Stanford
Center for International Development

Working Paper No. 340

Household Income Inequality, Income Mobility, and Labor Supply in China and the United States

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Abstract

To what extent are differences in household income inequality between China and the United States modified when computing income over a longer period of time than one year? Is China a less income mobile society than the United States? How does labor supply differ in the two countries and do these differences help account for the patterns of income inequality and income mobility in the two countries? Using incomes on the same households over six years, this paper takes up these and other questions about income inequality and mobility in these two countries.

HOUSEHOLD INCOME INEQUALITY, INCOME MOBILITY, AND LABOR SUPPLY IN CHINA AND THE UNITED STATES

Niny Khor and John Pencavel[*]

I. Introduction

Much has been written about income inequality in China since the 1980s, but almost all of this research draws upon annual income to document the increase in inequality. However, it has long been recognized that, in societies characterized by year-to-year income mobility, the use of annual data may well give a distorted perspective of the amount of enduring income inequality which requires a longer perspective than that provided by annual incomes. The purpose of this paper is to document how indicators of income inequality in China are affected by a view of incomes longer than one year and to measure the amount of income mobility.

The research here differs from that in an earlier paper (Khor and Pencavel, 2006) in at least three respects. First, we analyze household income rather than the income of individuals.[1] Second, we link differences and changes in income inequality to differences and changes in household structure and in attachment to market work. We find that labor supply plays a important part in understanding income inequality. Third, in measuring income in China, we investigate the consequences of allowing for changes in state-financed subsidies to households.

Indicators of income inequality are difficult to assess unless placed in some comparative context and, accordingly, our goal is to compare income inequality and income mobility in China with that of another major economy, namely, the United States. The two economies are, of course, at quite

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[*] We acknowledge with thanks comments on our earlier work from Paul Glewwe and Yingyi Qian. This research has been supported in part by a grant from the Smith Richardson Foundation through the Stanford Institute for Economic Policy Research.

[1] Because most people live not alone but in multi-individual households in which incomes are pooled and shared, assessments of inequality in material well-being tend to use the household as the unit of analysis, not the individual, even though little is known about the distribution of resources within households.

different stages in their economic development and their historical evolution has been fundamentally different. These facts might appear to render U.S.-China comparisons less useful than comparisons involving another pair of economies.

On the other hand, income inequality and income mobility in the United States has been examined extensively so that, compared with many other economies, there is more agreement about how markets work in the U.S. and this makes the U.S. a useful yardstick for evaluating income inequality and income mobility in other countries. Furthermore, the extensive part played by market mechanisms in the U.S. compared with China's much more heavily state-regulated economy and society provides a useful contrast. There has been strong disagreement over the relative amount of income inequality and income mobility in socialist and capitalist societies and a comparison of China with the United States may very well be relevant to this long-standing issue especially as we examine China at a time when the state's conspicuous and extensive role in the setting of wages attenuated. For these reasons, the comparison of the United States and China is both pertinent and important.

We examine both Chinese and American data on income inequality in the 1990s and define these data in such a way as to maximize their comparability.[2] We find striking differences in household income inequality between China and the United States. However, when household structure is held constant and households refer to those in which both the husband and the wife work for pay, the gap between China's and the U.S. household inequality narrows perceptibly. Changes over time in market work propensities help account for U.S.-China differences in income mobility.

[2] The data describe households in urban areas and incomes consist of all pre-tax incomes (sometimes including an estimate of changes in household subsidies in China). For most households in both countries, by far the largest source of income is derived from labor market activity.

II. Longitudinal Household Data for China and the United States

Data Sources

The data on Chinese households in this paper are drawn from the Chinese Household Income Project, CHIP, (Riskin, Renwei, and Shi (2000)), a survey conducted in 1996 of about 8,000 rural households and almost 7,000 urban households.[3] This paper examines only urban households.[4] The Appendix provides information about how our samples were constructed.

We require data on incomes over several years on the same households so we may take up the questions raised in the Introduction about income mobility and the measurement of income inequality over several years. The CHIP survey for 1996 provides such data because it asks individuals in urban areas for retrospective information on their incomes and these data may be aggregated over individuals within the same household to form household income in these years. Individuals reported their "total income" not only for 1995, but for each of the previous five years so that the incomes of individuals - and, after aggregation, the incomes of households - are available each year from 1990 to 1995.[5]

These data for China are to be compared with those for the United States drawn from the Panel Study of Income Dynamics (PSID). Because the PSID's procedures for the coding of wage income were revised in 1993, it is not straightforward to follow household incomes in the PSID for the years

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[3] The Chinese Household Income Project is a joint research effort sponsored by the Institute of Economics, Chinese Academy of Social Sciences, the Asian Development Bank and the Ford Foundation. Additional support was provided by the East Asian Institute, Columbia University. An analysis of some of its findings is contained in Khan and Riskin (2001). The 1996 Chinese Household Income Project is similar to an earlier survey in 1989 that collected information for 1988 (Griffin and Renwei (1993)). In this paper, we shall be exploiting information from both surveys.

[4] The retrospective information on incomes in all years was not asked of rural households. Urban dwellers without a formal residence certificate (*hukou*) are not surveyed.

[5] Income consists of the sum of labor income, property income, transfer income, and "income from household sideline production". By far the largest fraction of total income is labor income.

from 1990 to 1995, the same years as the data for China, so we chose the survey years from 1994 to 1999 (the years for incomes from 1993 to 1998) to follow U.S. household incomes. In these years, the income definitions were constant although, in 1997, the PSID switched from collecting data annually to biannually so we do not have income observations for 1997. Household income is the sum of five categories of income: the taxable income of the head and spouse, the transfer income of the head and spouse, the taxable income of other family unit members, the transfer income of other family members, and Social Security income. We apply the same criteria and definitions to the PSID households as those that relate to the Chinese households. After applying the sample household weights in the PSID to generate a sample that mirrors the population, we have 3,611 U.S. metropolitan households. More details on the characteristics of the PSID sample are provided in the Appendix.

The Quality of the Chinese Data

Retrospective information present two problems. First, to what extent will the correlation in incomes across years include errors in recall? The consequence of such errors for our inferences about mobility will depend on the particular form that they take. The research on the quality of recall data suggests several potential difficulties including telescoping (when the respondent confuses the relevant ranges of the reference period) and the irregularity of memory (when only prominent events are likely to be recalled). These two classes of error are less likely to blight the recall of annual income earned.

Errors are more likely to arise from individuals reporting not their true incomes but the same incomes (or the same proportion of their incomes) in successive years. If so, this will suggest more immobility and less flux in incomes than is really the case. While some research raises questions about the accuracy of retrospective data, other research is more encouraging. A blanket judgment

regarding the reliability of retrospective income data appears not to be appropriate.[6] In our case, the respondent is instructed to refer to his or her records of past incomes and there may be strong social pressure on individuals in China to take the question seriously. It is impossible to provide a confident statement about the accuracy of the retrospective income information in urban China in the early 1990s but previous research on such income information indicates that it clearly merits examination - especially in the absence of no alternative. Certainly it would be inappropriate to believe the only useful longitudinal information can be provided by panel surveys.[7]

A second problem is that of non-response: eight percent of urban Chinese households with income data in 1995 do not provide information on income in all the years from 1990 to 1994. Such non-responses may raise the same problem as that suspected with attrition in panel data: the sub-sample of urban households that provide income information in all years may not be representative of all urban households.[8] The importance of this concern may be assessed by determining whether incomplete response is related to income (and to the values of other variables) in 1995. Are those not providing information in all years concentrated in particular income segments?

To answer this, we estimated a conventional logistic maximum likelihood equation describing

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[6] For instance, Duncan and Hill (1989) investigated the accuracy of answers to certain retrospective questions in the PSID by comparing them with highly accurate records from the employer. The quality of the respondents' answers varied with the type of information sought, but the amount of measurement error in respondents' reports of annual earnings was small: average respondent reports of annual earnings were within one percent of the earnings records of the employer and the ratio of the error in variance in reported annual earnings to the variance in true earnings was 0.154 in one case and 0.301 in another. See also Kornfeld and Bloom (1999). Retrospective information on job histories are standard sources to compute job tenures. See Stevens (2005).

[7] A measured assessment of the benefits of panel data collection in poorer countries is contained in Ashenfelter, Deaton, and Solon (1986).

[8] Income inequality estimates may be altered considerably by the monthly pattern of non-responses to the Household Income and Expenditure Survey in urban China (Gibson *et al.* (2003)).

the household's probability of providing income information for every year from 1990 to 1995 as a function of a number of attributes of the household or household head in 1995 including a set of 1995 income dummy variables, one for each income decile. The coefficient estimates on the income decile dummy variables suggest that the probability of response is greatest for those households in the fourth income decile in 1995 where the response probability is 2.7 percent above the lowest decile and response is least among the top decile in 1995 where the probability of full response is eleven percent below the lowest income decile.[9] In other words, there is a tendency for full response to be least in the tails of the income distribution, a result with parallels in the study of attrition in U.S. panel data (Becketti *et al.* (1988), Fitzgerald *et al.* (1998), MaCurdy *et al.* (1998)). Consequently, by omitting more households in the tails of the income distribution, the households present in the full sample for the years from 1990 to 1995 will exhibit less income inequality than the larger number of households who report an income in 1995.

This is consistent with the fact that the 1995 income distribution of those households providing income in all six years is slightly narrower than the 1995 income distribution of the larger sample of households that provided income information in 1995.[10] Hence the analysis below of income mobility among the 6,357 households supplying income information in all six years will not be entirely representative of all urban households. Furthermore, when the dispersion in annual household income is examined in each year among these 6,357 households who provide income information in all years,

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[9] The hypothesis of no relationship between income and the probability of full response is comfortably rejected on a conventional likelihood ratio test. The calculated chi-squared statistic is 115, far above the critical level.

