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THE TREND IN URBAN INCOME INEQUALITY IN TWO CHINESE PROVINCES, 1986–90

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This paper discusses to what extent the economic growth in China in the 1980's has improved the economic well-being in urban regions of the provinces Sichuan and Liaoning and whether or not the economic growth has been attained at the cost of increased inequality. The study is based on individual household data from the State Statistical Bureau's Urban Household Survey during the 1986–90 period.

1. INTRODUCTION

Since 1979 China has carried out important economic reforms both in the agricultural sector and in the non-agricultural sectors in order to increase productivity and improve the level of living of Chinese households. To achieve these objectives economic controls have gradually been relaxed and market incentives have been introduced. Although the Chinese government still determines the wages of workers in state- and collective-owned enterprises and in the public sector, more economic incentives are provided for the workers, of which the introduction of bonus payments is the most important. Altogether, these reforms resulted in a rapid increase in productivity and output. Faced by the hypothesis that there is a trade-off between economic policies that guarantee a minimum income with low level of inequality and policies that provide a higher overall level of income at the cost of higher inequality, the following questions may be asked.

(i) Have households increased their level of living?
(ii) Has the composition of different income factors changed?
(iii) What is the impact on the distribution of income?

These important policy questions will be studied by the use of individual household data from the State Statistical Bureau's Urban Household Survey during the 1986–90 period. In this paper we focus on urban household income inequality in the provinces Sichuan and Liaoning. By contrast, most studies on income inequality in China consider nationwide income inequality and its sensitivity to changes in the urban/rural income gap, see Adelman and Sunding (1987) who found that the national inequality fell slightly between 1978 and 1983, primarily due to changes in the urban/rural gap. Their study applies aggregated income

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data which for estimation of inequality measures requires some assumptions about the income distributions in question. According to Howes (1993) the assumptions used by Adelman and Sunding (1987) resulted in underestimation of the 1983 figures relative to the 1978 figures. Based on similar data Ahmad and Wang (1991) found that income inequality increased between 1981 and 1987. However, the estimated measures of inequality are based on influential assumptions concerning income class means which according to Howes (1993) probably make any ratio of 1987 to 1981 inequality measures upward biased. Using additional information on group means Howes (1993) provides estimates of the trend in urban income inequality between 1981 and 1990 and concludes that inequality increased but remained low. Although these results are based on additional aggregate information Howes (1993) still calls for caution when it concerns the interpretation of the reported results. By contrast, various recent studies on urban income inequality in China are based on a microeconomic data set from 1986 that originates from a survey designed by the Institute of Economics of the Chinese Academy of Social Sciences (CASS); see Howes and Lanjouw (1991) and Hussain *et al.* (1991) who both report modest variation in provincial urban income inequality, which according to Howes and Lanjouw (1991) means that one can predict a province's welfare ranking from its mean income ranking. Note, however, that their results refer solely to analyses of 1986 data. Knight and Lina (1991) use the same data source to identify and explore factors which have influenced the level of inequality in urban China. Their analysis demonstrates that the low urban income inequality among households was mainly due to modest wage and salary differentials in state-owned and collective-owned enterprises. In 1986 these differentials were still partly set by the central government even though the state's control over wages had been gradually relaxed through the course of the eighties.

The studies referred to above either compare trends in annual income inequality based on aggregated data or uses the CASS micro data of 1986 to examine provincial variations in and determinants of income inequality. It is, however, impossible to judge the significance of the reported estimates and their differences since information on standard errors is absent. The present study differs from the previous ones since it compares microbased estimates for the 1986–90 period and moreover provides estimates of standard errors.

This paper focuses mainly on couples with one child which, as a result of the current birth control policy, turn out to be the predominating household group in China. As a supplement we also provide results for all households.

Our methodological approach is based on the Gini coefficient and a closely related measure of inequality, called the A-coefficient. The essential difference is that the A-coefficient is more sensitive than the Gini coefficient to inequality in the lowest part of the income distribution. Both measures take, however, values between zero and one.

The following section discusses the UHS data. Section 3 discusses the properties of the employed measures of inequality and a method for decomposing overall inequality with respect to income sources. Sections 4 and 5 describe the trend and structure in household income inequality in urban Sichuan and Liaoning during the 1986–90 period. Section 6 summarizes the findings and the conclusions of the paper.

2. The Urban Household Survey of China

The State Statistical Bureau's Urban Household Survey is an annual survey of non-agricultural households living in cities and county towns. The survey covers all provinces, but in this paper we restrict the analysis to the microeconomic data from the provinces of Sichuan and Liaoning for the years 1986–90.

The Urban Household Survey (UHS) was initiated in 1955, but was suspended from 1966 to 1979 as a consequence of the Cultural Revolution. Since its re-establishment in 1980, the UHS has been reorganized and extended several times. The major extension took place in 1984 when the survey expanded both in coverage and content. For further information on the history of the UHS see Bjerkholt and Zhu (1993).

A particularly attractive feature of the UHS is its continuity in recording the income and consumption data. Each household is required to keep daily records of its cash income and its consumption quantities and expenditures for monthly collection by survey officials.

2.1. *Sample Method and Coverage*

The sample of households is selected by adopting a two-stage sampling design. At each stage stratified systematic sampling is used. In the first stage, a sample of cities and county towns is selected by the State Statistical Bureau (SSB) and provincial statistical bureaus. The cities and county towns are according to the size of their non-agricultural populations selected by means of a systematic sampling procedure. In the second stage 100 households are selected randomly from each selected city and county town. The total sample size is about 15,000 households. In addition to providing daily income and consumption accounts, the selected households are each month asked questions about household size and composition and about education and employment status of the household members.

In order to reduce non-response and the extent of measurement errors the Urban Household Survey has been based on a rotation sample since 1988. The rotation proportion is 1/3 and the rotation period is one year. Unfortunately, SSB does not publish information on non-response rates, but the Survey officials report very high response rates due to extensive supervision by the local household survey divisions and a comprehensive set of instructions for Survey officials. These instructions regulate the Survey officials' behavior during the field operations. They are, for instance, instructed to assist the selected households with homework and child care and otherwise comply with the households' customs. Note that selected households who initially refuse to participate are revisited by Survey officials in order to convince them about the importance of their participation.

