition is that the rural-urban status is held constant through 2000. So, even if a rural area completely paves over its farms and industrializes, it will remain "rural". The second definition is based on economic structure, and is malleable over time. We define localities as rural if most of the households are farmers. Specifically, a locality is rural if fifty percent (or more) of the households earn fifty percent or more of their income from farming. A village that industrializes between 1991 and 2000 will thus switch its classification from rural to urban.

Several findings emerge. First, the urban-rural gap is higher with the second definition, being close to two-to-one. This is not surprising, as the "urban" clusters are positively selected on the basis of having more rapidly developed non-agricultural income sources. The ratio for our first definition is around 1.5. Second, with Definition One, the urban-gap is generally (and slowly) falling (though there are big year effects that cloud the trend). Again, the first definition allows "successful", fast growing rural clusters to retain "rural" league status. Systematic reclassification hides the actual convergence that may be occurring between town and country. Finally, the growth rates are higher for both urban and rural under Definition One. The "rural" growth rate is less than two thirds as high under Definition Two, as "successful" villages are systematically dropped. The urban growth rate is also lower under the second definition (0.46 versus 0.59). This may seem puzzling, except that the relatively rural, formerly "rural" clusters are poorer than the originally urban clusters. The newly "promoted" urban clusters continuously lower the average "urban" income.

5.3   Inequality Dynamics: Interior versus Coast

Regional differences play a relatively small role in the overall changes in inequality we observe. This does not preclude the possibility of differences in the dynamics of inequality between regions that may be important in their own right, and possibly linked to the growth process. In table 8, we provide summary data on incomes, inequality, and the results of a spatial decomposition for the coastal and interior region separately using the CHNS for the 1990s. Coastal includes the provinces of Liaoning, Shandong, Jiangsu, and Guangxi, while interior includes Heilongjiang, Hubei, Henan, Hunan, and Guizhou. In 1991, mean incomes in the coastal provinces were only modestly higher than they were in the interior, with both urban and rural incomes in the coastal areas higher than their counterparts in the interior. Over the decade, the difference in average incomes between the two regions widens considerably, with mean income in the coastal provinces at 2,215 yuan by 2000 compared to 1,652 in the interior, or a difference of one-third.

Much of the increase in the gap, however, appears to be the result of a growing difference in incomes between rural households in the coastal and interior provinces. By 2000, rural incomes in the coastal provinces are nearly fifty percent higher than they are in the interior. On the other hand, there are only modest differences in the growth rate of urban household incomes in the two regions, and the ratio of mean or median urban incomes in the two regions remains more or less constant over this period. The failure of incomes in the interior to keep up with coastal areas appears to be a rural phenomenon.

Differences in the behavior of inequality in the two regions are equally telling. Not only is the level of inequality higher in the interior, but the increase through the 1990s is greater as well. In the coastal provinces, inequality increases from 0.35 to 0.39, with the increase occurring largely in the early 1990s. In the interior, it increases from 0.39 to 0.48. The significantly larger increase in the interior can be attributed to two key factors: first, the more rapid increase in inequality in rural areas in the interior compared to the coastal provinces; and second, a widening rural-urban income gap in the interior compared to the coastal provinces. In the interior, rural inequality increases from 0.40 to 0.49, but in the coastal provinces inequality remains more or less the same. In the interior, on the other hand, the rural-urban gap widens from 1.58 to 1.85, while in the coastal provinces it falls from 1.60 to 1.32. Partially offsetting some of this is the more rapid increase in urban inequality in the interior.

Spatial decompositions show that the role of location in explaining income differences decreases much faster in coastal regions than in interior regions, e.g. income variations explained by the city/village dummy decreased from 0.46 in 1991 to 0.24 in 2000 in costal regions but only from 0.35 to 0.30 in the same period in interior regions. This trend reflects a faster convergence in terms of regional inequality in costal regions.

Several of these same trends are also mirrored in mean provincial urban and rural household incomes reported by the NBS, and provided in table 9. We attribute the same mean per capita income to everyone living in urban (rural) areas in a province, and use the urban-rural spatial deflators and population weights to construct a mean provincial income. We then use the NBS data and our constructed estimates to look at inequality in mean provincial urban and rural incomes within the two regions separately, the differences in urban-rural incomes, as well as inequality in mean provincial incomes in the two regions. Recall that these calculations assume no differences in urban or rural incomes within provinces. Significantly, the pooled Gini is higher and rises more rapidly in the interior than it does in the coastal provinces. The primary source of the difference in the behavior between the two regions is the failure of rural incomes in the interior to grow as rapidly as the urban incomes. We observed the same phenomenon in the CHNS.

How might we explain these differences in the behavior of the inequality between the two regions? There is a potential link with recent research by Brandt, Hsieh and Zhu (2005) on growth and structural transformation in China, and the influence of the size of the state sector on the absorption of labor out of the countryside. At the outset of the reforms, the role of the state sector was significantly more important in the interior than in the coastal provinces. Some of this reflected the policy of the Third Front, and a redirection of much of China's industrial investment to the interior in the 1960s and 1970s. With reform, the growth of the non-state sector in the interior provinces has been much slower as more resources went to support a larger population **tied to state sector in the urban areas**. This has handicapped the growth in rural incomes through the demand for labor in a host of secondary and tertiary industry in both the urban and rural sectors.[15] Recall that the most significant source of growth for rural households has been in non-agricultural activity, especially off-farm wages and family businesses. Although migration to coastal provinces has relaxed some of these constraints, it can be argued that expansion in these opportunities has been more seriously constrained as more resources have been tied up in the interior provinces in supporting an inefficient state sector. In contrast, growth in the non-state sector in the more dynamic coastal provinces has helped to keep the urban-rural income gap from rising, but has also provided a wide array of opportunities to households that had prevented a sharp deterioration in rural inequality as observed in the interior.

6. Decomposition by income sources

Why has inequality gone up within China's villages and cities? Addressing this question requires a careful analysis of the evolution of institutions that map household endowments into family income, and is a significant research enterprise in itself. Our more limited objective here is to sketch some of the correlates of the "within" inequality, particularly those related to the composition of household income.

The key tools in our analysis are descriptive statistics of the structure of income in both urban and rural areas, and Shorrocks's (1982, 1983) decompositions. The Shorrocks decomposition tells us the proportion of total inequality that can be attributed to inequality of income source k. It is a purely descriptive tool, and there are limits to the extent that one can attribute a causal interpretation to the coefficients. However, as we shall see, even within the limits of interpretation the decompositions are illuminating.

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[15] They find at the provincial level that the reallocation of labor from agriculture to non-agriculture is inversely related to the size of the state sector at the time of the reform.