[10] The Gini coefficient of 1995 household income for the 6,932 households providing income information in 1995 is 0.278 while the Gini coefficient of 1995 household income for the subset of 6,357 households providing full information on incomes in all six years from 1990 to 1995 is 0.257. Other indicators of income inequality also suggest the same qualitative inference.

the clear suggestion is that income inequality fell somewhat over these years.[11] This contradicts the cross-section information for 1988 and 1995 contained in the Chinese Household Income Project surveys for 1989 and 1996.[12] Because some households did not provide income in all six years, the sample of complete responders is systematically different from the sample of all urban households. The full responders are drawn disproportionately from the middle part of the 1995 income distribution.

It is not unusual in studies of income mobility for those who provide continuous and complete information on income to differ systematically from those who do not and that, therefore, a study of incomes based on the subset of those providing full information is not completely representative of the entire population. However, the fact that this is common to studies of income mobility does not imply we may discount the very important forewarning that our analytical sample is not entirely representative of China's urban households in the 1990s. The differences in the degree of income inequality in our analysis sample may not be regarded as materially different from the entire urban population, but nevertheless the differences suggest withholding confident inferences about income mobility among Chinese urban households from our particular sample of households until our results may be corroborated by analysis with a different sample.

Therefore, we use the 6,357 urban Chinese households providing information on their incomes in all years from 1990 to 1995. Income in each calendar year is expressed in 1995 yuan by using the consumer price index as a deflator.[13] The incomes of the 3,611 urban U.S. households from 1993 to 1998 are expressed in 1996 dollars by using the personal consumption expenditures price deflator.

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[11] Thus, for the 6,357 households, the Gini coefficient of household income falls from 0.287 in 1990 to 0.257 in 1995.

[12] See Khan and Riskin (1998) and Khor and Pencavel (2005).

[13] If we were more confident in the regional price indices that have been created, we would have used a price deflator that recognized geographical as well as calendar time variations in prices.

Adjustment for Household Size and Composition

The size and composition of households varies by income as indicated by the data contained in Table 1. This presents information on the average number of children, the average number of adults, and the average number of workers by household income decile in 1995 for our 6,357 Chinese households and in 1998 for our 3,611 U.S. households. In China, urban households with greater income tend to have fewer children whereas the opposite is the case in the U.S. Chinese households in the top income decile have three-quarters of the average number of children as the lowest income decile whereas, in the U.S., households in the top income decile have well over twice the average number of children as those in the lowest.

At each income decile, there are more workers per household on average in China than the corresponding decile in the U.S. In both countries, households with greater income have more workers, the relationship being steeper for the U.S. than for China: those in the top income decile in the U.S. have over five times the average number of workers as those in the bottom decile whereas those in the top decile in China have 1.8 times the number of workers as those in the bottom decile. The link between household income and the number of workers is hardly surprising, but it emphasizes that the description of income inequality has a labor supply dimension: richer households have more adults and more working adults than poorer households. This association will be taken up explicitly later in this paper.

To examine the implications of these differences in household size and structure for household income inequality and mobility, we use two measures of income. The first is total household income, y_i, without any adjustments for household size and structure. The second adopts an adult equivalent scale: if N^A_i is the number of adults in household i and N^C_i the number of children, then per adult equivalent household income is $y_i/(N^A_i + \kappa.N^C_i)^\tau$ where κ is the weight attached to children and τ is

the scale economies parameter. We explored the implications of different values of κ and τ and found that our general inferences were not materially affected by values within what appeared to be plausible values.[14] In the results reported below, per adult equivalent household income corresponds to values of κ of 0.75 and of τ of 0.85 which implies, for example, that, in assessing the value of a given yuan or dollar of household income, a household consisting of five adults and no children is "equivalent" to a household with two adults and four children.[15]

Measures of income dispersion for our 6,357 Chinese households and our 3,611 U.S. households are provided in Table 2. In both countries, household income inequality usually is higher before adjusting for the size and composition of the demographic structure of the household. The differences between the two countries clearly dominate any difference between the income concepts within each country. Household income is substantially more unequal in the U.S. than in China: household income at the ninetieth percentile is between seven and ten times the income at the tenth percentile in the U.S., a ratio that is between two or three times that in China.

III. Income Mobility

Transition Matrices

Cross-classifying households by their incomes in two years, place these Chinese households into income quintiles from I (the bottom quintile) to V (the top quintile) in 1990 and in 1995 with an

[14] Values of κ and of τ between 0.50 and unity were examined. Per capita household income corresponds, of course, to $\kappa = \tau = 1$. The U.S. National Academy's Panel on Poverty and Family Assistance advised values of both κ and τ near 0.70 (Citro and Michael (1995)).

[15] The information on household size and structure for China is available for one year only, 1995. To make the comparisons with the United States as methodologically similar as possible, therefore, the U.S. data are standardized by the size and structure of the household in one year, namely, 1998.

equal number of households in each quintile.[16] Each element in the five-by-five transition tables consists of p_{jk}, the fraction of households in quintile *j* in 1990 occupying quintile *k* in 1995.[17] The transition matrix for all 6,357 Chinese households is given in Table 3 and that for the 3,611 American households is given in Table 4. According to the top panel of Table 3 for China, organizing the households by total income, exactly one-half of those households who occupied the richest fifth in 1990 remained in the same quintile six years later in 1995. Some 44 percent (0.435) of the poorest fifth in 1990 remained in the same quintile in 1995. The matrix for per equivalent adult household income in Table 3 is similar.

Less mobility is suggested for the American households in Table 4: sixty-three percent of households in the highest income quintile V in 1993 and sixty-six percent of the households in the lowest income quintile I in 1993 were in the same quintiles in 1998.[18] Casual inspection of the transition matrix for per equivalent adult household income in Table 4 suggests similar mobility as that for household income.

To summarize the information in these transition matrices, consider the following indicators: one is the average quintile move; a second is the fraction who remain in the same quintile, also called the "immobility ratio"; and a third is an "adjusted immobility ratio", namely, the fraction who remain

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[16] In the event of ties, households were allocated randomly to adjacent quintiles so that the same number of observations occupy each quintile.

[17] These values of p_{ij} correspond to the maximum likelihood estimator of the first-order Markov transition probabilities (Anderson and Goodman (1957, p. 92)).

[18] Are the transition matrices symmetric? For a maximum likelihood test of symmetry compute the statistic $\Gamma = \Sigma_{i>j} (p_{ij} - p_{ji})^2 / (p_{ij} + p_{ji})$ which is distributed as chi square with $q(q-1)/2$ degrees of freedom where q is the number of quantiles. For the transition matrices in Tables 3 and 4, the hypothesis of symmetry cannot be rejected with a very high level of confidence (i.e., calculated p values close to unity). See Bishop, Fienberg, and Holland (1975, pp.282-3).

in the same quintile plus the fraction who move one quintile.[19] These indicators of income mobility are reported under "income quintiles" in Table 5 for China and the U.S. Thus, for household income (the first column), the average quintile move is 1.04 for China and 0.65 for the U.S., the immobility ratio is 0.34 for China and 0.51 for the U.S., and the adjusted immobility ratio is 0.72 for China and 0.87 for the U.S. More income mobility is indicated among Chinese households than among those in the U.S.

Another way to describe income mobility is to measure incomes after eliminating income differences associated with various enduring factors that may be associated with mobility. So envisage the difference between a household's income in year *t* and that income predicted from a least-squares regression of income in year *t* on certain characteristics of the head of household, namely, age, schooling, and gender. Now form a transition matrix based on these adjusted incomes. The indicators of mobility after removing the effects of these attributes are given in the middle panel

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[19] The average quintile move is defined as

$$\frac{1}{5}\left\{\sum_{j=1}^{5}\sum_{k=1}^{5}(|j-k|)\,p_{jk}\right\}.$$

The fraction who remain in the same quintile is defined as $(5)^{-1}\Sigma_{j=1,\ldots,5}(p_{jj})$. The immobility ratio is close to (but not the same as) Shorrocks' proposed index, namely, $(q - T)/(q - 1)$ where q is the number of quantiles (here 5) and T is the trace of the matrix (Shorrocks (1978)). To provide a yardstick, if every value of p_{jk} in the matrix were one-fifth (a situation some call loosely "perfect mobility"), the average quintile move would be 1.6, the immobility ratio would be 0.20, and the adjusted immobility ratio would be 0.52. Or, at the other extreme, if the transition matrix were an identity matrix with unit values on the main diagonal and zeros elsewhere (complete immobility), the average quintile move would be 0, and the immobility ratio and the adjusted immobility ratio would each be 5. So the range of the average quintile move is from 1.6 to 0, that of the immobility ratio is 0.20 to 5, and that of the adjusted immobility ratio is 0.52 to 5. Higher values of the average quintile move suggest greater mobility and higher values of the immobility ratio and the adjusted immobility ratio imply less mobility.

of Table 5 under "income quintiles of residuals".[20] For household income, these indicators suggest slightly greater mobility for Chinese households though the differences are small: the average quintile move rises from 1.04 to 1.10, the immobility ratio falls from 0.34 to 0.33, and the adjusted immobility ratio falls from 0.72 to 0.70. The effects of adjusting for factors associated with income are greater for the U.S. (because the stronger link in the U.S. between incomes and these factors) so the differences between the mobility indicators for "income quintiles of residuals" and those for "income quintiles" are larger for the U.S.: the new mobility indicators for the U.S. are 0.85 for the average quintile move, 0.43 for the immobility ratio, and 0.81 for the fraction who remain in the same quartile plus the fraction who move one quintile. Nevertheless, conspicuous differences in income mobility between China and the U.S. remain.