It turns out that the UHS does not include households that are temporarily living and working in urban areas without urban registration. According to Howes (1993) this floating population may account for as much as 20 percent of the urban population. Arguments provided by Ahmad and Wang (1991), Hussain *et al.* (1991) and Howes (1993) suggest that the inclusion of the floating population would increase urban income inequality. Moreover, Hussain *et al.* (1991) found by cross-checking, that the UHS 1986 is significantly biased in favour of the

employees in state-owned units. In our sample very few households comprise self-employed persons or wage earners in foreign enterprises and joint ventures, which indicate biases similar to those reported by Hussain *et al.* (1991). Since this group of wage earners and self-employed persons probably earn considerably more than employees in state-owned and collective-owned work units, the level and growth rate of income inequality may be downward biased. However, lack of relevant data prevent us from assessing the overall effect of these possible biases. Thus, for the moment we should primarily bear in mind that the results of this paper solely concern the non-floating urban households who mainly make their living from work in the state sector. Note, however, that the private sector merely accounted for 3.5 and 4.5 percent of the urban labor force at the end of 1985 and 1989, respectively (see Statistical Yearbook of China 1990, p. 119).

2.2. *Definition and Measurement of Household Income*

A household is defined to include all persons living in the same dwelling and having common board. The main income variable of the UHS, total annual household income, includes all cash income received by the household during the year, but excludes sources of spending such as bank deposits withdrawn, money borrowed from relatives or friends, and repayment of debt by others. The predominant source of cash income in urban areas is wage earnings by employment in the state or collective sector. Other important sources comprise subsidies, pensions, income from secondary employment and income from self-employment. For the purpose of decomposition total household income will be divided into the following five basic income sources.

Wage earnings in state-owned or collective-owned units are the total wages of household members employed in state-owned or collective-owned enterprises, government offices and other state institutions. Such wages consist of base wage, bonuses, floating salary and contractual income. By floating salary we mean a flexible salary, the amount of which depends upon the quality of work produced. Contractual income is the income that staff and workers in some state-owned and collective-owned enterprises earn from work they are contracted to perform. The amount of the contractual income is equal to the total income derived from the contracted activities minus all production costs, taxes, and profits set by contract.

Other income from work units consists mainly of rented housing subsidies, costs of medical insurance from the work unit, transportation subsidies, and single-child subsidies.

Income from current transfers includes pension and price subsidies.

Other income consists of income from self-employment, secondary employment, property and gifts and other special income.

Note that most of the non-floating urban households enjoy housing subsidies. The reported amounts, however, merely comprise rental housing which do not reflect the "market" value of housing. As is apparent from the UHS definition of household income other types of non-cash benefits from employment are also disregarded. It is, for instance, well-known that state-owned work units regularly offer commodities and services at prices below the market price. The common practice of providing price subsidies through the system of ration coupons has,

however, gradually been abolished in the second half of the eighties. As an alternative to the coupon system the government has introduced direct price subsidies which is measured by the UHS as transfer income. Thus, the underreporting of the benefits from ration coupons has diminished during the late eighties.

Various observers have noted that most Chinese surveys suffer from lack of non-cash income data. The National Income Household Survey 1988 is, however, a notable exception. Based on data from this survey Khan *et al.* (1991) are in the position to account for various non-cash income sources. By comparing the standard SSB figures with those reported by Khan *et al.* (1991), Howes (1993) found that the non-cash income on average amounts to approximately half of the reported cash income. About 50 percent of this difference is due to the imputed "market" value of housing. The impact on income inequality from disregarding non-cash incomes was examined by Khan *et al.* (1991) and they found that the overall effect of non-cash income slightly increased urban income inequality. It is important to bear in mind the indicated weaknesses when interpreting the UHS data. Nevertheless, it should be noted that the American and European income surveys suffer from similar deficiencies.

3. Measurement and Decomposition of Inequality

In order to evaluate the deviation of each household's income from that of a household living in a society of complete equality, the standard approach is to employ the Lorenz curve. The Lorenz curve relates the cumulative proportion of income units to the cumulative proportion of income received when units are arranged in ascending order. Thus, the Lorenz curve captures the essence of inequality when inequality is defined as the deviation from the state of equality and restricted to satisfy the principles of transfers and scale invariance. The principle of scale invariance states that inequality should remain unaffected if each income is altered in the same proportion and it therefore requires that the inequality measure to be independent of the scale of measurement. The principle of transfers implies that if a transfer of income takes place from a richer to a poorer person without changes in the relative positions, the level of inequality diminishes. Ranking induced by the Lorenz curve is, however, incomplete. Therefore, several summary measures of inequality have been derived to provide complete ranking of distributions. The most widely used measure of inequality is the Gini coefficient, which satisfies the principles of scale invariance and transfers. The reader is referred to Sen (1973) for a more comprehensive discussion of the normative implications of different measures of inequality.

3.1. *Measures of Inequality*

As is well-known, the Gini coefficient (G) is related to the Lorenz curve (L) in the following way

$$G = \int_0^1 [1 - 2L(u)]\, du. \tag{3.1}$$

The Gini coefficient offers a method for ranking distributions and quantifying the differences in inequality between distributions which is widely used in applied work. This practice, however, is questionable. Evidently, no single measure can reflect all aspects of inequality of a distribution, only summarize it to a certain extent. Consequently, it is important to have alternatives to the Gini coefficient. As pointed out by Atkinson (1970), the Gini coefficient assigns more weight to transfers in the centre of a unimodal distribution than at the tails. As a supplement to the Gini coefficient, we will employ an inequality measure—the A-coefficient—that assigns more weight to transfers at the lower tail than at the centre and the upper tail.

The A-coefficient, introduced by Aaberge (1986), is defined by

$$A=\int_0^1 [1-M(u)]\,du, \tag{3.2}$$

where M is given by

$$M(u)=\begin{cases} 0, & u=0 \\ L(u)/u, & 0<u\leq 1. \end{cases} \tag{3.3}$$

Nonparametric estimators for G and A are given by

$$\hat{G}=\frac{\frac{1}{n^2}\sum_{i=2}^{n}\sum_{j=1}^{i}(X_{(i)}-X_{(j)})}{\bar{X}} \tag{3.4}$$

and

$$\hat{A}=\frac{\frac{1}{n}\sum_{i=2}^{n}\sum_{j=1}^{i}\frac{1}{i}(X_{(i)}-X_{(j)})}{\bar{X}} \tag{3.5}$$

respectively, where $X_{(1)}\leq X_{(2)}\leq\ldots\leq X_{(n)}$ are the ordered observations.