Previous studies have emphasized the role of non-farm income in contributing to rising rural inequality.[16] Table 10 provides data for the composition of rural incomes since the 1980s using the RCRE data. For the first year for which we have data (1987), income from farming -which includes both cropping and farm sideline activity (animal husbandry, forestry and fishery) - was the source of more than half of all income, with participation in farming and farm sidelines nearly universal among households. The latter reflects the fact that nearly all households in rural China were allocated land. Income from grain by itself was thirty percent of total household income. Family businesses, mostly in commerce and services, comprised 16 percent of income, while wage income was the second largest overall component at 25 percent. Most wage income in the 1980s was earned locally, within the village or township, with more than two-thirds of all households reporting income from wages.

This structure of income changed dramatically by the end of the period, with much of the change occurring in the late 1990s. Especially noteworthy is the sharp drop in the percentage of income coming from agriculture, most of which is occurring in income from cropping. A significant portion of this can be linked to the sharp drop in farm prices beginning in the mid-1990s. Preliminary estimates for 2001 and 2003 (not reported) show a further reduction in the role of income from farming, even as agriculture prices recovered slightly. Currently, agriculture and agriculture sidelines only twenty percent of total household income. Moving down the column, we see improvements in income from family businesses, which rose from 16 to 23 percent as a share of total income. However, the largest improvements in family income came from wage earnings, especially wages earned by temporary migrants.[17] Locally earned wages have become less important in both relative and absolute terms, while employment opportunities outside the village and accessed through migration have become a more important source of labor earnings.

The Shorrocks decompositions are presented in the bottom half of table 10.[18] For 1987, we find that agricultural income, while disequalizing, contributed less to overall inequality than its share of total income (13 percent versus approximately 40 percent). The same applied to agricultural sidelines, so that only 20 percent of total inequality was attributed to inequality of agricultural income, even while this source accounted for 53

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[16]See Benjamin, Brandt, Glewwe and Li (2002) for a survey of these studies.

[17] The wage earnings of temporary migrants include household members residing in the village, but who commute outside the village to work and return on weekends, as well as wage earnings brought home by locally registered household members who work outside the village for a substantial portion of the year. The RCRE survey does not permit a further disaggregation.

[18] Elsewhere (Benjamin et. al., 2005) we have carried out the same decompositions controlling for location, which rarely matters. This indicates that composition of income matters within-villages much the same way as across villages.

percent of total income. Non-farm family businesses contributed most to inequality compared to their share of income (27 percent compared to about 16 percent), followed by wage income (31.6 percent compared to 25.1 percent). Within the wage category, local wages were relatively disequalizing, while wages from employment outside the village were relatively equalizing.

The results for the latter years are significantly different, and even more different than the change in average composition would suggest. First, note that in 1999 inequality of agricultural income contributed only 5 percent of overall income inequality. Even adding livestock and other sidelines, the overall contribution of farming income to inequality was 11 percent. Inequality of wage income contributes more to inequality in 1999 than 1987, though this is not surprising given its increased importance as a source of income. However, there is some asymmetry in the effect of local and non-local wage earnings, with the former contributing more to the increase in the inequality than the latter. Perhaps the most striking result of the decompositions is the large share - 40 percent - of total inequality attributed to family-run business earnings.

Taken together, these decompositions highlight two important sources of inequality, especially when we compare 1999 to 1987. First is the sharp decline of the relatively equalizing source of income from farming. Second is the relative increase in disequalizing income from non-farm family businesses, **and third is the failure of non-farm labor markets to provide income opportunities for low-income households that offset the collapse of agricultural income**. Past emphasis on the role of non-farm income as a source of inequality was only partially correct. Increasing agricultural incomes – at least in an equalizing way – are unlikely to improve overall income distribution, if for no other reason than agricultural incomes are only weakly associated with overall income, since they are also very low.

Table 11 provides comparable summary information on the composition of urban incomes using the NBS data. Wages are the most important component of urban incomes. However, as recorded by the NBS, wages do not appear to include many of the subsidies that urban residents receive, including access to goods and services at below market prices, as well as the value of the in-kind component of incomes. These were especially important in the 1980s, but declined sharply in the early 1990s. With these caveats, we observe a small decline of about ten percent in the percentage of households with wage income, and an even larger decline in the percentage of income coming from wages, from 85 percent to 64 percent. This is partially offset by rising income from self-employment (especially in the late 1990s), and pensions. By 2001, more than a third of all urban households report pension income, with pensions the source of nearly twenty percent of all income.

We augment our picture of the composition of urban incomes using the CHNS sample. The CHNS data provide a much better picture than do the NBS data on the role of subsidies, including access to major consumer goods (primarily food) and housing at below market prices, childcare, etc. Typically, these subsidies were allocated in a fairly egalitarian way to urban residents, and in 1991 these represented a quarter of a household's average income. Between 1991 and 1999, they declined in absolute terms by more than half, and by a factor of four when measured as a proportion of income.[19] Especially prominent in the CHNS is the big increase in "other", which includes pension income. We do not report it, but the role of pension income is very similar to that suggested by the NBS data. The CHNS show a similar percentage of households reporting self-employment income as in the NBS sample, but a higher share of income coming from this source. Finally, the small positive income from farming in the sample reflects slight differences in definition of urban between the two surveys.

In the bottom half of the table we report the results of the Shorrocks decomposition for urban incomes using the NBS data. Subject to their shortcoming that they do not capture a host of household subsidies and their changes, the decomposition shows that much of the urban inequality resides in wage earnings (60-70%). There are several potentially important dimensions to the latter. Enterprise, especially SOEs, and labor market reform in the late-1980s may have contributed to widening differentials in wages across firms and individuals. With the increase in the layoffs from the state sector beginning in the mid-1990s, and with over 40 million now laid off in industry, we might expect some of the growing dispersion in incomes to be coming from a shift into the lower paying self-employment options or perhaps even early retirement for some individuals and households. On the other hand, among those households with working members in the sector, an increase in wage earnings inequality could be coming from either growing differences in time worked, or from the wages (daily, weekly or monthly) earned. As documented in a recent paper by Cai et. al. (2005), enterprise and labor market reform lead to a significant increase in the returns to human capital and ability over the period we are analyzing, especially to those with higher education.

