

Consumption Distribution in Iran: A Statistical Overview

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Abstracts

This paper contains the main results concerning the evaluation of the consumption distribution of Iran in terms of levels, shape, inequality and social welfare for the years 1989 and 1994.

The results show that the shape of consumption distribution in Iran is showed to the right and there is a large gap between the average level of consumption in rural and urban areas. Inequality in Iran is relatively high and there were no significant changes in inequality in the whole country during the Islamic Republic's first five-year plan (1989-1994). This estimates for the whole country masks a decrease in quality of urban area and an increase in rural areas.

Keywords: Income distribution, inequality, social welfare

1- Introduction

We would like to know what the distribution of consumption looks like in Iran and how it has changed. This paper contains the main results concerning the evaluation of the consumption distribution of Iran in terms of levels, shape, inequality and social welfare for the years on which this study is based.

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The rural and urban areas in Iran, as is the case with other developing countries, differ in terms of such factors as cost of living, household size, degree of altruism, and economies of scale. Therefore, it is important to look at them separately in addition to look at the population as whole.

This paper is organised as follows. Section 2 briefly explains the data set. Section 3 illustrates the overall shape and levels of the consumption distribution. Section 4 break down the distribution by some household characteristics. Section 5 is devoted to inequality changes summarised by using five scalar measures of inequality. Section 6 compares the estimates of Lorenz curve and the Gini coefficient in this study with that of previous Statistical Centre of Iran (SCI) results. The paper then comes to a conclusion (section 7).

2- The data

This research data collected from micro-data sets of SCI Household Budget Survey (SCIHBS) for the years 1989 and 1994. The SCIHBS is a nationally and regionally representative household survey carried out by SCI through the sample observations. The ultimate sampling unit is a household. Information for the SCIHBS was collected by personal interview once in every 24 hours period for rural and once in every 48 hours period for urban for food items and month by month for non-food items throughout the year. The sampling methodology can be described as multi-stage random sampling with geographical stratification and clustering. The sample size for our analysis is as follows: the 1989 sample numbered 11,520 households - 52% rural households and 48% urban households, the 1994 sample covered 19, 909 households - 39% rural households and 61% urban households. The distribution used is the personal equivalent normalised needs-adjusted expenditure (PENNE)¹.

In adjusting the data to the 1989 price levels we used a modified version of Iran's consumer price index (CPI) for rural and urban areas separately. The ordinary CPI is far from ideal for our purpose because there is particularly a problem with it in the case of the dual-prices system in those transitional economies implementing adjustment policy. Following this policy in which

1- PENNE is equivalised household expenditure amongst person assuming equal share in the household (see Cowell, 1989).

coupon prices gradually phased out (as has partially occurred in Iran since 1989), using ordinary CPI is not to be recommended because it fails to properly reflect the inflation which poor people experience. I have re-weighted the CPI so as to better reflect the consumption pattern of the poor. The difference in need is considered by defining different poverty line for different household types. For more detail see Mahmoudi (2001).

3- The overall shape and levels of the consumption distribution

Table 1 presents mean consumption by decile groups as well as the mean and median for the whole population. Comparing rural and urban levels of consumption reveals a large disparity between them particularly for upper decile groups. The gap between rural and urban average consumption rose between 1989-1994. The other point is that in spite of a decrease in mean consumption in both urban and rural areas, the overall mean shows an increase. The reason is mainly due to large gap between level of consumption between these two areas and a big change in number of persons in each area. One explanation for the latter factor is immigration from rural to urban areas during this period.

In rural areas, all decile groups except the top one had a decrease in mean consumption. In urban areas, the mean consumption of all decile groups (except the first and second) fell from 1989 to 1994.

Table 2 shows that in 1994 the poorest decile group of households in urban and rural areas spent 2.6% and 2.5% of the total household expenditure respectively, while the top decile group spent about 30.5% and 29.5% of the total expenditure. There is some evidence to indicate a more unequal distribution of expenditure in rural areas whereas there seems to be a tendency for the expenditure distribution in urban areas becomes slightly less unequal between these years.