Mobility across income quintiles is likely to be greater in societies where income dispersion is narrow so that a given change in income is more likely to vault a household across quintiles. As shown in Table 2, China's urban household income distribution in the 1990s was considerably narrower than that in the U.S. so to what extent are the differences between the two countries in income mobility attributable to the device of using transition matrices based on income quintiles? This may be answered by constructing a transition matrix not by allocating households to income quintiles but by allocating households on the basis of the deviation of their income from median household income. Thus, define five income clusters: the lowest cluster consists of households with incomes less than 0.65 of the median income; the second cluster consists of households with incomes between 0.65 and 0.95 of the median income; the third income cluster consists of households with

[20] To be clear, in each calendar year, cross-section income equations were fitted that regressed the logarithm of household income on the age, age squared, years of schooling, and gender of the head of household. This was done for each of the two measures of household income. Transition matrices were formed from these residuals and the indicators under "income quintiles of residuals" in Table 5 provide summary information on these transition matrices.

incomes between 0.95 and 1.25 of the median income; the fourth cluster consists of households with incomes between 1.25 and 1.55 of the median income; and the fifth cluster consists of households with incomes above 1.55 of the median income. Clearly, if median income is the same in the two countries, the income cutoffs will correspond to different proportions of households when income inequality is not the same. In an economy with a narrow income distribution, more households will be in the income clusters around the median compared with an economy with a wide income distribution. However, now a household experiencing a given absolute increase in income in two societies will be equally likely to cross the thresholds between income clusters.

The effects on our indicators of income mobility in China of measuring transitions across income clusters instead of transitions across income quintiles are shown under "income clusters" in Table 5. Measured income mobility in China is slightly less than that in the previous panels (to be expected given China's relatively narrow income distribution) and income mobility across clusters in the U.S. is larger than across income quintiles , but the difference between China and the U.S. remains. In short, regardless of the indicator of income mobility, mobility among urban Chinese households in the 1990s was greater than among those in the U.S.

Other Indicators of Income Mobility

Closely related to the mobility of incomes across quintiles or clusters is the effect on income inequality of measuring incomes over different time horizons. Income inequality usually declines when incomes are computed over a longer time horizon. This is shown for urban Chinese households by the data in the upper panel Table 6 where indicators of income inequality are presented using incomes averaged over different years. Thus, the ratio of the income at the 90^{th} percentile to the income at the 10^{th} percentile in 1995 is 3.20 and it declines to 3.09 when incomes are averaged over the five years from 1991 to 1995. For the U.S. (the bottom panel of Table 6) income inequality also

falls when incomes are averaged over longer time horizons though inequality appears still to be falling after averaging incomes over five years in the U.S. whereas the inequality indicators plateau earlier for China.

The degree to which inequality falls when averaging incomes over several years depends on the correlation coefficients of income across different years as well as the level of inequality and how this inequality is changing. The higher the correlation coefficients, the smaller the reduction in inequality by averaging over the years. Correlation coefficients between household incomes in different years are listed in Table 7 for China and for the U.S.[21] Correlation coefficients in adjacent years tend to be higher in China than in the U.S., but they fall faster in China as the gap in the number of years grows larger. For China, holding constant the interval between years, correlation coefficients are lower for the years in the mid-1990s than those in the early 1990s. For example, correlation coefficients of incomes of the same households are lower for 1994 and 1995 than for 1990 and 1991, consistent with the hypothesis that income mobility in China was increasing.

Does this finding of an increasingly mobile Chinese society prevail once other factors associated with the correlation of incomes across years are taken into account? To determine this, we associate households with the characteristics of the designated head and form gender-age-year cells. We calculate the average value of household income in each of these cells and then construct the correlation coefficient between the incomes of the households in these cells. So, for men and women heads of households separately, we compute the correlation coefficient between the incomes of households at each age a and at age $a + j$ where $j = 1, 2, 3, 4, 5$.[22] Let $\rho(g; a, a + j; t, t + j)$ denote

[21] For the U.S., NA in Table 7 means "not available", no income survey being conducted for 1997.

[22] When $j = 1$, there are five possible data points: those involving the years 1990 and 1991, 1991 and 1992, 1992 and 1993, 1993 and 1994, and 1994 and 1995. When $j = 2$, there are four data points: 1990 and 1992, 1991 and 1993, 1992 and 1994, and 1993 and 1995. When $j = 3$, there are three data

the correlation coefficient between household incomes for those with heads of household aged a and $a + j$ observed in years t and $t + j$ for gender g. Then estimate the least-squares relationship between ρ and age in 1990, gender, the number of years between a and $a + j$, the average years of schooling of the heads of household in each cell, the number of children in the household, the number of adults in the household, and the calendar years when the correlation is computed:

$$(1) \quad \rho(g\,;\, a,\, a+j\,;\, t,\, t+j) = \gamma_0 + \gamma_1(a) + \gamma_2\,(a)^2 + \gamma_3 F + \gamma_4\,(Schooling) + \gamma_5 N^C + \gamma_6 N^A + \gamma_7\,(a - a') + \Sigma_t \delta_t Y_t + u$$

Here a measures the household head's years of age (as of 1990), F is a dummy variable taking the value of unity for a woman and of zero for a man, *Schooling* measures average years of schooling of the heads of household in the cell, N^A the cell's average number of adults in the household, N^C the cell's average number of children in the household, and $a - a'$ represents the number of years between the two years (t and $t + j$) whose incomes are being correlated. Y_t is a dummy variable that takes the value of unity if the correlation coefficient involves year t and of zero otherwise. There are five calendar year dummy variables, one for each year from 1991 to 1995; the year 1990 is the reference year. This equation is estimated by weighted least-squares, using the number of households in each cell as weights. The resulting estimates of equation (1) are reported in Table 8.

According to these estimates, the correlation coefficient between household incomes in China tends to be higher for larger households and for those households whose heads have more years of

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points: 1990 and 1993, 1991 and 1994, and 1992 and 1995. When $j = 4$, there are two data points: one entails the pair of years 1990 and 1994 and the other involves the years 1991 and 1995. When $j = 5$, the only set of observations consist of those correlating incomes in 1990 and 1995. So there are fifteen correlation coefficients for each gender and each age. If age ranges from 16 years to 83 years, there are 68 ages and two genders so there are 2,040 (15 x 68 x 2) potential correlation coefficients. In fact, some cells are empty so the effective data set of correlation coefficients is 1,680. Note that, in this exercise, we are not restricting the households to consist of those who report incomes in each and every year though necessarily households must have incomes in the two years to which the correlation coefficients relate.

schooling. Correlation coefficients fall with the number of years intervening between the two years: other things equal, when household incomes are four years apart, the correlation coefficient is 0.23 lower than when the incomes are just one year apart. This is consonant with income mobility rising as the time interval lengthens.[28]

Table 8's estimates on the year dummy variables imply that correlation coefficients fall over calendar time in China. Thus, the implied correlation coefficients between incomes in 1993 and 1995 are eight percent lower than those between incomes in 1992 and 1994, eleven percent lower than those between incomes in 1991 and 1993, and fourteen percent lower than those between incomes in 1990 and 1992. Thus, holding $a - a'$ constant, correlation coefficients of household incomes in China are declining over time, a signal of an increasingly fluid society.

Accounting for Changes in Housing Subsidies

The income concept in the research above pertains to total before-tax cash income. Are these results sensitive to measuring income differently? This question is especially pertinent to China where, until the 1990s, various subsidies constituted an important resource for households. Under the old state-regulated system, food and housing were strictly rationed for urban households but food subsidies were being phased out in the late 1980s. Housing subsidies remained in place until the early 1990s although their elimination proceeded at different rates across the various provinces. If the value of in-kind housing subsidies are added to cash income in 1990 and in 1995, how would our measures

[28] Note that the cells consist of varying number of observations, some with as few as merely two observations. When we restrict the sample to consist of cells with at least 50 households, the estimates attached to $a - a'$ and the calendar year dummy variables do not change at all. However, the estimates attached to N^C and N^A are apt to switch sign. So whereas the estimates attached to the key variables are very robust, those attached to some other variables are not at all robust. Note that the estimated convex relationship with age implies that the minimum correlation coefficient is reached at a young age and then rises with age. In other words, over most ages, household income correlation coefficients are larger for households headed by older people.

of income inequality and income mobility be altered? For the year 1995, this can be determined from the 1996 CHIP which collected information on subsidies, but the retrospective questions did not ask for information on the value of subsidies in previous years. However, such information is provided for 1988 in the survey from the Household Income Project for 1989.

An analysis of the information on subsidies in 1988 and 1995 from these two surveys indicates that both cash subsidies and in-kind subsidies formed an important resource for urban households in China in 1988 but, by 1995, these had been sharply reduced. In 1988, at median household non-subsidy income, the value of in-kind housing subsidy is more than one-quarter of per capita household non-subsidy income. After increasing rental rates towards market values and privatizing some public housing, the median household in 1995 received no in-kind housing subsidy according to the 1995 household survey. Similarly, in-kind food subsidies are extensive in 1988 but, by 1995, food subsidies had been phased out completely. Similar reductions are observed for other subsidies.

The issue for an analysis of income inequality and income mobility is the distribution of these various subsidies across households: if the value of these subsidies were proportional to cash income, the inclusion of these subsidies in income would not, of course, affect the ranking of households based on cash income.[29] In fact, in 1988, the in-kind food subsidy was equitably distributed[30] while the in-kind housing subsidy and the level of other cash subsidies are increasing in household income per

[29] Such proportionality is not fanciful. Among the urban population of public tenants in the provinces of Liaoning and Sichuan, Pudney and Wang (1995) find that the distribution of the implicit housing subsidy in 1990 is close to proportional to household cash income.