In table 12 and figure 4 we use the CHNS urban data to look at this dimension of urban inequality more carefully. The top half of table 12 provides measures of the inequality of wage earnings over all households, and then only over those reporting positive wage earnings. Both show significant increases in wage earnings inequality, with the Theil coefficient and the coefficient of variation nearly doubling over the 1990s. On the other hand, the bottom half provides a simple decomposition of the log of wage earnings for those

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[19] The decline in these subsidies was precipitated by the central government's fiscal problems. By the early 1990s, urban subsidies reportedly represented a quarter of all central government expenditure.

households with positive wage earnings into constituent log months worked and log monthly wages, as well as the covariance between the two. We express the results in levels, as well as the percentage of the total variation explained.[20]

Over the entire period, the variance of the log of wage earnings for those households with wage earnings increases by more than fifty percent. In 1991, 53.1 percent of the variance can be attributed to the variance in the log of months worked, with the variance in the monthly wage **explaining** 39.2 percent. Over the ten-year period between 1991 and 2000, there is not much of a change in the dispersion of months worked, but the variance of the log monthly wage more than doubled, however. Indeed, much of the increase that we observe in the dispersion of wage earnings can be attributed to the increase in the dispersion in the monthly wage.

The likely source of the increase in average monthly wage earnings inequality is the increase in the rate of return to human capital. Over the 1990s, the average rate of return to an additional year of education increased from 4 percent to more than 10 percent (Heckman, 2003; Heckman and Li, 2004). The increase in return was not realized uniformly over years of educational attainment; in other words, the percentage increase in wage earnings resulting from an additional year of school was not the same for someone with a middle school degree (9 years) and a high school degree (12 years). In fact, it appears that a significant amount of the increase was realized by those with university degrees, as wage earnings of those with a university degree increased significantly relative to someone with only high school degree.

Figure 4 provides information from the CHNS on participation rates in wage employment by age category for men and women separately. To what extent is the decline in employment (and thus wage income) concentrated among certain cohorts, especially the elderly? We observe significant reductions beginning in the mid-1990s in wage employment that are especially severe in the tails of the age distribution (20-30, 50+) for men, and for prime-age women (20-40) that are likely related to labor market and SOE reform. These declines are paralleled by similar reductions in labor force participation rates, so that the percentage of individuals that work that have wage employment remains fairly constant over time. Figure 4 points to an important cohort dimension to the rising inequality in China's cities.

7. Conclusions and apparent themes

Over the course of two and a half decades of reform, China has experienced a significant increase in inequality that is likely underestimated by the data we use. These

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[20] We carried out the same exercise using days rather than months, and obtained very similar results.

increases are observed within both the urban and rural populations. In rural areas, this increase is tied to the disequalizing role of some forms of non-agricultural income, and laggard growth of farming income, especially beginning in the mid-1990s. In urban areas, on the other hand, a decline in the role of subsidies and entitlements, increasing wage inequality related to labor market and enterprise reform, and the effect of restructuring of SOEs on some cohorts and households through layoffs, etc, have all played a part in enlarging inequality? Regional (spatial) differences, although certainly present, are much less important than commonly believed for both urban and rural populations, as well as urban and rural combined. The same is true for differences between China's urban and rural areas.

However, this increase in inequality must be seen in the context of rapidly rising incomes and improvements in welfare that literally pulled hundreds of millions out of poverty, especially in the agriculture sector. Prior to the onset of reforms, poverty in urban areas was very low, largely because of the severe urban bias in Chinese policy, and the fairly egalitarian distribution of incomes in the cities. Poverty does persist however—probably on the order of ten percent of the Chinese population or in excess of 120 million—and is largely a rural phenomenon. There is a need for more research in estimating and identifying the poor in both urban and rural areas. Probably the most obvious and feasible policy recommendation is to facilitate this research by improving access to nationally representative household survey data, as well as implementing household surveys designed to better measure income.

However, there are obvious other areas of public policy that need to take account of rising inequality. First, a recurring theme in our research is the important role played by education in both urban and rural areas. Probably no other single factor will be most closely tied to how the fruits of future growth are shared. Long-term poverty reduction policies in China should give more emphasis on education, training, and other human development programs. Second, China will have to adopt and implement more social safety nets, as even universal education will not be enough to generate a poverty-free income distribution. In the countryside, equally distributed land is unlikely to do the job, especially if returns to agriculture remain low. And finally, like most other countries, China will need to adopt a redistributive taxation system, both to support the social safety nets, finance public goods, and allow the broader society to share in the obvious wealth being generated by the top part of the income **distribution**. With a richer understanding of the characteristics of income distribution, the design and implementation of these and related types of policies will eventually provide for a richer research agenda in the future.

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Table 1

Levels of Income and Consumption, Selected Years and Data Sets
Urban and Rural Separately

	1987	1991	1993	1995	1997	1999	2000/1	Growth
				Urban				
NBS Data								
Income:								
Mean	1533	1742	2096	2385	2565	3040	3411	0.059
Median	1419	1546	1791	1994	2142	2510	2718	0.048
Consumption:								
Mean	1346	1491	1742	1994	2086	2468	2702	0.051
Median	1188	1286	1458	1621	1723	1948	2179	0.044
CHNS Data								
Income:								
Mean		1484	1651		1982		2532	0.059
Median		1417	1445		1765		2192	0.048
				Rural				
RCRE Data								
Income:								
Mean	1093	1040	1166	1401	1361	1363		0.018
Median	881	795	846	1077	1033	1016		0.012
Consumption:								
Mean	752	732	825	996	966	973		0.021
Median	665	608	648	816	779	763		0.011
CHNS Data								
Income:								
Mean		917	984		1344		1623	0.063
Median		739	735		1051		1206	0.054

Table 2 : Income and Consumption Inequality, Selected Years and Data Sets: Urban Only

	1987	1991	1993	1995	1997	1999	2000-01
			Income				
NBS Data (Spatially Un-deflated)							
Gini	0.22	0.25	0.28	0.30	0.31	0.32	0.34
Theil	0.08	0.10	0.13	0.16	0.17	0.18	0.20
Atkinson (0.5)	0.04	0.05	0.06	0.07	0.08	0.08	0.10
Atkinson (1)	0.08	0.10	0.12	0.14	0.15	0.16	0.18
Atkinson (2)	0.15	0.18	0.22	0.25	0.27	0.29	0.31
90/10	2.64	2.97	3.59	3.90	4.08	4.34	4.77
% Below 0.5× 1987							
Median	3.99	4.71	1.89	1.95	1.50	1.25	0.91
NBS Data (Spatially Deflated)							
Gini	0.20	0.22	0.26	0.28	0.29	0.30	0.33
Theil	0.07	0.08	0.10	0.12	0.12	0.14	0.18
Atkinson (0.5)	0.03	0.04	0.05	0.06	0.06	0.07	0.09
Atkinson (1)	0.07	0.08	0.10	0.11	0.11	0.13	0.16
Atkinson (2)	0.13	0.15	0.18	0.20	0.22	0.24	0.30
90/10	2.49	2.69	3.15	3.29	3.39	3.76	4.62
% Below 0.5× 1987							
Median	3.88	2.14	1.51	1.40	1.20	1.10	0.78
CHNS (Spatially Undeflated)							
Gini		0.29	0.35		0.35		0.38
Atkinson(0.5)		0.07	0.10		0.11		0.13
Atkinson(1.0)		0.15	0.22		0.23		0.27
Atkinson(2)		0.40	0.50		0.59		0.62
90/10		4.40	6.50		6.32		8.24
% Below 0.5× 1987							
Median							