Comparing the shares of groups one to seven, the shares for rural areas show a decrease, while the share of the 3 upper groups indicates an increase. In urban areas the share of four lowest decile groups rose but the share of groups five to nine fell and decile group ten's share did not change. The distribution of

Table 1: Iran 1989, 1994: Mean PENNE by Decile Group and Areas

Group	Decile	rural		urban		Iran	
		1989	1994	1989	1994	1989	1994
1		176	149	231	262	197	188
2		273	234	390	401	317	303
3		340	297	513	500	403	391
4		399	360	643	599	494	478
5		467	427	767	709	600	573
6		546	504	918	835	716	682
7		640	603	1097	994	863	821
8		762	730	1362	1220	1073	1017
9		962	951	1774	1600	1438	1345
10		1748	1782	3371	3116	2791	2661
mean		631	604	1106	1024	841	846
median		501	461	841	770	619	625
% of household in the sample		52	39	48	61	100	100
# of persons		34991	44141	27702	60220	62693	104361

Note: all values are in 1989 Rials (1000s of Rials).

Source: author's calculations from SCIHBS, 1989,1994

Table 2: Iran 1989, 1994: Decile Group PENNE Shares

Group	Decile	rural		urban		Iran	
		1989	1994	1989	1994	1989	1994
1		2.8	2.4	2.1	2.6	2.3	2.2
2		4.3	3.8	3.5	3.9	3.7	3.6
3		5.4	4.9	4.6	4.9	4.6	4.6
4		6.3	5.9	5.8	5.8	5.6	5.7
5		7.4	7.1	6.9	6.9	6.8	6.8
6		8.7	8.4	8.3	8.2	8.1	8.1
7		10.2	9.9	9.9	9.7	9.7	9.7
8		12.1	12.1	12.3	11.9	11.9	12.0
9		15.3	15.8	16.1	15.6	16.1	15.9
10		27.7	29.5	30.5	30.5	31.3	31.5
% of household in the sample		52	39	48	61	100	100
# of persons		34991	44141	27702	60220	62693	104361

Source: author's calculations from SCIHBS, 1989,1994

expenditure in Iran is highly concentrated. The richest twenty percent of population in both rural and urban areas spend around 50% of the total expenditure.

We now consider changes in the concentration of people in different income ranges using density functions. The probability density function for consumption (estimated using the Kernel method¹) shows that the distribution is highly concentrated at low values (Figure 1). By investigating of probability density functions for rural and urban areas separately, some differences emerge. It seems that the poorest people in urban gained whereas in rural areas lost a part of their income, i.e. there is a shift in concentration towards lower PENNE ranges. Note that the distribution of expenditure for country as whole did not change significantly.

The differences between the mean and the median indicate a skewness of the distribution to the right. The poverty line, which is fixed between the two years, is around 50% and 60% of mean PENNE in urban and rural areas respectively and was located below the median. Both the mean and median show a slight decrease between the two years. About 50% of the population had PENNE in the range of 400-1000 rials.

1- A Kernel density estimate is formed by summing the weighted values calculated with the Kernel function K as in $\hat{f}_K = \frac{1}{nw} \sum_{i=1}^n \left[\frac{x - X_i}{w} \right]$, where w is the bandwidth. For example, the value of w that minimizes the mean integrated square error (MISE) is

given by $w = \left[\frac{\int K(t)^2 dt}{\sqrt{2\pi n} \int f''(x) dx} \right]^{\frac{1}{5}}$. The role of 'bandwidth' for Kernel density

estimators is similar to the inverse of the number of bins in a histogram: smaller width means more detail (Cowell, Ferreira and Litchfield, 1996). I assumed the window-width is roughly 100 Rials. I also reproduced the graphs with different width. No significant differences were discovered.