3.2. *Decomposition of Inequality*

Given the inequality in the distribution function F measured by A or G, the next step is to identify the sources that make substantial contributions to the inequality. Assume that the main variable X is the sum of s different factor components,

$$X=\sum_{i=1}^{s}X_i. \tag{3.6}$$

According to Rao (1969), G admits the following decomposition

$$G=\sum_{i=1}^{s}\frac{\mu_i}{\mu}\gamma_i \tag{3.7}$$

where μ_i/μ is the ratio between the means of X_i and X, respectively, and γ_i can be interpreted as the conditional G-inequality of factor i given the units rank order in X. Analogously, Aaberge (1986) demonstrated that

$$A=\sum_{i=1}^{s}\frac{\mu_i}{\mu}\alpha_i \tag{3.8}$$

where α_i is related to A and has a similar interpretation as γ_i related to G.

Notice that α_i and γ_i are measures of correlation between factor i, X_i, and X. Assume for example that $\mu_i>0$. Then, a negative value of α_i or γ_i expresses negative correlation and means that factor i has an equalizing effect on the inequality in the distribution F of X. A positive value expresses a disequalizing effect on the inequality in F. For $\mu_i<0$, then positive values of α_i and γ_i express an equalizing effect on the inequality in F. We call α_i and γ_i concentration coefficients which is in accordance with Mahalanobis (1960).

If α_i and γ_i are equal to 0, then every household (or individual) receives an equal amount of factor i. Thus, factor i does neither hold a disequalizing nor an equalizing effect on the distribution F of X. We say that factor i holds a neutral effect.

The above interpretation of the concentration coefficients is based on a consideration where the influence of the different factor components on the overall income inequality is judged simultaneously. If we instead are interested in the impact on overall income inequality from increasing factor i income solely, given that all the concentration coefficients are assumed fixed, this follows from the following elasticities which are established by straightforward differentiation,

$$\frac{\partial \log A}{\partial \log \mu_i}=\frac{\mu_i}{\mu}\left(\frac{\alpha_i}{A}-1\right), \qquad i=1,2,\ldots,s \tag{3.9}$$

and

$$\frac{\partial \log G}{\partial \log \mu_i}=\frac{\mu_i}{\mu}\left(\frac{\gamma_i}{G}-1\right), \qquad i=1,2,\ldots,s. \tag{3.10}$$

The formulas (3.9) and (3.10) yield the marginal effects on A and G from a small increase of an income factor, conditional on fixed concentration coefficients. From the expressions (3.9) and (3.10) we see that overall inequality will increase (decrease) if and only if the current concentration coefficient is larger (smaller) than the overall inequality. Hence, we may obtain a decline in inequality even if the corresponding concentration coefficient exhibits a disequalizing effect.

4. The Trend in Household Income Inequality in Urban Sichuan and Liaoning

According to Blank and Blinder (1986) income inequality has, historically, increased during economic recessions and declined during recoveries. These cyclical swings in inequality, however, are not consistent with the evidence given by Danziger *et al.* (1989). Their results are related to the economic recovery in the United States during the 1982–87 period and revealed a substantial increase in

income inequality. However, this evidence is entirely restricted to a pure market economy and thus not directly transferable to a regulated economic system such as the Chinese one.

China's economy has since liberation in 1949 been dominated by egalitarian objectives and high degree of central planning, which have resulted in low income inequality both compared to other developing countries and to developed countries. However, during the recent decade a series of market-oriented economic reforms have been introduced in order to increase productivity and improve the standard of living of Chinese households. The market-oriented reforms began in the late seventies and were then mainly aimed at the rural economic system. At the end of 1984 the government decided to introduce significant urban economic reforms. Important aspects of the reforms were to decentralize decisions to the local government level or even to the firm level and allow firms to retain a larger fraction of profits and to make use of performance-linked bonus payments. Altogether, the economic reforms resulted in a considerable increase in productivity and output and on average in the standard of living. Now, the question is whether or not the success in the Chinese economy has been attained at the cost of increased income inequality. This question will be discussed by means of individual household data from the State Statistical Bureau's Urban Households Survey for urban Sichuan and Liaoning during the 1986–90 period. The 1990 data have previously been applied by Aaberge *et al.* (1992) to examine the structure of economic inequality in 1990. Their results refer to distributions of households income, expenditure and savings.

4.1. *A Sketch of Previous and Present Status of the Urban Economic Systems in Sichuan and Liaoning*

Liaoning is a coastal province situated in the northeast of China and had a population of 40 million people in 1990. Due to its rich natural resources Liaoning early appeared as an important region for industrial activities. Thus, Liaoning has been and still is characterized by relatively high degree of urbanization and industrialization, mainly as a result of the First Five-Year Plan pursued in the fifties. This plan made Liaoning the leading province for heavy industry and its fulfilment resulted in increased urbanization. A consequence is that four out of 30 cities with more than 1 million non-agricultural residents are located in Liaoning. Liaoning's position as the base for heavy industry in China has been maintained during the period of market-oriented reforms in the eighties, which is also demonstrated by the fulfilment of high investment goals. However, at the initiation of the recent reform period the industrial enterprises suffered due to old technology, and thus the modernization program had to be carried out gradually over a longer period of time. Although considerable results have been achieved, important investment plans still remain to be fulfilled. The extensive structural problems may also have reduced the pace at which the performance-linked bonus payments have been accomplished. Bearing these factors in mind, it seems that Liaoning has changed more slowly than other coastal provinces during the reform process.

Compared to Liaoning the more heavily-populated south-western province of Sichuan suffers from a disadvantageous position with regard to economic structure, infrastructural facilities and international trade. Sichuan is the largest

province in China with about 110 million people or 10 percent of the total population in 1990. The degree of urbanization is, however, low. Only two of the cities has a population above 1 million people, while the remaining 24 cities are medium-sized or small; most of them with fewer than 200,000 residents. The relatively low degree of urbanization in Sichuan is mainly due to the economic history of the region. The industrial production was very low before 1949. In the years following the First Five-Year Plan, however, development of the industry production in this region was given high priority. Later, in the sixties and seventies, Sichuan was heavily affected by the "Third Front" policy which aimed at developing the military industry as a response to an expected attack from the Soviet Union and U.S.A. During this period as much as 40 to 60 percent of total industrial investment was yearly absorbed by the "Third Front" policy. It seems likely that most of these investments went to urban areas and may explain why urban Sichuan on average experienced a considerable increase in standard of living between 1965 and 1975. Although Sichuan benefited largely from the "Third Front" policy this region has, however, not been in the frontline of the urban economic reforms and export-oriented development strategy that were initiated in 1984.