Notes: (1) The inequality measures are calculated using the same rural and urban data as described in Table 1. In particular, where relevant, all incomes are reported in constant 1990 yuan; (2) "Spatially Deflated" calculations are based on further adjustments for geographic differences in cost-of-living as described in Brandt and Holz (2004); (3) "90/10" is the ratio of the 90th to the 10th percentiles of the income distribution; (4) "% Below 0.5× 1987 Median" is the percentage of individuals with per capita incomes below a constant benchmark, namely one-half the median 1987 per capita income (or consumption)

Table 3 : Income and Consumption Inequality, Selected Years and Data Sets : Rural Only

	1987	1991	1993	1995	1997	1999	2002*
			Income				
RCRE Data (Spatially Un-deflated)							
Gini	0.33	0.34	0.37	0.34	0.36	0.38	0.39
Theil	0.19	0.22	0.28	0.21	0.24	0.26	0.30
Atkinson (0.5)	0.09	0.10	0.12	0.09	0.11	0.12	0.13
Atkinson (1)	0.16	0.18	0.21	0.17	0.20	0.21	0.23
Atkinson (2)	0.30	0.33	0.35	0.34	0.42	0.97	0.69
90/10	4.26	4.11	4.58	4.04	4.88	5.43	4.95
% Below 0.5× 1987 Median	16.05	20.12	18.45	7.39	13.02	15.21	9.52
RCRE Data (Spatially Deflated)							
Gini	0.29	0.31	0.33	0.31	0.34	0.35	0.36
Theil	0.15	0.17	0.21	0.17	0.20	0.22	0.24
Atkinson (0.5)	0.07	0.08	0.09	0.08	0.09	0.10	0.11
Atkinson (1)	0.14	0.15	0.17	0.15	0.17	0.19	0.20
Atkinson (2)	0.26	0.29	0.30	0.31	0.39	0.95	0.57
90/10	3.76	3.65	3.97	3.67	4.44	4.91	4.74
% Below 0.5× 1987 Median	14.01	17.62	14.29	5.23	11.41	13.22	8.03

	1991	1993	1997	2000
CHNS Data (Spatially Un-deflated)				
Gini	0.39	0.43	0.41	0.46
Theil	0.26	0.32	0.28	0.36
Atkinson (0.5)	0.13	0.15	0.14	0.18
Atkinson (1)	0.25	0.31	0.28	0.36
Atkinson (2)	0.31	0.68	0.66	0.77
90/10	7.25	8.78	8.76	11.65
% Below 0.5× 1987 Median	20.58	21.81	13.32	13.16

Notes: (1) The inequality measures are calculated using the same rural and urban data as described in Table 1. In particular, where relevant, all incomes are reported in constant 1990 yuan; (2) "Spatially Deflated" calculations are based on further adjustments for geographic differences in cost-of-living as described in Brandt and Holz (2004); (3) "90/10" is the ratio of the 90th to the 10th percentiles of the income distribution; (4) "% Below 0.5× 1987 Median" is the percentage of individuals with per capita incomes below a constant benchmark, namely one-half the median 1987 per capita income (or consumption); (5) The RCRE estimates for 2002 are preliminary.

Table 4 : Spatial Variation of Incomes, Urban, Selected Years

	1987	1991	1993	1995	1997	1999	2001	2001
			Income					
NBS, Time Deflated								
Province	0.26	0.30	0.33	0.37	0.37	0.35	0.31	0.28
City			0.45	0.48	0.47	0.45	0.41	0.39
NBS, Spatially Deflated								
Province	0.17	0.17	0.26	0.29	0.30	0.29	0.26	0.13
City			0.39	0.34	0.39	0.4	0.37	0.27
CHNS, Time Deflated								
Province		0.04	0.05		0.06		0.02	
City		0.29	0.29		0.25		0.13	
			Consumption					
NBS, Time Deflated								
Province	0.25	0.28	0.31	0.36	0.35	0.33	0.28	0.25
City			0.44	0.47	0.46	0.45	0.42	0.40
NBS, Spatially Deflated								
Province	0.16	0.15	0.24	0.26	0.26	0.26	0.23	0.12
City			0.39	0.40	0.39	0.40	0.37	0.29

Notes: (1) This table reports the proportion of total variation of log per capita income (or consumption, where noted) explained by a set of location indicators. This is calculated as the R-squared from a regression of "ln *y*" on a set of dummy variables for province, city, or cluster, depending on the level of spatial analysis. (2) The "spatially deflated" series refers to incomes adjusted for provincial differences in the cost of living, as calculated by Brandt and Holz (2004).

Table 5 : Spatial Variation of Income and Consumption Within-Rural Areas, Selected Years

	1987	1991	1993	1995	1997	1999	2000
Income							
RCRE, Time Deflated							
Province	0.27	0.25	0.29	0.21	0.20	0.17	
Village	0.52	0.49	0.51	0.43	0.44	0.44	
RCRE, Spatially Deflated							
Province	0.16	0.14	0.16	0.10	0.12	0.09	
Village	0.45	0.41	0.42	0.36	0.38	0.38	
CHNS, Time Deflated							
Province		0.06	0.06		0.06		0.05
Village		0.24	0.30		0.22		0.21
Consumption							
RCRE, Time Deflated							
Province	0.34	0.29	0.32	0.22	0.24	0.26	
Village	0.59	0.56	0.56	0.53	0.55	0.54	
RCRE, Spatially Deflated							
Province	0.21	0.17	0.18	0.11	0.14	0.15	
Village	0.52	0.48	0.47	0.46	0.49	0.47	

Notes: (1) This table reports the proportion of total variation of log per capita income (or consumption, where noted) explained by a set of location indicators. This is calculated as the R-squared from a regression of "ln y" on a set of dummy variables for province, city, or cluster, depending on the level of spatial analysis. (2) The "spatially deflated" series refers to incomes adjusted for provincial differences in the cost of living, as calculated by Brandt and Holz (2004).