[30] Almost every urban household in 1988 received a positive food coupon. If the households are ordered into deciles by per capita household income in 1988, the median per capita food coupon subsidy received by each household within each decile was close to the overall sample median of 163.8 yuan per year.

capita in both 1988 and 1995.[31] While food subsidies had been sharply reduced by 1990, the housing subsidies had not so we may ask, what difference would it make to our previous mobility measures if we augment 1990 cash incomes by an estimate of in-kind housing subsidies received? To address this, we use the 1988 information on income, subsidies, and other household characteristics to impute subsidy levels in 1990. To the sample of urban households in 1988, we estimate a regression equation expressing the amount of in-kind housing subsidy received as a function of the characteristics of households, household demographics, and province dummy variables.[32] With the estimated coefficients and the values of household variables from the 1995 survey, we impute the values of in-kind housing subsidies for each household in 1990. Adding the imputed values of in-kind housing subsidies to cash income in 1990 results in a less unequal distribution of total household income: the measured Gini coefficient decreases from 0.287 to 0.266 for the Gini coefficient, from 0.554 to 0.513 for the coefficient of variation, and from 0.529 to 0.480 for the standard deviation of log income.

The values of the indicators on income mobility where the total household income quintiles in 1990 and those in 1995 include in-kind housing subsidies in both years (these are imputed for 1990 and reported subsidies in 1995) are 0.949 for the average move, 0.375 for the immobility ratio, and 0.738 for the adjusted immobility ratio. Comparing these with the values reported in the top panel of

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[31] For households in the first income decile in 1988, the median cash subsidies received amounted to 366.35 yuan while households in the tenth decile reported a median amount of 685.43 yuan. In 1995, the nominal amount of cash subsidy for households in the first income decile had dropped to zero while households in the tenth decile received a median amount of 40 yuan. For in-kind housing subsidies, in 1988 households in the first decile received a median amount of 473.36 yuan per capita compared with 757.4 yuan received by households in the tenth decile. By 1995, the median in-kind housing subsidy received by households was zero.

[32] The right-hand side variables in this regression equation are dichotomous variables for each household income decile, province dummy variables, the number of children and the number of adults in the household, and the following variables describing the household head: gender, Minority status, age and age squared, schooling, and Communist Party status.

Table 5 (1.038, 0.342, and 0.720, respectively) which are based on cash income reveals slightly less mobility when housing subsidies are included. However, the differences between the values of two sets of indicators are small, a consequence of the fact that the ordering of incomes including the value of housing subsidies is very close to the ordering of incomes that omit housing subsidies.[33] For this reason, our analysis continues using the total cash income of households.

IV. Changes in Labor Supply and Inequality

The Link between Household Income and Number of Working Members[34]

In both China and the United States, most household income consists of labor income and, naturally, household income is higher when more household members work for pay.[35] Suppose we express the logarithm of a household's percentile in the income distribution in year t , $ln[y^P_i(t)]$, as a linear stochastic function of $N^W_i(t)$, the number of adults in household i who work for pay in year t, a household fixed effect ψ_i and a stochastic error term $\varepsilon_i(t)$: $ln[y^P_i(t)] = \psi_i + \omega N^W_i(t) + \varepsilon_i(t)$. Write this for urban Chinese households in the year 1990 and the year 1995 and first difference. Applying least-squares to the resulting first-difference equation yields an estimate of ω of 0.417 (with

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[33] The correlation coefficient between the ranking of household income based on cash income alone and the ranking of household income including the value of in-kind housing subsidies is 0.946 in the 1995 household survey data and 0.899 in the 1988 household survey data.

[34] Given the similarity of our results for household income and per equivalent adult household income, for the remainder of this paper, we report our analysis using just total household income.

[35] For 1995, we may determine whether an individual in urban China is working for pay by applying two criteria: his income is positive and he reports his employment status as "working". So, subsequently in this paper, when we use 1995 data alone and not in conjunction with data in previous years, we shall apply these twin criteria. When we compare data over time in China, we cannot apply these two criteria as the second piece of information was not collected for individuals in earlier years. In our analysis of the years 1990 to 1995, therefore, someone is defined as working in year t if his income is positive in year t and he was not receiving retirement income in 1995 (on the assumption that, if he did not receive retirement income in 1995, he would not be receiving retirement income when he was younger in earlier years).

an estimated standard error of 0.027). This implies that, after accounting for unchanging characteristics of households, one more working adult moves a household up the income distribution by 52 percent. Given China's relatively narrow income distribution, this substantial jump is expected. In the U.S., using the information on households in 1993 and 1998, the analogous estimate of ω is 0.209 (with an estimated standard error of 0.015): one more working adult moves a household up the income distribution by 23 percent. With U.S.'s wider income distribution, an additional household member in employment has a smaller impact on the household's ranking in the income distribution.

However, the actual impact of changes in the number of workers on the level and ranking of income depends on other factors affecting income and on the degree to which households actually manifest changes in the number of workers. Insofar as there is a lot of persistence in labor supply (i.e., the same people work in each and every year), the actual impact of changes in the number of household workers on household income will be much less. While movements in and out of employment have the potential to move households up and down the income distribution by large amounts, if there are relatively few of these movements, then the effect of changes in the number of workers on the household income distribution may be negligible.

In urban China, though there is a variation across households in the number of household members at work for pay in any year, at any moment, almost two-thirds of households have two adults at work. This is shown in the upper panel of Table 9 which presents the percentage distribution of households in each year in urban China by the number of workers. About eleven percent of households regularly have no workers, these being households consisting of older people who receive a state pension. There are more single individual households in the U.S. so the lower panel of Table 9 shows that the fraction of households with two workers is smaller than in China. There is also a larger fraction of households in the U.S. with no workers, many of whom are older people.

Table 9 describes the distribution of workers across households in a given year. Table 10 provides information about the persistence in work behavior over time. The upper panel of Table 10 takes the distribution of workers across households in 1990 in China and determines how the work propensities of these households changed five years later in 1995. The entries sum to unity along any row. There is clearly a large amount of persistence in the number of workers: the weighted average of the entries along the main diagonal is 0.87 so that 87 percent of households have the same number of workers in 1995 as they had in 1990. This persistence tends to fall as the interval of time between the years lengthens.[36] There are 14,277 adults (defined as aged at least 18 years in 1990) in these 6,357 households and seventy percent work in all six years. One-quarter of these adults work in no years and this leaves just four percent of adults working intermittently.[37]

The corresponding information for the U.S. is contained in the bottom panel of Table 10. There is also a large amount of persistence in work behavior in the U.S.: the weighted average of the entries on the main diagonal is 0.64 so 64 percent of households report the same number of workers in 1998 as in 1993. However, this value is substantially below the Chinese figure of 87 percent. Though there is persistence in work behavior (defined as the number of workers per household) in both the U.S. and China, there is less persistence and more mobility in the U.S. Whereas just four percent of Chinese adults work intermittently between 1990 and 1995, one-quarter of U.S. adults work intermittently between 1993 and 1998 (excluding 1997) and just over one-half work in all years.[38]

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[36] Thus, the fraction of households with the same number of workers as in 1990 is 0.976 in 1991, 0.948 in 1992, 0.918 in 1993, 0.889 in 1994, and 0.869 in 1995.

[37] The precise values are as follows: 25.2 percent work in no years, 0.7 percent work in one year, 0.5 percent work in two years, 0.7 percent work in three years, 0.8 percent work in four years, 1.3 percent work in five years, and 70.8 percent work in all six years.

[38] The precise values for the United States are as follows: 20.2 percent work in no years, 3.9 percent work in one year, 4.1 percent work in two years, 5.6 percent work in three years, 11.7 percent work

We treat the fraction of years worked as an indicator of the labor supply of these adults and ask what characteristics of these adults are correlated with their labor supply. Thus, first with the Chinese households, a logit maximum likelihood equation is fitted relating the fraction of the six years the adults work for pay to various attributes of these adults. The consequences are reported in Table 11 which gives the implied probability derivatives assessed at the mean values of the right-hand side variables. These estimates indicate that a woman has a 20 percent lower probability of working in any year than a man and a Communist Party member has an eleven percent higher work probability than someone who is not a member. Work probabilities rise 2.2 percent for each additional year of schooling completed. Work probabilities rise with the number of children and fall with the number of adults in the household: one more child is associated with a six percent higher work probability and one more adult is associated with a two percent lower work probability. Work probabilities follow a familiar concave relationship with respect to age and reach a maximum at 36 years of age.

The analogous estimates for the U.S. adults are also reported in Table 11. There are some striking similarities with the Chinese adults: for example, one year of additional schooling raises the work probability among U.S. adults by 2 percent, the same as the value for the Chinese adults; also the work probability rises with the number of adults in the household in the U.S. at about the same rate as that in China. The only noticeable qualitative difference between the Chinese and American adults (excluding, of course, the role of membership in the Communist Party) is the partial correlation with the number of children in the household: in China, households with more children reveal higher adult work propensities whereas, in the U.S., households with more children have lower adult work propensities. This is probably because, in China, relatives and friends provide more opportunities to care for children and release the parents for market work than is the case in the U.S.

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in four years, and 54.5 percent work in all five years.

Given the differences in labor supply behavior in China and the U.S., by how much would income inequality and income mobility be affected if each household had the same number of members at work in all years? To address this, we estimate a regression equation in each year in which the logarithm of household income is related to a vector of dummy variables, D_k, each variable identifying the number of members at work in household i: $ln(y_i) = \alpha + \Sigma_k \beta_k D_{ki} + u_i$. The estimates of this equation are used to adjust each household's income such that each household is "endowed" with two working members. Thus, using the appropriate estimates of the β coefficients, households with fewer than two workers have their income adjusted upwards and those households with more than two working members have their income adjusted downwards. The resulting incomes are called the "constant worker incomes ". How much household income inequality and income mobility would there be in China and the U.S. if all households had two workers in each year?