The urban reform of 1984 concerns all provinces. However, due to the establishment of special economic zones and the introduction of an urban price reform in a few eastern coastal provinces, the southeastern coastal provinces seem to have been in the forefront of the reform process. Although Liaoning and Sichuan have not been in the frontline of the economic reform process both provinces had to implement the Central government decision of introducing market incentives such as bonus payments. This part of the reforms has most likely resulted in increased income inequality no matter how successful the reforms have been with regard to economic growth. Due to a more developed economy and openness to the outside world Liaoning has, however, been more in focus for the urban reform policy of the Central government than Sichuan. Consequently, urban Sichuan suffered from low industrial investments in the eighties and, thus, should be expected to have lower growth in mean income than urban Liaoning.

4.2. *Empirical Results*

In this section we focus on income inequality among couples with one child and among all households living in urban regions of Sichuan and Liaoning. The results for all households provide important information about household inequality, but must be interpreted with caution when used as a basis for analysis of welfare since households vary with respect to size and composition. However, when comparing the relative economic position of couples with one child this problem is not present. We focus on couples with one child because this particular household group constitutes roughly half the population of urban households in these provinces and moreover comprises the majority of the children. Thus, from this group we also obtain important information about economic inequality among children.

Total household income includes all cash income received by the household during the year, but excludes sources of spending such as bank deposits withdrawn, money borrowed from relatives or friends, and repayment of debt by

TABLE 1

ANNUAL MEAN INCOME FOR COUPLES WITH ONE CHILD LIVING IN URBAN SICHUAN AND LIAONING BY DECILE GROUPS, 1986–90

Decile Group	Province									
	Sichuan					Liaoning				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
1	3,348	3,152	2,902	2,761	2,836	3,089	3,372	3,226	906	3,495
2	4,058	3,889	3,567	3,470	3,529	3,658	3,886	3,807	3,095	4,036
3	4,347	4,189	3,961	3,749	3,967	3,890	4,197	4,226	3,960	4,362
4	4,558	4,451	4,280	4,084	4,413	4,073	4,435	4,473	4,364	4,651
5	4,734	4,716	4,595	4,307	4,764	4,276	4,618	4,757	4,657	4,993
6	4,945	5,062	4,827	4,608	5,051	4,468	4,818	5,066	4,943	5,310
7	5,201	5,393	5,177	5,001	5,427	4,634	5,032	5,366	5,237	5,543
8	5,479	5,702	5,623	5,441	5,780	4,782	5,275	5,655	5,563	5,849
9	5,982	6,180	6,218	5,997	6,312	5,131	5,619	6,104	5,904	6,284
10	7,261	7,075	7,918	7,235	7,294	6,392	6,552	7,102	6,901	7,542
All	4,991	4,981	4,907	4,665	4,937	4,439	4,781	4,978	4,553	5,207
	(65)	(70)	(98)	(88)	(91)	(67)	(54)	(67)	(93)	(65)

Note: Yuan figures are at 1990 prices. Standard deviations are given in parentheses.

others. To illustrate the trend in the income differences between couples with one child, Table 1 provides mean incomes in 1990 Yuan by each decile of couples with one child living in urban Sichuan and Liaoning, rsepectively. For 1986–89 the household incomes are adjusted for price changes using the urban consumer price indexes for Sichuan and Liaoning.

The income figures in Table 1 show that the 1986–90 period was one of relatively steady growth in the mean income of one child couples living in urban Liaoning, while the corresponding mean incomes in urban Sichuan were reasonably steady at the 1986 level. These regularities were, however, distorted in 1989 by a notable decline in the level of income, which was mainly caused by sharp increases in the consumer prices in 1988 and in 1989. This specific drop in real incomes seems to be closely related both to implemented and announced economic reforms. The implementation of the urban reforms from 1984 resulted gradually in increased inflation. Despite demand pressure and increasing inflation the Central government announced plans for a comprehensive price reform in June 1988. The knowledge of these plans made it attractive for consumers to switch from financial assets to durable goods. Purchase of durable goods were primarily financed by savings from previous years although relaxation of credit control in 1987 also made it possible to get commercial credit. The boom in purchases of durables from summer 1988 until summer 1989 reinforced the inflation pressure. Faced with an inflation rate above 20 percent, the Central government implemented a series of stabilization measures in June 1989. The anti-inflation policy finally succeeded in reducing annual inflation to below one percent in 1990.

Note, however, that the extremely low mean income of the lowest decile group in Liaoning in 1989 may be due to a bias caused by the sample design. Until 1990 the industrial structure formed the basis for selection of households in Liaoning; households were selected as clusters according to the addresses of

the employers. Due to the restructuring of the industry in Liaoning several enterprises were closed down in 1989, which again led to reduced annual wage earnings for the affected employees. It appears, however, that the households of the sample were more heavily affected by plant closures than the remaining part of the population. The 1989 figures for Liaoning must thus be interpreted with caution. By contrast, in Sichuan the survey design and selection of households were based on the dwelling addresses of the households.

As a result of the economic changes during the 1986–90 period the mean income in urban Sichuan changed from being 12 percent above the mean income in urban Liaoning in 1986 to become 5 percent below the mean income in urban Liaoning in 1990. The figures in Table 1 demonstrate that this pattern is particularly visible among the poor. The reason for this trend seems to have an historical origin. As emphasized above the "Third Front" policy, which was gradually reduced in the late seventies, has been considered particularly important for the level of living in urban Sichuan and may explain why the mean level of living was higher in Sichuan than in Liaoning up to 1987. The change in position from 1988 was likely due to the fulfilment of important investment programs for the heavy industry in Liaoning during the mid-eighties. By contrast, in this period the industry in Sichuan was not given similar favorable treatment in terms of investments by the Chinese authorities. Moreover, it seems that Liaoning and other coastal provinces have been in an advantageous position with regard to benefiting from the export-oriented reforms initiated in 1984. Altogether, these factors may explain the trends which emerge in Table 1.