Table 6 : Inequality for Combined Urban and Rural, CHNS Data

	1991	**1993**	**1997**	**2000**
Mean Per Capita Income	1121	1194	1560	1912
Gini Coefficient	0.37	0.42	0.40	0.44
Atkinson (0.5)	0.12	0.15	0.13	0.17
Atkinson (1)	0.24	0.30	0.27	0.34
Atkinson (2)	0.51	0.67	0.66	0.76
90/10	6.93	8.82	8.49	11.04

Spatial Decompositions
Proportion attributable to:

	1991	**1993**	**1997**	**2000**
Province	0.05	0.04	0.05	0.06
Province plus Urban-Rural	0.17	0.14	0.12	0.14
City/Village (Cluster)	0.31	0.36	0.28	0.17

Notes: (1) This table reports mean incomes and inequality measures for a combined sample of urban and rural households, where adjustment has been made for spatial differences in the cost of living, including urban-rural differences in prices (from Brandt and Holz, 2004); (2) All figures are reported based on the spatially deflated, constant 1990 yuan; (3) The spatial decompositions are the same as described in Tables 8 and 9. "Province plus Urban-Rural" means province interacted with a rural/urban indicator (which does not permit spatial differences within the urban or rural sectors within a province).

Table 7 : The Sensitivity of Urban-Rural Distinctions to the Definition of "Rural" : Mean Per Capita Incomes and Growth, CHNS

	1991	1993	1997	2000	Growth
Rural, Fixed Definition	917	984	1343	1623	0.063
Urban, Fixed Definition	1484	1651	1982	2532	0.059
Urban/Rural Ratio, Fixed Definition	1.62	1.68	1.48	1.56	
Rural, Allowing reclassification	772	766	1042	1108	0.040
Urban, Allowing reclassification	1391	1474	1798	2106	0.046
Urban/Rural Ratio, Allowing Reclassification	1.80	1.92	1.73	1.90	

Notes: (1) This table shows mean per capita incomes expressed in constant 1990 yuan, for varying definitions of urban and rural. (2) The first definition of urban-rural is based on the CHNS sampling definition, where "rural" includes "purely" rural and "suburban" households, approximately corresponding to rural registered households. This definition is fixed for the entire period, so that a 1991 rural household (cluster) remains rural in 2000. (3) The second definition is based on economic structure. Clusters are defined as rural if fifty percent or more of households earn fifty percent or more of their income from farming (i.e., most of the households are farmers). This definition is re-calculated each survey, so clusters can evolve from rural to urban classification. (4) "Growth" is defined as the implied annual compounded rate from 1991 through 2000.

Table 8 : Inequality for Combined Urban and Rural, CHNS Data

	1991	1993	1997	2000
Coastal regions				
Mean Per Capita Income	1167	1316	1746	2215
Mean, Urban	1580	1792	2153	2725
Mean, Rural	991	1150	1620	2065
Gini Coefficient	0.35	0.39	0.37	0.39
Gini, Urban	0.26	0.34	0.35	0.37
Gini, Rural	0.38	0.40	0.38	0.39
Interior regions				
Mean Per Capita Income	1078	1086	1433	1652
Mean, Urban	1352	1473	1862	2338
Mean, Rural	858	850	1152	1265
Gini Coefficient	0.39	0.45	0.41	0.48
Gini, Urban	0.31	0.37	0.35	0.39
Gini, Rural	0.40	0.45	0.42	0.49
Spatial Decompositions				
Proportion attributable to:				
Coastal regions				
Province	0.04	0.01	0.02	0.02
Province plus Urban-Rural	0.14	0.10	0.06	0.06
City/Village	0.46	0.43	0.29	0.24
Interior regions				
Province	0.04	0.04	0.03	0.02
Province plus Urban-Rural	0.15	0.13	0.10	0.13
City/Village	0.35	0.33	0.26	0.30

Notes: (1) This table reports mean incomes and inequality measures for a combined sample of urban and rural households, where adjustment has been made for spatial differences in the cost of living, including urban-rural differences in prices (from Brandt and Holz, 2004); (2) All figures are reported based on the spatially deflated, constant 1990 yuan; (3) The spatial decompositions are the same as described in Tables 8 and 9. "Province plus Urban-Rural" means province interacted with a rural/urban indicator (which does not permit spatial differences within the urban or rural sectors within a province).

Table 9 : Differences in Provincial Mean Incomes by Region

Inland Provinces

Year	Rural Gini	Urban Gini	Urban-Rural Income Ratio	Pooled Gini	Mean Rural Income	Mean Urban Income
1985	0.092	0.087	1.65	0.147	743.94	1224.62
1988	0.092	0.083	1.82	0.169	743.39	1356.53
1991	0.081	0.09	2.05	0.197	740.6	1518.69
1994	0.107	0.103	2.29	0.235	833.06	1911.21
1997	0.087	0.111	1.92	0.202	1102.36	2121.71
2000	0.085	0.109	2.19	0.234	1222.7	2671.85

Coastal Provinces

Year	Rural Gini	Urban Gini	Urban-Rural Income Ratio	Pooled Gini	Mean Rural Income	Mean Urban Income
1985	0.065	0.087	1.51	0.128	857.18	1294.5
1988	0.059	0.11	1.57	0.151	952.68	1499.11
1991	0.054	0.099	1.73	0.164	993.41	1716.9
1994	0.095	0.114	1.88	0.196	1206.17	2268.06
1997	0.082	0.1	1.56	0.153	1646.61	2565.92
2000	0.087	0.102	1.7	0.175	1852.15	3140.3

Notes: (1) This table shows the "simulated" Pooled Gini coefficient for inland and coastal China, in which each individual in a province is attributed the mean per capita income for that province. This effectively sets within-province inequality to zero for urban and rural China respectively. (2) The urban and rural Gini's are based on spatially deflated per capita incomes, accounting for cross-province price differences, while the pooled Gini also spatially deflates with account for different prices in urban and rural areas. (3) For reference, we also show the ratio of urban to rural spatially deflated mean incomes. (4) *Source*: Authors' calculations using NBS Yearbooks.

Table 10 : Composition of Income, Selected Years - RCRE Data (Rural Only)

	1987		1995		1999	
Mean Per Capita Income	1093		1401		1363	
	Share	% > 0	Share	% > 0	Share	% > 0
Agricultural Income	0.40	98.1	0.37	96.4	0.22	94.2
Agricultural Sidelines	0.13	95.5	0.10	84.1	0.10	76.4
Family Business	0.16	61.6	0.20	57.8	0.23	50.1
Wage Income	0.25	71.1	0.27	64.0	0.39	68.0
Family Transfers	0.05	52.5	0.05	51.2	0.05	49.5
Government Transfers	0.01	65.1	0.00	68.6	0.01	70.8
Other	0.01	13.8	0.01	10.3	0.01	11.0
TOTAL	1.00		1.00		1.00	
Shorrocks Decomposition:						
Agricultural Income	0.13				0.05	
Agricultural Sidelines	0.07				0.06	
Family Business	0.35				0.44	
Wage Income	0.37				0.40	
Family Transfers	0.08				0.04	
Government Transfers	0.00				0.00	
Other	0.00				0.01	

Notes: (1) This table reports mean incomes in constant 1990 yuan; (2) The "Share" is the proportion (share) of total income earned in the specified category; (3) "%>0" is the percentage of households (individuals) reporting positive (non-zero) income from the given source. (4) The Shorrocks decompositions report the proportion of total inequality that can be attributed to inequality of that particular income source.