This is answered by the entries to Table 12. The upper panel reports indicators of household income inequality for China and the U.S. and the lower panel reports indicators of income mobility based on reported incomes and constant worker incomes. In the upper panel, the measures of income inequality reveal less inequality when all households are endowed with two workers, but the reductions are small for China's households. For China, the Gini coefficient falls from 0.257 to 0.244 when removing differences in the number of workers across households and the ratio of the ninetieth to the tenth percentile does not change at all. By contrast, in the U.S., removing differences in the number of workers induces a fall in the Gini from 0.415 to 0.391, almost twice China's reduction, and the ratio of the ninetieth to the tenth percentile falls from 9.61 to 6.12. Given the greater variation in the number of workers across U.S. households[39] and the greater dispersion of household incomes in

[39] Thus, according to Table 10, whereas 66 percent of Chinese households average two workers per household, in the U.S. 39 percent of households have one worker, 32 percent have two workers, and 24 percent no workers.

the U.S., it is not surprising that eliminating differences in the number of workers across households generates a smaller reduction in inequality in China than in the U.S.

The effect of removing differences in the number of workers on income mobility over six years is shown in the lower panel of Table 12. Mobility between 1990 and 1995 falls in China by very little: the average quintile move falls from 1.038 to 1.036 and the correlation coefficient barely changes. This is not surprising given the persistence in work behavior in China suggested in Table 10. By contrast, in the U.S., after holding constant variations in the number of workers across households, income mobility between 1993 and 1998 is noticeably higher: the average quintile move rises from 0.65 to 0.81 and the correlation coefficient falls from 0.66 to 0.51. This reflects the greater mobility in work behavior in the U.S. than in China. On the criteria of the average quintile move and of the immobility index, 42 percent of the difference in income mobility between China and the U.S. is accounted for differences in worker mobility.[40] According to the correlation coefficient of incomes across years, once U.S.-China differences in worker mobility are removed, household incomes reveal more mobility in the U.S. than in China. Therefore, differences in worker mobility are a critical part of the contrast in household income mobility between China and the U.S. The result here is analogous to the effect on income mobility reported in Table 5 when income mobility is measured on the basis of income residuals ("income quintiles of residuals"): the association between income and various factors such as schooling and age and, in this instance, the number of workers is stronger in the U.S. than in China so the effect of holding constant these factors is to narrow the income distribution more in the U.S. than in China and, with a narrower income distribution, the change in income needed to move across quintiles becomes smaller and measured income mobility increases.

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[40] In other words, the gap between the U.S. and China in the values of the average quintile move (immobility index) falls by 42 percent when differences in the number of workers in the beginning and end years are removed.

Decomposing Household Income Inequality

The research earlier in this paper demonstrated that urban China's annual household income inequality in the early and mid-1990s was narrower than that of urban U.S. households and this difference persisted when income inequality is measured over a longer period of time than merely one year. The previous sub-section indicated that greater differences among households in market work propensities in the U.S. than in China help to account for differences in household income inequality and mobility between the two countries. Prompted by this finding, the purpose of this section is to determine whether these differences in the dispersion of incomes can be decomposed into differences in the components of household income that might help an understanding of the sources of this difference between the two countries. Again we shall find that differences in market work propensities (labor supply) contribute to an understanding of the differences in household income inequality between China and the United States.

To focus on the components of income rather than on differences in household structure - a larger proportion of households in the U.S. consists of single-person households than in China - we limit our analysis in this sub-section to the total household income of husband-wife households. These households constitute a proper subset of the households we have been examining to this point. In China, husband-wife households constitute a substantial majority of the 6,357 urban households: 5,388 households are husband-wife households. As is evident from Table 13, the income inequality and income mobility indicators for these 5,388 Chinese husband-wife households are close to those of all the 6,357 Chinese households. Income inequality tends to be a little lower and income mobility a little higher among the husband-wife households than among all households but the differences are small - necessarily because husband-wife households represent 85 percent of our original sample.

In the U.S., the husband-wife households represent a smaller fraction of all households than

in China. We identify 2,119 husband-wife households in the U.S. from the 3,611 households we have been examining to this point, that is, 59 percent of the original sample.[41] The income inequality and income mobility indicators for these U.S. husband-wife households compared with the original households are also given in Table 13. Once single-person households are removed from the U.S. data, household annual income inequality falls noticeably and income mobility increases. Expressed differently, the gap between China and the U.S. in income inequality and income mobility narrows once comparisons are made between husband-wife households in the two countries.

For these husband-wife families, within each country, consider the following decomposition of the dispersion in their total household income in a given year. This decomposition is designed to identify the sources of the differences in household income inequality in the two countries. Define total household income, y , as the sum of the labor income of the husband, y_1 , the labor income of the wife, y_2 , and all other household income, y_3 which includes the nonlabor income of the husband and wife as well as any labor and nonlabor income of other household members: $y = y_1 + y_2 + y_3$. Any of these components may be zero. Forming the variance of this sum and converting to coefficients of variation that provide scale-invariant measures of dispersion, the square of the coefficient of variation of household income, V^2 , may be written as[42]

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[41] In the U.S., we restrict ourselves also to those husband-wife households married to the same individuals in 1998 as in 1993. Given the features of the Chinese survey, we are not able to apply this restriction to the Chinese households but, given the lower marital separation rates in China, we suspect that, if we were able to apply this restriction, a much smaller fraction of Chinese husband-wife families would be eliminated than in the U.S.

[42] Given $y = y_1 + y_2 + y_3$, define the variance of income j as σ_j^2 (where j = 1 , 2 , 3) and the covariance between income j and k as σ_{jk}^2 (where j , k = 1 , 2 , 3 and $j \neq k$). If r_{jk} is the coefficient of correlation between income j and income k , then $r_{jk} = \sigma_{jk}^2 / \sigma_j . \sigma_k$ and σ^2 the variance of household income may be written

$$\sigma^2 = \sum_{j=1}^{3} \sigma_j^2 + 2 \sum_{j=1, j \neq k}^{2} \sum_{k=2}^{3} r_{jk} \sigma_j \sigma_k$$

$$V^2 = \sum_{j=1}^{3} B_j^2 V_j^2 + 2 \sum_{j=1, j \neq k}^{2} \sum_{k=2}^{3} B_j B_k r_{jk} V_j V_k \quad (2)$$

where $B_j = \mu_j / \mu$, μ being the mean of household income and μ_j the mean of income of type j. B_j is the average share of income of type j in total income. The left-hand side of equation (2) is a measure of the dispersion of incomes, namely, the square of the coefficient of variation in household income. According to equation (2), an indicator of inequality in total household income, V^2, may be decomposed into two general parts: (i) the sum of the inequality in the labor incomes of husbands, inequality in the labor incomes of wives, and inequality in other household income, where each of these terms is weighted by their relative importance in average household income and where inequality is measured by the square of the coefficient of variation; and (ii) the sum of three factors that incorporate the correlation between each pair of the three components of income. The elements of equation (2) apply to both workers and non-workers so entries for y_1 and y_2 will be zero whenever the husband and the wife, respectively, does not work for pay. The values for each of the components of equation (2) are given in Table 14 for Chinese households in 1995 and for U.S. households in 1998.

The average fraction of total household income deriving from husbands' labor income, B_1, is similar in the China and the U.S.: B_1 is 0.44 in China and 0.51 in the U.S. The average fraction of total household income deriving from wives' labor income, B_2, is fifty percent larger in China that in the U.S.: B_2 is 0.33 in China and 0.22 in the U.S.

Define the coefficient of variation of total household income as $V = \sigma / \mu$ where μ is the mean of household income and the coefficient of variation of income of type j as $V_j = \sigma_j / \mu_j$ where μ_j is the mean of income of type j. Replacing variances with coefficients of variation leads to equation (2) in the text. Equation (2) was used by Cancian, Danziger, and Gottschalk (1993) and Pencavel (2006) to analyze the impact of the growing labor force participation of wives on family income inequality in the United States.

The correlation between husbands' incomes and wives' incomes is over three times in China its value in the U.S.: r_{12} is 0.49 in China and 0.14 in the United States. Recall that r_{12} incorporates the zero values of husbands' incomes and of wives' incomes when the husbands and the wives are out of the labor force and, as we shall see shortly, the fraction of husbands and wives at work for pay is lower in the U.S. than in China. The correlation coefficients between income of different types are of the same sign in the two countries: the correlation between the labor income of husbands and other household income , r_{13} , is -0.23 in the U.S. and -0.38 in China and the correlation between the labor income of wives and other household income , r_{23} , is -0.04 in the U.S. and -0.44 in China. In both countries, a substantial component of "other household income" consists of retirement income and the negative correlations, r_{13} and r_{23} , reflect the fact that retirement income is greater for older workers who are no longer at market work.[43]

In both countries, a notable contribution to the total inequality in household incomes (as measured by V^2) derives from the labor income of husbands (as given by $B_1^2.V_1^2$): this term accounts for 44 percent of the inequality in household income in China and 62 percent in the U.S. In China, the contribution of wives' labor income ($B_2^2.V_2^2$) to total inequality is twice that in the U.S.: 32 percent in China and 16 percent in the U.S. Other household income also makes a substantial contribution to the accounting of income inequality across these husband-wife families with the negative covariance between "other household income" and the labor income of husbands and wives ameliorating the dispersion of incomes. But the decomposition points to the importance of the dispersion of labor incomes in describing the inequality in these husband-wife household incomes: inequality in husbands' and wives' incomes (the sum of $B_1^2.V_1^2$ and $B_2^2.V_2^2$) accounts for three-

[43] In addition, "other household income" consists of the labor income of other household members and, in China, this tends to be negatively correlated with the income of the husbands and wives.

quarters of the dispersion in family income in both countries.