In order to sum up the annual income differences displayed in Table 1, Table 2 provides estimates of the A-coefficient and the Gini coefficient. Similar estimates for all households are given in Table 3.

TABLE 2

ESTIMATES OF THE A-COEFFICIENT AND THE GINI COEFFICIENT IN DISTRIBUTIONS OF INCOME FOR COUPLES WITH ONE CHILD LIVING IN URBAN SICHUAN AND LIAONING, 1986–90

	Province									
	Sichuan					Liaoning				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
Number of observations	264	253	212	210	199	185	273	276	298	323
A-coefficient	0.175 (0.009)	0.195 (0.008)	0.228 (0.011)	0.228 (0.013)	0.227 (0.010)	0.164 (0.012)	0.157 (0.007)	0.192 (0.008)	0.328 (0.018)	0.182 (0.007)
Gini coefficient	0.115 (0.006)	0.126 (0.005)	0.156 (0.008)	0.151 (0.008)	0.148 (0.007)	0.107 (0.008)	0.102 (0.005)	0.125 (0.006)	0.188 (0.013)	0.122 (0.006)

Note: Standard deviations are given in parentheses.

According to Table 2 income inequality among couples with one child living in urban Sichuan increased considerably during the 1986–88 period. By contrast, mean real income did not change. Both when measured by the Gini coefficient and the A-coefficient income inequality for this household group stabilized on the 1988 level during the 1988–90 period. Similarly, income inequality for couples with one child living in urban Liaoning increased during the 1986–88 period and

TABLE 3

ESTIMATES OF THE A-COEFFICIENT AND THE GINI-COEFFICIENT IN DISTRIBUTIONS OF INCOME FOR HOUSEHOLDS LIVING IN URBAN SICHUAN AND LIAONING, 1986–90

	Province									
	Sichuan					Liaoning				
	1986	1987	1988	1989	1990	1986	1987	1988	1989	1990
Number of observations	600	599	550	550	550	600	600	600	600	597
A-coefficient	0.235 (0.008)	0.245 (0.007)	0.283 (0.008)	0.301 (0.009)	0.303 (0.010)	0.229 (0.007)	0.245 (0.008)	0.283 (0.009)	0.355 (0.012)	0.257 (0.008)
Gini coefficient	0.156 (0.005)	0.162 (0.005)	0.188 (0.006)	0.199 (0.006)	0.200 (0.007)	0.155 (0.005)	0.171 (0.006)	0.189 (0.007)	0.221 (0.009)	0.174 (0.006)

Note: Standard deviations are given in parentheses.

then in 1990 declined below the 1988 level. Between 1986 and 1990, the increase in inequality in Liaoning was 11 percent measured by the A-coefficient and 14 percent measured by the Gini coefficient. In Sichuan the corresponding changes in inequality were 30 percent and 29 percent, respectively.

The results for all households reported in Table 3 more or less confirm the picture given by Table 2. Due to heterogeneity in household size and composition the level of inequality was, however, substantially higher for all households than for couples with one child.

5. DECOMPOSITION OF HOUSEHOLD INCOME INEQUALITY

Since it is of obvious interest to identify the sources that made substantial contributions to the level and changes in the level of inequality in urban Sichuan and Liaoning during the 1986–90 period, this section is devoted to decomposition of overall inequality with respect to five basic income sources: wage earnings in state-owned units, wage-earnings in collective-owned units, other income from work units, income from current transfers and other income.

As demonstrated in section 3.2, the applied decomposition method views each income factor's contribution to overall income inequality as the product of its fraction of and correlation with total income. In analyzing each income factor's contribution to overall inequality this method has the advantage over the common stepwise methods of being independent of the order by which the income factors are entered. The standard approach in applied work is to compare inequality with and without the income factor in question. For example, in examining the question whether working wives decrease family income inequality, Horvath (1980) and Danziger (1980) employed this approach. Thus, their results depend on whether one compares family income inequality with income inequality between husbands or with income inequality between wives. In answering this type of questions a more relevant approach is to employ methods which are independent of the ordering of income factors.

The results of the decomposition of the income inequality, as measured by the Gini coefficient, are given in Tables 4 and 5. As a supplement, corresponding results for the A-coefficient are given in Appendix. Due to a change in the reporting

routines between 1987 and 1988, which appears to affect the definitions of wage earnings and transfers, we solely report 1988–90 estimates for the population of all households.

For each of the two household groups the first and second column of Tables 4 and 5 display the relative contribution from the various income factors to overall inequality and to total income, respectively. The third column gives the concentration coefficients which are defined and discussed in section 3.2. Note that the income factors contribution to overall inequality are equal to the products of the figures in columns two and three (divided by 100). Thus, the sum of the first five inequality contributions in Table 4 is equal to overall inequality (0.115) in the distribution of income for couples with one child living in Sichuan in 1986.

Table 4 shows that all income factors, except wage earnings in collective-owned units, has a disequalizing effect on the distributions of income both for couples with one child and for all households living in urban Sichuan. Note, however, that the effect of wage earnings in collective-owned units for all households is relatively small and even close to zero in 1989, which means that this income factor has nearly a neutral effect on overall income inequality. During the 1988–90 period the major income factor, wage earnings in state-owned units, accounted for 60–61 percent of total income and 86–90 percent of overall inequality for couples with one child. The corresponding figures for all households are 52–56 percent and 78–82 percent. By contrast, wage earnings in collective-owned units reduced inequality by 13–16 percent for couples with one child and by 0–6 percent for all households. The predominating contribution from wage earnings in state-owned units to the level and variation in household income reflects primarily the fact that the majority of the urban labor force is employed in state-owned units and is in accordance with the findings of Hu *et al.* (1986) that wages and bonus payments are greatly influenced by affiliation to state-owned enterprises.

From 1986 to 1987 the increased inequality for couples with one child living in urban Sichuan was mostly due to a reduced equalizing effect of wage earnings in collective-owned units. The corresponding concentration coefficient increased from −0.178 to −0.086. Between 1988–90 the concentration coefficient of wage earnings in collective-owned units decreased below its 1987 value, while this income factor's fraction of total income stabilized on about 13 percent. Thus, during the 1988–90 period wage earnings in collective-owned units again increased its equalizing effect. Despite this fact, income inequality among couples with one child, as measured by the Gini coefficient, increased by 24 percent from 1987 to 1988, but did not vary significantly between 1988 and 1990. The increased income inequality was mainly due to a rising disequalizing effect from wage earnings in state-owned units which, however, was weakened by a declining disequalizing effect of income from current transfers. During the 1988–90 period income from current transfers accounted for 9–11 percent of total income and merely 1–3 percent of inequality, which means that income from current transfers was approximately evenly distributed across couples with one child living in urban Sichuan.