Table 11 : Composition of Income, Selected Years - NBS, Urban

	1987		**1995**		**2001**	
Mean Per Capita Income	1533		2385		3411	
	Share	%>0	Share	%>0	Share	%>0
Wages	0.86	97.92	0.74	93.58	0.68	87.09
Self-employment	0.01	2.28	0.02	4.26	0.05	14.85
Pensions	0.07	20.29	0.12	27.73	0.15	33.4
Family Transfers	0.02	33.78	0.02	34.81	0.02	34.73
Other	0.03	95.98	0.06	59.71	0.07	66.67
Total	1.00		1.00		1.00	
Shorrocks Decomposition:						
Wages	0.66		0.61		0.72	
Self-employment	0.03		0.01		0.01	
Pensions	0.12		0.08		0.11	
Family Transfers	0.10		0.04		0.03	
Other	0.09		0.16		0.13	

Notes: (1) This table reports mean incomes in constant 1990 yuan; (2) The "Share" is the proportion (share) of total income earned in the specified category; (3) "%>0" is the percentage of households (individuals) reporting positive (non-zero) income from the given source. (4) The Shorrocks decompositions report the proportion of total inequality that can be attributed to inequality of that particular income source.

Table 12 : A Closer Look at the Distribution of Earnings - Urban Areas, CHNS, Selected Years

	1991	1993	1997	2000
All Households				
Total # of households	1189	1069	1276	1232
Inequality of Earnings:				
Gini	0.49	0.56	0.57	0.67
Theil E	0.46	0.61	0.64	0.91
CV	0.94	1.25	1.26	1.72
Households with Positive Earnings				
# of households	897	769	844	711
% of all households	75.4	71.9	66.1	57.7
Inequality of Earnings:				
Gini	0.32	0.39	0.36	0.42
Theil E	0.17	0.28	0.23	0.36
CV	0.65	0.92	0.81	1.13

Decomposition of Variance of Log Earnings (among households with positive earnings)

|	Variance	% Expl.	Variance	% Expl.	Variance	% Expl.	Variance	% Expl.
var (log wage earnings)	0.416	100	0.569	100	0.457	100	0.663	100
var (log months worked)	0.221	53.1	0.253	44.5	0.18	39.4	0.233	35.1
var (log monthly wage)	0.163	39.2	0.297	52.2	0.261	57.1	0.365	55.1
Covariance (h,w)	0.032	7.7	0.016	2.8	0.016	3.5	0.065	9.8

Notes: (1) This table uses the CHNS data to describe inequality of wage income in urban areas; (2) All nominal figures are expressed in constant 1990 yuan; (3) The top two panels report various measures of wage-income (earnings) inequality, including or excluding households with "zeroes" (unconditional, or conditional, on positive earnings); (4) The bottom panel reports the total variance of log earnings, decomposed into constituent log months worked and log monthly wages, as well as the covariance between log months worked and log wages ("Covariance (h,w)"). (5) The decomposition is expressed in levels, as well as the percentage of total variation explained "% Expl.")