Given the importance of labor income in both countries to an understanding of the dispersion of household incomes, we can decompose further the dispersion in the labor income of husbands and in the labor income of wives into a part that is associated with the dispersion of incomes among workers and a part associated with the fraction of husbands or wives who are employed for pay. In particular, letting $j = 1$ for husbands and $j = 2$ for wives,

(3) $$(V_j)^2 = (E_j)^{-1} .(V^e_j)^2 + (E_j)^{-1} - 1 .$$

where E_j is the fraction of group j at work for pay and V^e_j is the coefficient of variation in labor incomes among those in group j who work for pay (that is, excluding the non-workers).[44] According to equation (3), the dispersion of earnings including non-workers (that is, those with zero earnings) $V_j{}^2$ exceeds the dispersion of earnings among workers, $V^e_j{}^2$, by an amount that depends on the employment-population ratio, E_j . The values for the components of equation (3) for China and the U.S. are given in Table 15.

The inequality in income among all husbands and the inequality of income among all wives is greater in the U.S. than the corresponding inequalities in China. Part of that difference arises because more people in the U.S. are recorded with zero incomes; that is, the spike at zero income, the bottom tail of the income distribution, is greater in the U.S. than in China. Thus, of the 5,388 husbands and wives in China in 1995, the employment-population ratio, E_1 , of husbands is 0.83 and that of wives, E_2 , is 0.78 ; in the U.S. in 1998, among the 2,119 husbands and wives, E_1 is 0.73 and E_2 is 0.64. Employment-population ratios are higher in China than in the U.S. When the dispersion of labor incomes is computed among workers only, the gap between China and the U.S. in income

[44] This equation is derived and exploited in Pencavel (2006).

inequality narrows.[45] Thus for husbands, the Gini coefficient of income falls in China from 0.381 for all husbands to 0.255 for working husbands and that in the U.S. falls from 0.535 for all husbands to 0.366 for working husbands so the gap between the U.S. and China falls from 0.154 among all husbands to 0.111 among working husbands. Correspondingly, the gap in the Gini coefficient for the incomes of wives falls from 0.179 among all wives to 0.126 among working wives. Hence a part of the difference between China and the U.S. in annual income inequality among husbands and of the difference between the two countries in annual income inequality among wives is attributable to the fact that employment-population ratios in China are higher than those in the U.S. and, other things equal, a larger fraction of non-workers in a population tends to increase income inequality in that population.[46]

V. Conclusions

This paper has described and analyzed the differences in household income inequality in China and the United States. We focus on households in urban areas and we have been particularly concerned with determining whether the conventional focus on annual income inequality yields misleading inferences about the amount of enduring income inequality in a society. To address this

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[45] In Table 15, the entry "ND" means "not defined". This is attached to two indicators of income inequality for all people: the income at the 90th percentile divided by the income at the 10th percentile and the standard deviation of the logarithm of income. For the former, among all husbands and among all wives, the 10th percentile corresponds to someone with zero income. As for the standard deviation of the logarithm of income, for all husbands and wives not at work for pay, this would involve taking the logarithm of zero incomes.

[46] This finding that differences in labor supply (in this instance, employment-population ratios) help to account for differences in income inequality between China and the United States carries over to another dimension of labor supply, namely, hours of work among workers. Khor and Pencavel (2005) reported that differences among workers in annual earnings in China arise principally from differences in hourly pay whereas, in the United States, differences among workers in annual earnings are attributable both to differences in hourly pay and to differences in annual hours of work. Thus differences in inequality in hourly pay between China and the United States are smaller than differences in inequality in annual earnings between the two countries.

issue requires following the same households over time. In China, the sample available to us consists of households who are not fully representative of the urban population. Our urban Chinese households tend to be a more stable group with a slightly higher probability of occupying the center of the income distribution. This is an important limitation of the study here.

Subject to this caveat, we find the greater inequality of household incomes in the U.S. than in China does not disappear when we compute household income over a period of time longer than one year. In the 1990s, household income mobility appears to have been greater in China than in the U.S. Taking account of the elimination of housing subsides in China does not alter this finding. The falling correlation coefficients in income in the first half of the 1990s suggest income mobility was increasing in China at that time.

Households tend to have more members in China than in the U.S. and relatively more household members are at work for pay in China. We find a large amount of persistence in labor supply in both countries although the amount of persistence in China exceeds that in the U.S.: over a six year period, whereas 64 percent of U.S. households report the same number of workers at the beginning as at the end of those six years, in China, the corresponding figure is 87 percent. The factors associated with the probability of market work are similar in China and the U.S.

If these differences in labor supply between China and the U.S. are removed, how would income inequality and income mobility change? To answer this, we simulate the impact on the distribution of income and the patterns of income mobility if, in each country, two members of each household are at work at all times. When differences across households in labor supply are removed, income inequality narrows, the extent of narrowing being slight in China and larger in the U.S. Holding constant differences in labor supply from year to year, income mobility changes little in China (not surprising given the very high persistence in work behavior) but income mobility rises

noticeably in the U.S. so the gap between China and the U.S. in income mobility is attributable in part to differences in the pattern of worker mobility. In the U.S., individuals with lower incomes are more likely to participate intermittently in the labor force and, if we remove the effects of this intermittent participation, the U.S. income distribution narrows and income mobility increases. Such intermittent participation is less common in China so the effects on the income distribution and on income mobility are negligible.

A decomposition of household inequality in China and the U.S. for husband-wife families finds that inequality in the labor incomes of husbands and wives constitute the larger part of household income inequality. In turn, the inequality in labor incomes is attributable in part to the inequality in incomes among workers and to the fraction of people at work for pay. Once comparisons are made between workers only, the U.S.-China gap in labor income inequality of husbands and of wives falls. Thus part of the difference in inequality in household incomes between China and the U.S. is attributable to differences in their employment-population ratios of husbands and wives.

Finally, drawing on our work elsewhere (Khor and Pencavel (2006)), we may compare income inequality and income mobility across households with inequality and mobility across individuals. In China, individual income inequality is slightly greater than household income inequality; the reverse is the case in the U.S. Analogously, individual income mobility exceeds household income mobility in China while the opposite is true in the U.S. Though the differences between individuals and households may not be viewed as substantial, they may signal a different character and function of households in the two societies. We hope to report on this on a future occasion.

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APPENDIX

Data for China

The data for the Chinese households and individuals in this study come from the Chinese Household Income Project 1995, publicly available through the Inter-university Consortium for Political and Social Research and more fully described in the relevant codebooks. Considerable effort was devoted to "cleaning" the data and removing what appear to be errors in coding or reporting. Essentially this was effected by examining the sequence of incomes over the years for each individual and identifying unexpected or odd values. Sometimes these individuals were dropped from the sample. In other cases, it seemed reasonable to alter the recorded entry on income. This would occur when, for instance, zeros were missing in a single year. Our procedure was as follows, for each individual, the income series over the years from 1990 to 1995 was examined for unexpected or odd values. To do this, we compute the individual's real income in each year as a ratio of the average of the individual's real income over the six years. Next, we create flags for outliers: if real income in a year is greater than 200% of average real income between 1990 and 1995 or smaller than 33.3%, then we flag that observation as "unexpected". (We examined other thresholds too.) Using the observations that are not unexpected, we fit a regression equation to predict the logarithm of income using average income from the other years (not including income from the year being predicted) and interactions with age groups (in 5 year intervals), educational levels, gender, and province dummy variables. We predict out of sample values for those observations flagged as unexpected. We 'guess' the right level of income by taking the original reported income and adjusting it by multiples of ten (the particular magnitude being determined by comparing the observation to the rest of the sequence). We compare the 'guess' with the predicted value from the regression. If the 'guess' estimate is closer to the predicted value than the original reported income, we use this value instead.

To reduce the influence of outliers that are sometimes thought to be the consequence of measurement errors, each year's data were trimmed by dropping the 0.5 percent lowest and 0.5 percent highest household incomes in each year. This will reduce the values of indicators of income inequality that use information on incomes throughout the income distribution. Though this will affect some particular indicators of income inequality, our qualitative inferences are unaffected as we examined different inequality measures and avoided drawing inferences when (in those very few occasions) alternative indicators delivered ambiguous implications.

Income is the sum of labor income, property income, transfer income (including retirement income), and "income from household sideline production" and household income is the sum of reported income from all family members. The largest component of total income is labor income. For years before 1995, the number of employed members of each household in year *t* is computed as the total number of adults aged between 17 and 65 years who reported positive income in year *t* and who reported their status as "working" in 1995.

All monetary values are converted to 1995 values using the consumer price index for all respondents as given by the China Statistical Yearbook 1996 (Table 8-1, p. 255).

Data for the United States

The Panel Study of Income Dynamics data come from the online data center[1]. The characteristics of these U.S. data were limited to conform to those applied to the Chinese data. Owing

[1] http://psidonline.isr.umich.edu/

to changes in reported income variables, our sample for the PSID includes the later survey years of 1994 to 1999.[2] The income variable we use is from the Income Plus files. Household income consists of the sum of five categories of income: the taxable income of the head and spouse, the transfer income of the head and spouse, the taxable income of other family unit members, the transfer income of other family members, and Social Security income. Because we seek to construct a balanced panel on income, we restrict the sample of the individuals to those who are always in the sample and who are either heads of households or their respective spouses. As for the Chinese data, the PSID households were trimmed by dropping the top and bottom 0.5% of incomes in each year. The number of employed members of each household in year t is the total number of adults aged between 17 and 65 years who reported "working" as their main status in year t .