The notable decline in the income fraction of wage earnings in state-owned units from the 1986–87 period to the 1988–90 period was accompanied by a

TABLE 4

DECOMPOSITION OF THE GINI COEFFICIENT IN DISTRIBUTIONS OF HOUSEHOLD INCOME WITH RESPECT TO (1) WAGE EARNINGS IN STATE-OWNED UNITS, (2) WAGE EARNINGS IN COLLECTIVE-OWNED UNITS, (3) OTHER INCOME FROM WORK UNITS, (4) INCOME FROM CURRENT TRANSFERS AND (5) OTHER INCOME, FOR ALL HOUSEHOLDS AND FOR COUPLES WITH ONE CHILD LIVING IN URBAN SICHUAN

		Fraction of Overall Inequality (%)		Fraction of Total Income (%)		Concentration Component	
Year	Income Factor	Couples with One Child	All House-holds	Couples with One Child	All House-holds	Couples with One Child	All House-holds
1986	1	90.7		66.6		0.157	
	2	−24.0		15.5		−0.178	
	3	10.9		8.9		0.141	
	4	3.9		0.9		0.499	
	5	18.5		8.1		0.265	
1987	1	78.1		67.3		0.147	
	2	−9.8		14.5		−0.086	
	3	10.6		8.2		0.164	
	4	3.4		0.8		0.561	
	5	17.7		9.2		0.241	
1988	1	86.6	81.5	61.0	55.7	0.221	0.274
	2	−15.1	−5.5	13.4	10.3	−0.174	−0.100
	3	11.7	8.3	9.0	6.6	0.204	0.235
	4	2.2	7.1	9.0	18.6	0.039	0.072
	5	14.4	8.6	7.6	8.7	0.295	0.186
1989	1	88.2	78.2	60.6	52.0	0.220	0.299
	2	−12.7	−0.1	12.8	10.1	−0.149	−0.001
	3	11.1	9.1	8.8	6.8	0.191	0.265
	4	2.4	5.4	11.0	22.4	0.033	0.048
	5	11.0	7.4	6.8	8.7	0.247	0.169
1990	1	89.3	81.7	61.2	53.9	0.216	0.303
	2	−15.8	−5.3	12.5	8.4	−0.188	−0.125
	3	13.2	9.6	8.8	7.1	0.221	0.273
	4	1.3	6.2	10.4	22.1	0.019	0.056
	5	12.0	7.2	7.1	8.5	0.250	0.183

Note: Fraction of overall inequality $= \dfrac{\text{(Fraction of total income)(Concentration coefficient)}}{\text{Overall inequality}}$.

Example: Other income's fraction of overall inequality in 1986 $= \dfrac{8.1 \times 0.265}{0.115} = 18.5$.

corresponding increase in the income fraction of income from current transfers. This fact is due to a change in the reporting routines between 1987 and 1988, when compensation for increasing food prices changed classification from being included in wage earnings to be included in current transfers. Although the change in the classification of food price subsidies also affects the levels of the concentration coefficients of wage earnings in state-owned units and current transfers Table 4 shows that their joint contribution to overall inequality rose from 0.103 in 1987 to 0.138 in 1988, which is slightly more than the increase in overall inequality. Thus, the change in reporting routines does not distort our main conclusion of a rising disequalizing effect from wage earnings in state-owned units from 1987 to 1988.

TABLE 5

DECOMPOSITION OF THE GINI COEFFICIENT IN DISTRIBUTIONS OF HOUSEHOLD INCOME WITH RESPECT TO (1) WAGE EARNINGS IN STATE-OWNED UNITS, (2) WAGE EARNINGS IN COLLECTIVE-OWNED UNITS, (3) OTHER INCOME FROM WORK UNITS, (4) INCOME FROM CURRENT TRANSFERS AND (5) OTHER INCOME, FOR ALL HOUSEHOLDS AND FOR COUPLES WITH ONE CHILD LIVING IN URBAN LIAONING

		Fraction of Overall Inequality (%)		Fraction of Total Income (%)		Concentration Component	
Year	Income Factor	Couples with One Child	All House-holds	Couples with One Child	All House-holds	Couples with One Child	All House-holds
1986	1	108.7		63.7		0.182	
	2	−25.6		21.4		−0.127	
	3	8.0		7.2		0.119	
	4	1.9		0.7		0.298	
	5	7.0		7.0		0.106	
1987	1	108.1		51.6		0.214	
	2	−35.7		29.3		−0.125	
	3	5.4		8.7		0.064	
	4	−0.2		0.5		−0.038	
	5	22.4		9.9		0.231	
1988	1	94.3	72.4	53.6	52.0	0.219	0.263
	2	−23.8	1.6	22.4	15.2	−0.133	0.016
	3	7.2	5.6	7.5	6.0	0.199	0.176
	4	4.0	6.5	9.5	15.9	0.052	0.077
	5	18.3	13.9	7.0	7.9	0.331	0.332
1989	1	65.8	62.2	52.6	53.3	0.235	0.431
	2	8.6	7.7	21.7	16.6	0.074	0.218
	3	10.1	7.3	8.7	7.2	0.217	0.374
	4	4.5	7.2	10.0	15.1	0.084	0.177
	5	11.0	11.7	7.0	7.8	0.299	0.452
1990	1	100.2	79.7	53.7	53.6	0.228	0.259
	2	−24.2	−1.6	21.8	17.1	−0.136	−0.016
	3	8.1	6.6	8.2	6.9	0.121	0.167
	4	−0.4	2.4	9.7	15.1	−0.005	0.028
	5	16.3	12.9	6.6	7.3	0.303	0.307

Now comparing the results for all households with those for couples with one child we find, as expected, that income from current transfers becomes more important while wage earnings becomes less important as income sources. This difference in the composition of urban income is primarily due to the fact that all households also include households with pensioners. Note that the equalizing effect from wage earnings in collective-owned units is weakened while the disequalizing effect from the remaining variables, except from other income, increases.