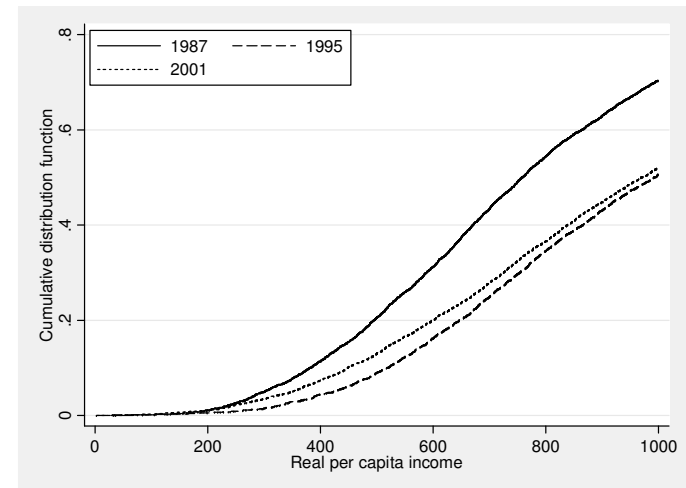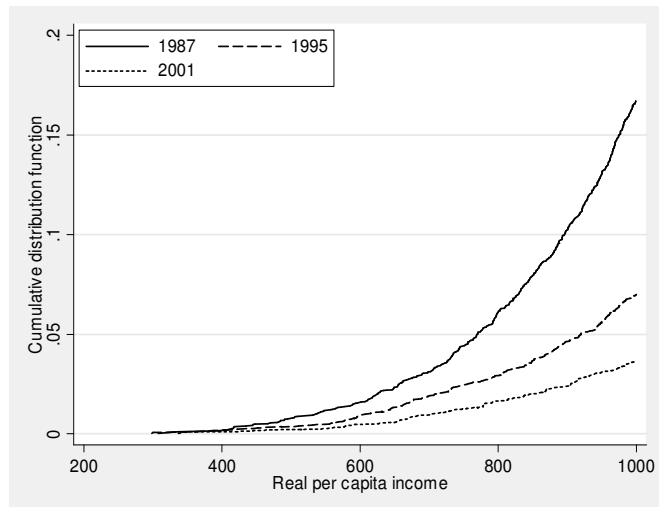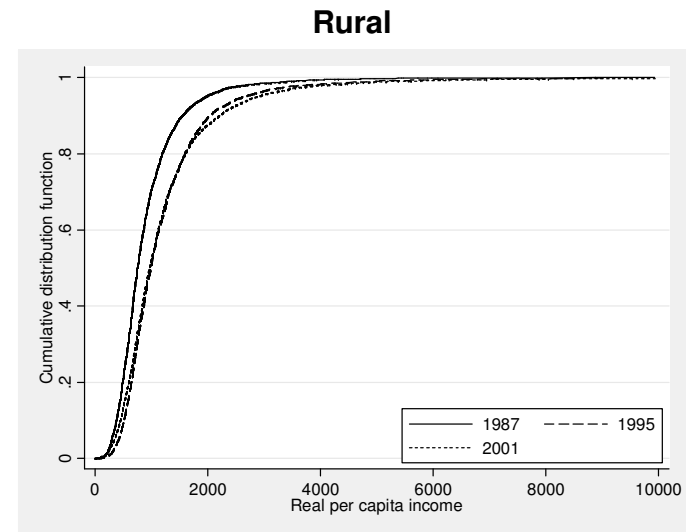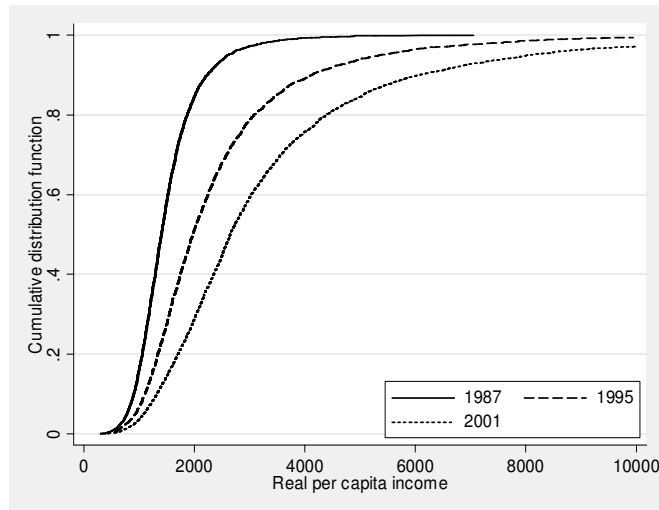**Figure 1: Lorenz Curves, Urban and Rural Incomes**
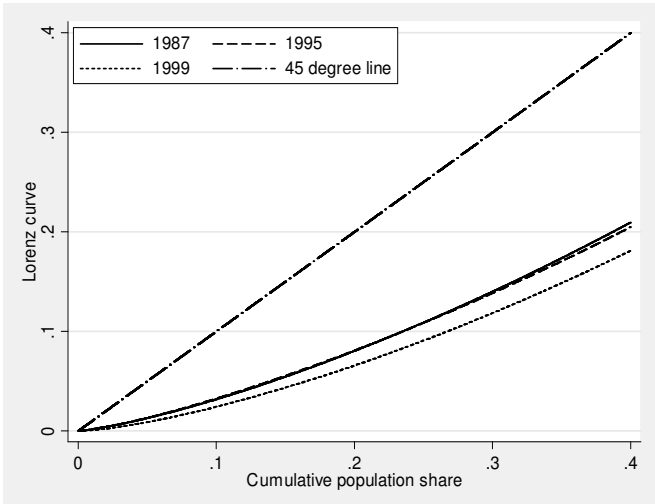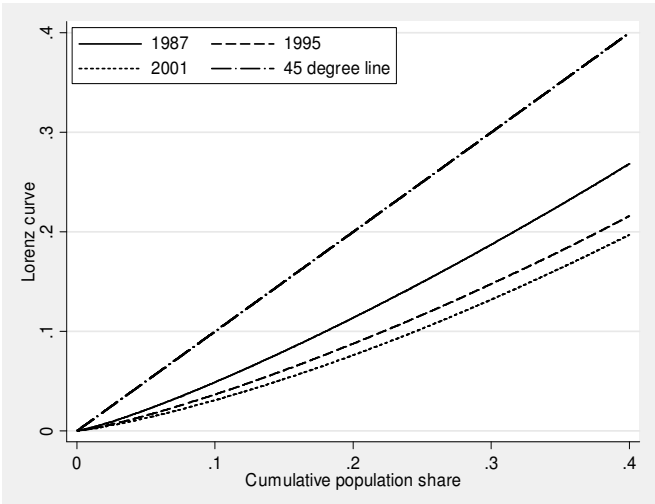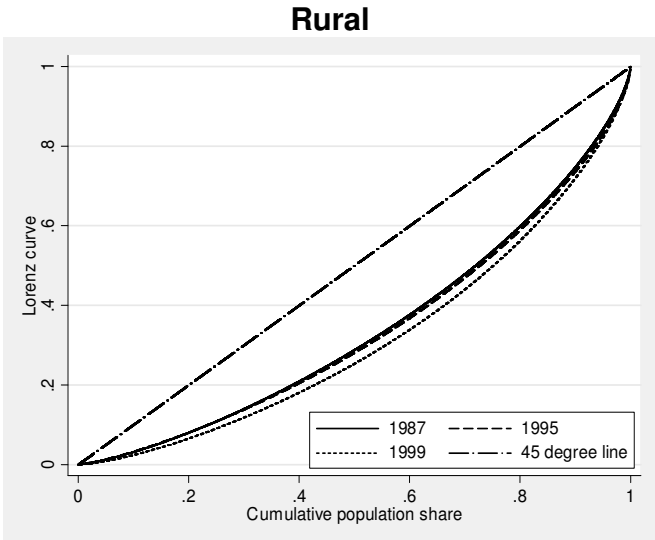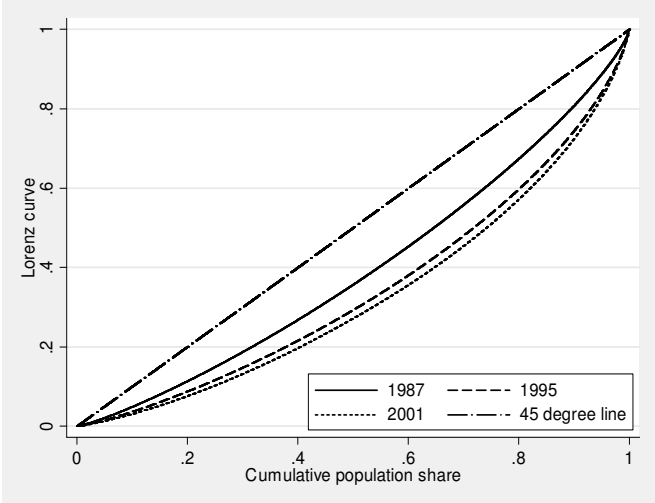
Notes: The Lorenz curves are based on the urban (NSB) and rural (RCRE) data described in Tables 1, 2, and 3. All calculations are based on spatially-undeflated, constant 1990 yuan.