[2] No survey of incomes was conducted in 1998.

Table 1

Household Size and Composition by Household Income Decile: China and the United States

CHINA, 1995										
	income decile									
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
N^C	0.675	0.712	0.750	0.708	0.690	0.657	0.632	0.536	0.525	0.510
N^A	2.101	2.250	2.247	2.329	2.373	2.406	2.461	2.634	2.742	2.923
N^{A+C}	2.776	2.962	2.997	3.037	3.063	3.118	3.093	3.170	3.267	3.433
N^W	1.259	1.509	1.634	1.668	1.767	1.830	1.819	1.893	2.068	2.254
UNITED STATES, 1998										
	income decile									
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
N^C	0.345	0.375	0.417	0.478	0.539	0.801	0.730	0.733	0.765	0.837
N^A	1.256	1.451	1.545	1.679	1.756	1.931	1.962	2.094	2.129	2.258
N^{A+C}	1.601	1.825	1.962	2.157	2.295	2.731	2.692	2.827	2.894	3.095
N^W	0.327	0.536	0.736	0.946	1.123	1.388	1.443	1.574	1.686	1.755

N^C denotes the average number of children, N^A the average number of adults, N^{A+C} the average number of household members, and N^W the average number of workers. Children are defined as those aged less than 18 years and adults as 18 or more years. There are 6,357 urban Chinese households and 3,611 metropolitan U.S. households described here. The 1st decile is the lowest income decile and the 10th is the highest.

Table 2

Measures of Income Inequality for Two Concepts of Household Income

CHINA, 1995	household income	per equivalent adult household income
Gini Coefficient	0.257	0.255
90th/10th percentile	3.203	3.182
coefficient of variation	0.495	0.487
standard deviation of log income	0.464	0.460
UNITED STATES, 1998		
Gini Coefficient	0.415	0.401
90th/10th percentile	9.612	7.195
coefficient of variation	0.837	0.845
standard deviation of log income	0.912	0.859

Table 3: Household Income Transition Matrix for China: 1990-1995

total household income						
		year 1995				
		I	II	III	IV	V
year 1990	I	0.435	0.237	0.176	0.113	0.038
	II	0.288	0.260	0.195	0.149	0.108
	III	0.163	0.247	0.249	0.206	0.134
	IV	0.101	0.186	0.230	0.263	0.219
	V	0.013	0.070	0.149	0.268	0.500
per equivalent adult household income						
		year 1995				
		I	II	III	IV	V
year 1990	I	0.454	0.229	0.169	0.111	0.037
	II	0.281	0.249	0.215	0.157	0.098
	III	0.164	0.243	0.230	0.218	0.145
	IV	0.090	0.197	0.239	0.260	0.214
	V	0.012	0.082	0.147	0.254	0.506

Roman numeral I corresponds to the households in the lowest income quintile and V to the households in the highest income quintile.

Table 4: Household Income Transition Matrix for the United States: 1993-1998

total household income						
		year 1998				
		I	II	III	IV	V
year 1993	I	0.660	0.233	0.092	0.023	0.020
	II	0.208	0.445	0.238	0.089	0.037
	III	0.078	0.232	0.394	0.253	0.061
	IV	0.044	0.060	0.189	0.441	0.251
	V	0.010	0.030	0.087	0.194	0.631
per equivalent adult household income						
		year 1998				
		I	II	III	IV	V
year 1993	I	0.653	0.219	0.080	0.038	0.030
	II	0.203	0.434	0.276	0.098	0.031
	III	0.074	0.226	0.373	0.241	0.086
	IV	0.054	0.074	0.191	0.402	0.239
	V	0.017	0.047	0.079	0.221	0.615

Roman numeral I corresponds to the households in the lowest income quintile and V to the households in the highest income quintile.

Table 5: Indicators of Household Income Mobility

	household income	per equivalent adult household income
CHINA, 1990-95		
income quintiles		
(A) average move	1.038	1.037
(B) immobility ratio	0.342	0.340
(C) adjusted immobility ratio	0.720	0.718
income quintiles of residuals		
(A) average move	1.096	1.099
(B) immobility ratio	0.326	0.325
(C) adjusted immobility ratio	0.696	0.692
income clusters		
(A) average move	0.983	0.983
(B) immobility ratio	0.352	0.355
(C) adjusted immobility ratio	0.745	0.741
UNITED STATES, 1993-98		
income quintiles		
(A) average move	0.651	0.699
(B) immobility ratio	0.514	0.495
(C) adjusted immobility ratio	0.874	0.858
income quintiles of residuals		
(A) average move	0.846	0.856
(B) immobility ratio	0.430	0.431
(C) adjusted immobility ratio	0.806	0.806
income clusters		
(A) average move	0.784	0.817

(B) immobility ratio	0.566	0.534
(C) adjusted immobility ratio	0.825	0.812

In this table, "average move" means the average quintile or cluster move defined as

$$\frac{1}{5}\left\{\sum_{j=1}^{5}\sum_{k=1}^{5}(|j-k|)\,p_{jk}\right\}.$$

The "immobility ratio" is the fraction who remain in the same quintile or in the same cluster defined as $(5)^{-1}\Sigma_{j=1,\ldots,5}(p_{jj})$. The "adjusted immobility ratio" is the fraction who remain in the same quintile or cluster plus the fraction who move one quintile or one cluster. If every value of p_{jk} in the matrix were one-fifth, the average quintile move would be 1.6, the immobility ratio would be 0.20, and the adjusted immobility ratio would be 0.52. Or, at the other extreme, if the transition matrix were an identity matrix with unit values on the main diagonal and zeros elsewhere (complete immobility), the average quintile move would be 0, and the immobility ratio and the adjusted immobility ratio would each be 5. Higher values of the average quintile move suggest greater mobility and higher values of the immobility ratio and the adjusted immobility ratio imply less mobility.

Table 6

Effects on Income Inequality of Measuring Household Income over Longer Time Horizons: China and the United States

income averaged over years	average real income*	Gini coefficient	90th to 10th percentile	coeff. of variation	stan. dev. of log of incomes
CHINA, 1995-1990					
1995	Y 13,741.0	0.257	3.203	0.495	0.464
1995 & ‘94	Y 13,041.7	0.249	3.124	0.478	0.451
1995, ‘94, & ‘93	Y 12,946.3	0.248	3.130	0.476	0.449
1995, ‘94, ‘93, & ‘92	Y 12,744.3	0.248	3.104	0.476	0.449
1995, ‘94, ‘93, ‘92, & ‘91	Y 12,418.1	0.249	3.089	0.476	0.449
1995, ‘94, ‘93, ‘92, ‘91, & ‘90	Y 12,049.9	0.249	3.088	0.478	0.451
U.S.A., 1998-1993					
1998	$56,532.7	0.415	9.612	0.837	0.912
1998 & ‘96	$ 53,973.9	0.393	7.775	0.763	0.813
1998, ‘96, & ‘95	$ 52,721.1	0.382	7.709	0.728	0.790
1998, ‘96, ‘95, & ‘94	$ 52,166.5	0.376	7.598	0.714	0.781
1998, ‘96, ‘95, ‘94, & ‘93	$ 51,659.1	0.374	7.297	0.711	0.774

* Real income measured in 1995 prices for China (using the consumer price index) and in 1996 prices for the U.S.A. (using the personal consumption expenditures deflator).

Table 7: Correlation Coefficients between Household Incomes in Different Years

Total Household Income, China 1990-95					
	1991	1992	1993	1994	1995
1990	0.960	0.900	0.812	0.703	0.571
1991		0.949	0.868	0.759	0.622
1992			0.925	0.826	0.680
1993				0.906	0.753
1994					0.816
Per Equivalent Adult Household Income, China 1990-95					
	1991	1992	1993	1994	1995
1990	0.960	0.900	0.813	0.699	0.571
1991		0.949	0.870	0.754	0.622
1992			0.924	0.818	0.676
1993				0.899	0.747
1994					0.809
Total Household Income, United States, 1993-98					
	1994	1995	1996	1997	1998
1993	0.796	0.777	0.746	NA	0.659
1994		0.788	0.743	NA	0.665
1995			0.788	NA	0.695
1996				NA	0.750
Per Equivalent Adult Household Income, United States, 1993-98					
	1994	1995	1996	1997	1998
1993	0.785	0.773	0.722	NA	0.635
1994		0.781	0.730	NA	0.635
1995			0.786	NA	0.681
1996				NA	0.711

Table 8

Weighted Least-Squares Estimates of the Variables Associated with the Coefficients of Correlation of Household Income across Years in China

$$\rho(g\,;\,a,\,a+j\,;\,t,\,t+j) = \gamma_0 + \gamma_1(a) + \gamma_2\,(a)^2 + \gamma_3 F + \gamma_4\,(Schooling) + \gamma_5 N^C + \gamma_6 N^A + \gamma_7\,(a - a') + \Sigma_t \delta_t Y_t + u$$

	household income	per equivalent adult household income
γ_0	0.957 (0.063)	0.735 (0.067)
$\gamma_1\,(10)^{-2}$	-0.465 (0.176)	-0.031 (0.189)
$\gamma_2\,(10)^{-3}$	0.091 (0.020)	0.041 (0.021)
γ_3	0.009 (0.005)	-0.002 (0.005)
γ_4	0.008 (0.003)	0.010 (0.004)
γ_5	0.056 (0.017)	0.098 (0.018)
γ_6	0.004 (0.013)	0.038 (0.014)
γ_7	-0.077 (0.002)	-0.077 (0.002)
δ_{91}	-0.023 (0.006)	-0.022 (0.006)
δ_{92}	-0.032 (0.006)	-0.033 (0.006)
δ_{93}	-0.036 (0.006)	-0.037 (0.006)
δ_{94}	-0.062 (0.006)	-0.066 (0.006)
δ_{95}	-0.134 (0.005)	-0.136 (0.006)
R^2	0.707	0.678