The results for urban Liaoning, reported in Table 5, roughly correspond to the changes reported for urban Sichuan. We shall, however, comment upon some noteworthy exceptions. Firstly, the atypical large income inequality among couples with one child in 1989 occurred because the effect of wage earnings in collective-owned units changed from being equalizing in 1988 to be disequalizing in 1989. By 1990, wage earnings from collective-owned units again had an equalizing effect

on overall inequality. Secondly, the income fraction of wage earnings in collective-owned units was about 9 percent points larger in urban Liaoning than in urban Sichuan, while the income fraction of wage earnings in state-owned units was about 8 percent lower. Thirdly, in contrast to urban Sichuan income from current transfers contributed significantly to income inequality in 1989, especially for all households. By 1990, however, this income factor had as in urban Sichuan approximately a neutral impact on income inequality among couples with one child, which broadly speaking means that income from current transfers was evenly distributed across couples with one child living in urban Liaoning and Sichuan, respectively.

For both provinces the decomposition results of Tables 4, 4A, 5 and 5A suggest that wage earnings in collective-owned units along with wage earnings in state-owned units were the predominating income sources of the poor couples with one child while wage earnings in state-owned units was the predominating income source of the rich couples during the 1986–90 period. More or less the same structure applied for the population of all households except that transfer payments held a higher relative importance. This feature is particularly visible among the poor households due to a relatively high share of pensioner households. For further details, see Tables 6 and 7 which provide a decomposition of the deciles of total income with respect to five income sources for all households in 1990.

TABLE 6

MEAN DECILE HOUSEHOLD INCOMES FOR HOUSEHOLDS LIVING IN URBAN SICHUAN DECOMPOSED WITH RESPECT TO (1) WAGE EARNINGS IN STATE-OWNED UNITS, (2) WAGE EARNINGS IN COLLECTIVE-OWNED UNITS, (3) OTHER INCOME FROM WORK UNITS, (4) INCOME FROM CURRENT TRANSFERS AND (5) OTHER INCOME, 1990

Decile Group	Mean Total Income	Corresponding Decile Specific Mean Income Factor				
		1	2	3	4	5
1	2,314	537	439	97	983	259
2	3,498	1,178	743	209	1,008	361
3	4,047	1,422	642	213	1,370	397
4	4,514	2,064	622	297	1,180	351
5	4,935	3,033	371	386	832	313
6	5,335	2,967	382	356	1,320	394
7	5,701	3,384	356	387	1,123	511
8	6,367	4,038	336	493	1,014	486
9	7,231	4,401	276	568	1,433	552
10	9,292	5,698	424	760	1,529	880
All	5,329	2,873	450	371	1,180	450

Now, by using (3.10) and the estimates of Tables 4 and 5 we derive effects on income inequality from marginal changes of one income factor while the remaining income factors are kept fixed. The estimates of these elasticities prove to be equal to the difference between the sources' fractions of overall inequality and total income, respectively. During the 1986–90 period, a small increase in wage earnings in state-owned units would have caused the largest increase in income inequality both among all households and among couples with one child, irrespective of

TABLE 7

DECOMPOSITION OF MEAN HOUSEHOLD DECILE INCOMES FOR HOUSEHOLDS LIVING IN LIAONING DECOMPOSED WITH RESPECT TO (1) WAGE EARNINGS IN STATE-OWNED UNITS, (2) WAGE EARNINGS IN COLLECTIVE-OWNED UNITS, (3) OTHER INCOME FROM WORK UNITS, (4) INCOME FROM CURRENT TRANSFERS AND (5) OTHER INCOME, 1990

Decile Group	Mean Total Income	Corresponding Decile Specific Mean Income Factor				
		1	2	3	4	5
1	3,087	737	700	162	1,306	182
2	3,993	1,707	1,155	298	615	218
3	4,463	1,756	1,418	322	640	326
4	4,900	2,637	899	407	744	213
5	5,266	3,130	828	354	710	244
6	5,573	2,869	1,235	406	693	370
7	5,978	3,188	1,070	428	907	384
8	6,462	4,253	504	428	820	457
9	7,367	4,390	770	451	1,043	712
10	9,780	5,785	1,145	687	1,094	1,070
All	5,687	3,045	973	394	857	418

province. In Sichuan the elasticity of wage earnings in state-owned units was steady about 0.3 between 1988 and 1990. By contrast, the corresponding elasticity for Liaoning varied between 0.1 and 0.5. The main explanation for this variation was the atypical high level of income inequality in 1989. If, however, we had increased wage earnings in collective-owned units in 1990 by 1 percent, then income inequality among couples with one child living in urban Sichuan and Liaoning would be reduced by 0.3 percent and 0.4 percent respectively. The corresponding figures for all households were 0.1 and 0.2. For the interpretation of these results, however, note that possible effects of behavioral responses are disregarded.

6. SUMMARY AND CONCLUSIONS

The 1980s has been a period of economic reforms and growth in China. China's new economic system is characterized by the introduction of market forces combined with market regulations and public ownership. The question is whether or not the success in the Chinese economy has improved the overall level of living in urban regions of the provinces Sichuan and Liaoning and if so whether or not this improvement has been attained at the cost of increased income inequality. This paper discusses this question by means of individual household data from the State Statistical Bureau's Urban Household Survey for urban Sichuan and Liaoning during the 1986–90 period.

As a result of the current birth control policy in China couples with one child are the dominating household group accounting for roughly 35 percent of the households in Sichuan and 50 percent of the households in Liaoning. For that reason this particular household group is emphasized in this study.

Our findings show that the 1986–90 period was one of relatively steady growth in mean real income of couples with one child living in urban Liaoning, while the

corresponding mean real income in urban Sichuan did not change much during this period of time. As a result of this development, the mean real income in urban Sichuan changed from being 12 percent above the mean real income in urban Liaoning in 1986 to a level of 5 percent below the mean real income in urban Liaoning in 1990. This particular pattern is even more visible among poor couples with one child where the mean real income already switched in 1987 from being highest in Sichuan to becoming highest in Liaoning. This specific difference in trend between the two provinces may have a historical origin, since Sichuan more than any other province benefited from the "Third Front" policy pursued in the sixties and seventies. The change in position as from 1988 was primarily due to the result of huge investments in heavy industry in Liaoning during the mid and late eighties, while industry in Sichuan was not given similar favorable treatment. However, the increase in level of well-being among couples with one child in urban Liaoning was achieved at the cost of increased inequality. Although the urban Sichuan couples with one child did not increase their standard of living during the 1986–90 period they still experienced increased inequality. Thus a higher degree of inequality in Sichuan than in Liaoning in 1986 was maintained during this period of time.