Figure 2: Generalized Lorenz Curves, Urban and Rural Incomes
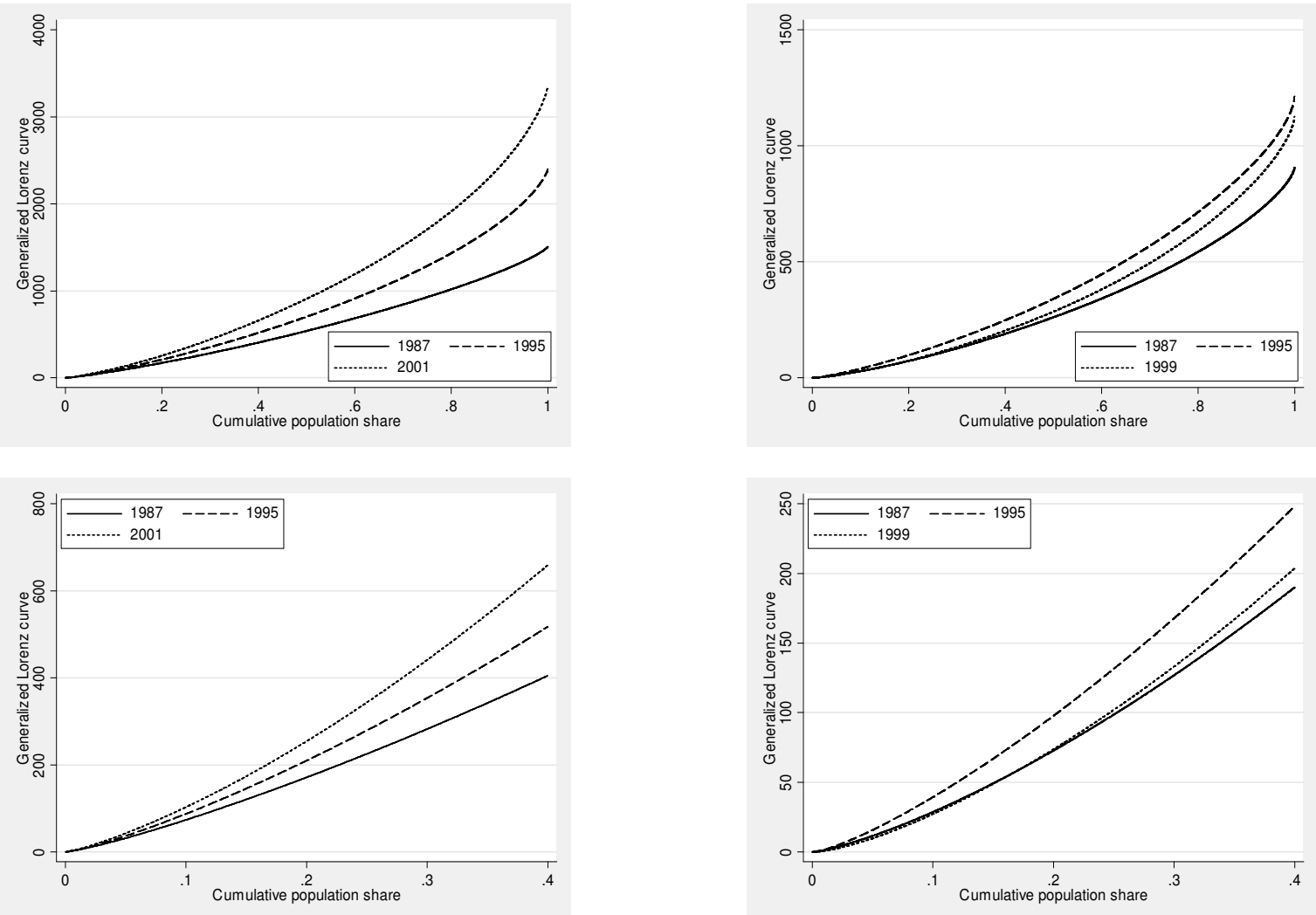
Urban

Rural

Notes: The Generalized Lorenz Curves are based on the urban (NSB) and rural (RCRE) data described in Tables 1, 2, and 3. All calculations are based on spatially-undeflated, constant 1990 yuan.

Figure 3: Cumulative Distribution Functions, Urban and Rural Incomes

Notes: The Cumulative Distribution Functions (CDF's) are based on the urban (NSB) and rural (RCRE) data described in Table 1. All calculations are based on spatially-undeflated, constant 1990 yuan.

Figure 4: Wage Employment Rates by Age and Gender, Urban

Wage Employment Rates, Men

· · ◆ · · 1991 ━■━ 1993 ━▲━ 1997 ━✕━ 2000

Wage Employment Rates, Women

· · ◆ · · 1991 ━■━ 1993 ━▲━ 1997 ━✕━ 2000

Notes: (1) These figures are based on individual-level data from the CHNS, and show the wage-employment participation rate by age group, for men and women, by CHNS year.

Annex :   Technical Note on Income Decomposition

Consider a decomposition of the mean of household income, based on household i's income, y_i :

$$y_i = \sum_{k=1}^{K} y_{ik}$$

(1)

which is the sum of K sub-components of income y_{ik}. Clearly, mean household income can be written:

$$\bar{Y} = \bar{Y}_1 + \bar{Y}_2 + ... + \bar{Y}_k$$

(2)

A one-percent increase in mean income from source k will lead to a W_k proportionate increase in $\bar{Y}$, where W_k is the share of income from source k. Decomposition of the sources of mean income is thus straightforward, and decomposition of inequality is designed analogously. We wish to estimate S_k, the proportion of inequality attributable to the inequality of income source k:

$$I(Y) = \sum_{k=1}^{K} S_k I(Y_k)$$

(3)

where $I(Y)$ is the index of inequality for total income Y, and $I(Y_k)$ is the index of inequality for income source k. Shorrocks showed that for any additively decomposable measure of inequality, S_k is estimated by:

$$\hat{S}_k = \frac{\mathrm{cov}(y_{ik}, y_i)}{\mathrm{var}(y_i)}$$

(4)

So, S_k captures the degree to which income source k is correlated with total income. In this sense, it measures the degree to which particular income sources are earned by the rich or poor. For an income source that is earned primarily by the rich, the decomposition will attribute a larger share of total income inequality to inequality of income earned from that source. How can we interpret these S_k? One benchmark is zero: an income source, which is negatively correlated with total income, is earned disproportionately by the poor, and so no inequality (indeed a negative share) of total income is correlated with that income source. Presumably, marginal increases of inequality of that source of

income (maintaining the same correlation with total income) would further reduce overall inequality. Very few sources of income will have negative S_k. An alternative helpful benchmark is the mean share of income from that source, or W_k. When $S_k > W_k$, then inequality of income source k contributes more to inequality than it does to mean income, $\overline{Y}$, which we denote as a disproportionate effect on inequality. In other words, if income from family businesses comprises 10 percent of average income, but 20 percent of inequality, we will conclude that family business income has a disproportionate effect on inequality.