Table 9

Percentage Distribution of Households by Number of Workers

number of workers	percentage distribution of households in year						
	China, 1990-95						
	1990	1991	1992	1993	1994	1995	average
zero	12.4	12.0	11.6	11.3	11.1	10.7	11.5
one	17.5	17.0	16.5	15.6	15.7	14.0	16.1
two	66.4	66.6	66.4	66.0	65.1	65.4	66.0
three	3.2	3.8	4.6	5.8	6.3	7.7	5.2
four	0.6	0.6	0.9	1.2	1.6	2.0	1.2
five	0.0	0.1	0.1	0.1	0.1	0.2	0.1

	U.S.A., 1993-98					
	1993	1994	1995	1996	1998	average
zero	21.5	23.0	23.0	25.7	26.6	24.0
one	41.6	39.7	39.9	38.1	37.4	39.3
two	31.6	32.4	32.1	31.4	31.1	31.7
three	4.3	4.3	4.3	4.1	4.3	4.3
four	0.9	0.5	0.7	0.6	0.6	0.7
five	0.1	0.1	0.1	0.1	0.1	0.1

Table 10
Transition Matrix of the Number of Workers per Household

		China from 1990 to 1995						
		number of workers per household in 1995						total number of households in 1990
		0	1	2	3	4	5	
number of workers per household in 1990	0	0.865	0.117	0.015	0.003	0	0	787
	1	0	0.714	0.247	0.033	0.005	0	1,110
	2	0	0.001	0.917	0.070	0.014	0	4,220
	3	0	0	0.005	0.745	0.230	0.020	204
	4	0	0	0	0.029	0.800	0.171	35
	5	0	0	0	0	0	1.000	1
total number of households in 1995		682	890	4,156	488	128	13	6,357
		United States from 1993 to 1998						
		number of workers per household in 1998						total number of households in 1993
		0	1	2	3	4	5	
number of workers per household in 1993	0	0.831	0.136	0.031	0.002	0	0	784
	1	0.162	0.609	0.204	0.021	0.004	0	1,473
	2	0.042	0.264	0.614	0.069	0.010	0	1,161
	3	0.073	0.227	0.435	0.236	0.027	0.002	158
	4	0.027	0.195	0.491	0.211	0.048	0.029	32
	5	0	0	0.893	0.107	0	0	3
total number of households in 1998		952	1,352	1,125	157	23	2	3,611

Table 11

Logit Maximum Likelihood Labor Supply Estimates: Fraction of Years Worked in China 1990-95 and in the United States 1993-98

	China, 1990-95		United States, 1993-98	
	$\partial p / \partial x$	standard error	$\partial p / \partial x$	standard error
age	0.088	0.004	0.022	0.003
age squared / 100	-0.123	0.005	-0.035	0.003
woman = 1	-0.195	0.011	-0.120	0.011
ethnic minority = 1	-0.020	0.024	-0.042	0.014
Communist member = 1	0.106	0.010		
number of adults in household	-0.022	0.005	-0.020	0.007
number of children in household	0.059	0.009	-0.033	0.005
years of schooling	0.022	0.002	0.020	0.002

The left-hand side variable measures for China the fraction of the six years (between 1990 and 1995) that an individual worked and for the United States the fraction of the five years (between 1993 and 1998 excluding 1997) that an individual worked. Thus, for China, it takes the value of unity for someone who worked all six years and of zero for someone who worked in none of the years; in the United States, it takes the value of unity for someone who worked all five years. This is related to the variables listed in the left-hand column above by logit maximum likelihood methods. The column $\partial p / \partial x$ reports the implied probability derivatives (or the first differences in the case of dichotomous variables) of the estimates evaluated at the mean values of the right-hand side variables. "Age" is measured as years of age in 1995 in China and in 1998 in the U.S. The column "standard error" reports the estimated standard errors of these probability derivatives. This equation is fitted to 14,277 Chinese individuals who were adults in 1990 and 5,861 American individuals who were adults in 1993. The PSID estimates have been fitted to the sample without adjusting for sampling weights. However, the estimates are very similar when adjusted by sampling weights.

Table 12

The Effect of Differences across Households in the Number of Workers on Household Income Inequality and Household Income Mobility

	not holding constant the number of workers	constant worker incomes	not holding constant the number of workers	constant worker incomes
Income Inequality	**China, 1995**		**U.S.A., 1998**	
Gini Coefficient	0.257	0.244	0.415	0.391
90th/10th percentile	3.203	3.203	9.612	6.119
Coefficient of Variation	0.495	0.467	0.837	0.810
Standard Deviation of Log Income	0.464	0.439	0.912	0.787
Income Mobility	**China, 1990-95**		**U.S.A., 1993-98**	
Average Quintile Move	1.038	1.036	0.651	0.810
Immobility Ratio	0.342	0.342	0.514	0.441
Adjusted Immobility Ratio	0.720	0.718	0.874	0.818
Correlation Coefficient	0.571	0.570	0.659	0.514

The entries under the column “not holding constant the number of workers” are the numbers on income inequality and income mobility of total household income reported earlier. The entries under “constant worker incomes” are those simulated under the assumption that all households have two workers in all years.

Table 13

Household Income Inequality and Income Mobility for all Households and for Husband-Wife Households: China and the United States

	all households	husband-wife households	all households	husband-wife households
Income Inequality	**China 1995**		**U.S.A., 1998**	
Gini Coefficient	0.257	0.244	0.415	0.346
90th/10th percentile	3.203	2.985	9.612	5.160
Coefficient of Variation	0.495	0.473	0.837	0.688
Standard Deviation of Log Income	0.464	0.434	0.912	0.693
Income Mobility	**China, 1990-95**		**U.S.A., 1993-98**	
Average Quintile Move	1.038	1.096	0.651	0.712
Immobility Ratio	0.342	0.323	0.514	0.475
Adjusted Immobility Ratio	0.720	0.694	0.874	0.861
Correlation Coefficient	0.571	0.545	0.659	0.621

In China, there are 6,357 households under “all households” and 5,388 husband-wife households. In the United States, there are 3,611 “all households” and 2,119 husband-wife households.

Table 14
Components of the Inequality of Household Income for Husband-Wife Families
in China in 1995 and the United States in 1998

		Chinese households		**U.S. households**	
			subtotal as a percent of V^2		subtotal as a percent of V^2
Labor Income of Husbands = $B_1^2.V_1^2$					
1	B_1^2	0.190		0.256	
2	V_1^2	0.513		1.139	
3	subtotal	0.097	43.5	0.292	62.4
Labor Income of Wives = $B_2^2.V_2^2$					
4	B_2^2	0.109		0.047	
5	V_2^2	0.650		1.544	
6	subtotal	0.071	31.8	0.073	15.6
Other Household Income = $B_3^2.V_3^2$					
7	B_3^2	0.055		0.077	
8	V_3^2	3.059		2.343	
9	subtotal	0.168	75.3	0.180	38.5
Covariance of Labor Income of Husbands and Wives = $2.B_1.B_2.r_{12}.V_1.V_2$					
10	B_1	0.436		0.506	
11	B_2	0.330		0.216	
12	r_{12}	0.485		0.136	
13	V_1	0.716		1.067	
14	V_2	0.807		1.243	
15	2.subtotal	0.081	36.2	0.039	8.3
Covariance of Labor Income of Husbands & Other Household Income = $2.B_1.B_3.r_{13}.V_1.V_3$					
16	B_1	0.436		0.506	
17	B_3	0.234		0.278	

18	r_{13}	-0.378		-0.230	
19	V_1	0.716		1.067	
20	V_3	1.749		1.531	
21	2.subtotal	-0.097	-43.3	-0.106	-22.6
Covariance of Labor Income of Wives & Other Household Income = $2.B_2.B_3.r_{23}.V_2.V_3$					
22	B_2	0.330		0.216	
23	B_3	0.234		0.278	
24	r_{23}	-0.442		-0.044	
25	V_2	0.807		1.243	
26	V_3	1.749		1.531	
27	2.subtotal	-0.096	-43.2	-0.010	-2.1
28	total , V^2	0.223		0.468	

Table 15

Labor Income Inequality among All Husbands, among All Wives, among Working Husbands, and among Working Wives: China, 1995 and the United States, 1998

	China, 1995		United States, 1998	
	all	workers only	all	workers only
HUSBANDS				
square of the coefficient of variation	0.513	0.258	1.139	0.569
employment-population ratio	0.832	1	0.733	1
Gini coefficient	0.381	0.255	0.535	0.366
90th/10th percentile	ND	3.070	ND	6.133
standard deviation of log income	ND	0.471	ND	0.904
WIVES				
square of the coefficient of variation	0.650	0.284	1.544	0.636
employment-population ratio	0.778	1	0.643	1
Gini coefficient	0.437	0.277	0.616	0.403
90th/10th percentile	ND	3.634	ND	9.796
standard deviation of log income	ND	0.563	ND	1.048

In terms of equation (3), $(V_j)^2 = (E_j)^{-1} .(V^e_j)^2 + (E_j)^{-1} - 1$, in the table above, the square of the coefficient of variation of income for "all" corresponds to $(V_j)^2$ and for "workers only" to $(V^e_j)^2$. The employment-population ratio corresponds to E_j . "ND" means not defined. The tenth percentile among all individuals corresponds to zero income. For all, the standard deviation of the logarithm of income involves attempting to take the logarithm of zero income for non-workers.