The results for all households are roughly in line with those indicated for couples with one child. However, due to heterogeneity in household size and composition the level of inequality was substantially higher for all households than for couples with one child.

In order to identify the sources that made substantial contributions to the level and changes in level of inequality during the 1986–90 period, the annual overall inequality was decomposed with respect to five basic income factors. Our findings for Sichuan show that the major income factor, wage earnings in state-owned units, accounted for 60–68 percent of total income and for 78–91 percent of overall inequality. The predominating contribution from wage earnings in state-owned units on household income inequality is generally a result of the Chinese wage system where wages and bonus payments are greatly influenced by affiliation to state-owned enterprises. Note, however, that wage earnings in collective-owned units accounts for a relatively high share of total income for poor couples with one child and explains why this income source had an equalizing effect on overall inequality. The observed increase in income inequality during the 1986–90 period was to a great extent due to a rising disequalizing effect of wage earnings in state-owned units. Thus, the relaxation of market regulations combined with the introduction of economic incentives seem to have caused increased income inequality even though the overall level of income remained unchanged.

The results for urban Liaoning corresponds roughly to the structure reported for urban Sichuan except that the overall level of income increased considerably during the 1986–90 period. The disequalizing effect of wage earnings in state-owned units, however, were even stronger in Liaoning than in Sichuan. For both provinces the decomposition results reveal that wage earnings in collective-owned units along with wage earnings in state-owned units were the predominating income sources among the poor couples while wage earnings in state-owned units was the predominating income source among the rich couples with one child. More or less the same pattern applies for all households with the exception that

income from current transfers turns out to be a more important income source and even the most important income source for poor households. This specific difference in composition of household income is primarily due to the presence of retired households.

Appendix

Decomposition of the A-Coefficient

Note that Tables 4A and 5A correspond to Tables 4 and 5, respectively.

TABLE 4A

Decomposition of the *A*-Coefficient in Distributions of Household Income with Respect to (1) Wage Earnings in State-Owned Units, (2) Wage Earnings in Collective-Owned Units, (3) Other Income from Work Units, (4) Income from Current Transfers and (5) Other Income, for all Households and for Couples with One Child Living in Urban Sichuan

Year (Level of Inequality)	Income Factor	Fraction of Overall Inequality (%)		Fraction of Total Income (%)		Concentration Component	
		Couples with One Child	All Households	Couples with One Child	All Households	Couples with One Child	All Households
1986	1	89.4		66.6		0.235	
(0.175)	2	−17.9		15.5		−0.202	
	3	10.1		8.9		0.199	
	4	3.5		0.9		0.656	
	5	14.9		8.1		0.326	
1987	1	80.7		67.3		0.234	
(0.195)	2	−9.3		14.5		−0.124	
	3	10.4		8.2		0.247	
	4	2.7		0.8		0.678	
	5	15.5		9.2		0.328	
1988	1	91.0	83.9	61.0	55.7	0.341	0.426
(0.228)	2	−15.1	−2.8	13.4	10.3	−0.257	−0.077
	3	11.1	8.3	9.0	6.6	0.282	0.355
	4	3.2	5.5	9.0	18.6	0.080	0.083
	5	9.8	5.1	7.6	8.7	0.296	0.166
1989	1	93.6	79.6	60.6	52.0	0.353	0.460
(0.228)	2	−15.2	0.8	12.8	10.1	−0.269	0.024
	3	11.3	9.2	8.8	6.8	0.294	0.406
	4	4.1	4.5	11.0	22.4	0.085	0.060
	5	6.2	5.9	6.8	8 7	0.211	0.204
1990	1	92.2	80.9	61.2	53.9	0.342	0.454
(0.227)	2	−18.6	−3.3	12.5	8.4	−0.338	−0.118
	3	12.5	9.4	8.8	7.1	0.321	0.404
	4	3.7	5.9	10.4	22.1	0.081	0.081
	5	10.1	7.0	7 1	8.5	0.324	0.251

TABLE 5A

DECOMPOSITION OF THE *A*-COEFFICIENT IN DISTRIBUTIONS OF HOUSEHOLD INCOME WITH RESPECT TO (1) WAGE EARNINGS IN STATE-OWNED UNITS, (2) WAGE EARNINGS IN COLLECTIVE-OWNED UNITS, (3) OTHER INCOME FROM WORK UNITS, (4) INCOME FROM CURRENT TRANSFERS AND (5) OTHER INCOME, FOR ALL HOUSEHOLDS AND FOR COUPLES WITH ONE CHILD LIVING IN URBAN LIAONING

		Fraction of Overall Inequality (%)		Fraction of Total Income (%)		Concentration Component	
Year	Income Factor	Couples with One Child	All Households	Couples with One Child	All Households	Couples with One Child	All Households
1986	1	99.0		63.7		0.254	
	2	−18.5		21.4		−0.141	
	3	10.3		7.2		0.233	
	4	1.3		0.7		0.314	
	5	7.9		7.0		0.184	
1987	1	115.3		51.6		0.350	
	2	−36.1		29.3		−0.193	
	3	6.7		8.7		0.121	
	4	−4.9		0.5		−1.595	
	5	19.0		9.9		0.301	
1988	1	98.1	75.4	53.6	52.0	0.351	0.410
	2	−25.3	4.5	22.4	15.2	−0.216	0.075
	3	7.2	6.4	7.5	6.0	0.184	0.301
	4	5.1	1.5	9.5	15.9	0.102	0.026
	5	14.9	11.9	7.0	7.9	0.411	0.426
1989	1	62.9	64.7	52.6	53.3	0.392	0.431
	2	12.4	10.2	21.7	16.6	0.187	0.218
	3	9.6	7.6	8.7	7.2	0.360	0.374
	4	5.9	7.5	10.0	15.1	0.192	0.177
	5	9.2	10.0	7.0	7.8	0.432	0.452
1990	1	104.0	83.6	53.7	53.6	0.354	0.402
	2	−23.0	2.9	21.8	17.1	−0.192	0.043
	3	8.7	7.6	8.2	6.9	0.193	0.283
	4	0.4	−4.9	9.7	15.1	0.007	−0.083
	5	9.5	10.8	6.6	7.3	0.264	0.378

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