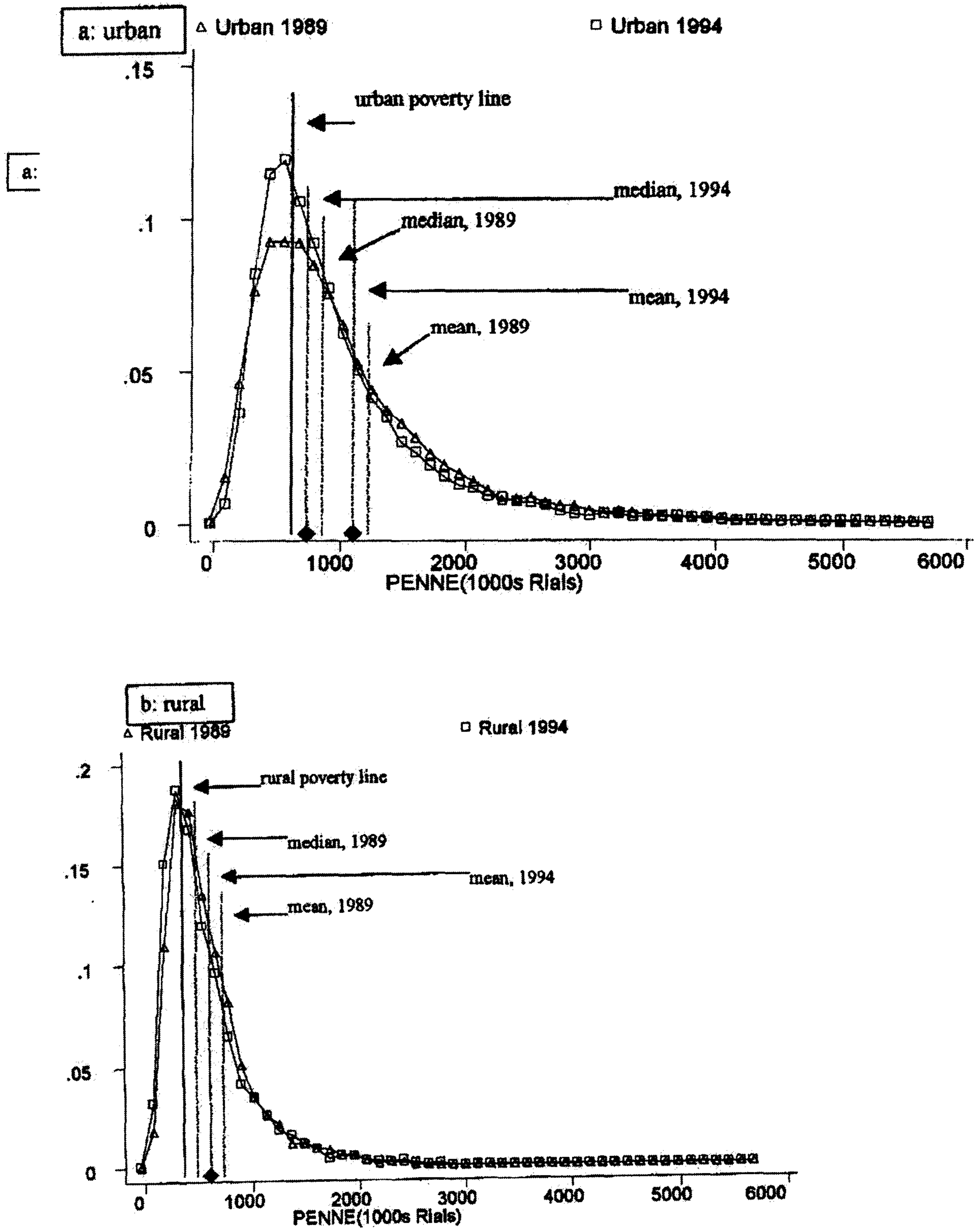


Figure 1: Iran 1989, 1994: the Probability Density Function for PENNE

Kernel density estimates, bandwidth 100 Rials. Richest 1% of population excluded

4- The distribution of PENNE amongst selected subgroups

It is important to investigate the change in distribution by breaking down the distribution by some crucial household characteristics such as employment position of the head of household and household size. From breakdown by employment position (Table 3), two noteworthy points emerge. First, both households with employed and unemployed head change their consumption in the same direction, i.e. the average PENNE share decreased for both. Second, PENNE share of the poorest quintile group of the population fell for the both categories. Table 4 reports the consumption shares of different fifths of the distribution broken down by the employment position of the head of household. The table shows an improvement in consumption share for persons in those households whose heads were private sector employees between 1989 and 1994. This is also true for public sector employees (rather than fifth quintile group). The increase in the consumption of the latter households is due to the fact that most public sector employees have been taking second or third job.¹ Therefore, these households have spent most of their effective time for working and much less left for leisure, which has adversely affected their well-being. This fact is hardly reflected in consumption figures. Those persons in households whose heads were self-employed² experienced a decline in their consumption in 1989-1994 (except the richest fifth). The reason for this decline may be because this group of households mainly used to receive subsidy for their means of production. Following the structural adjustment policy (1989-1994) they lost part of their production subsidies in addition to consumer subsidies, which affected their production of goods and in turn reduced their income.

Table 5 illustrates the PENNE share of different quintile group by household size. A notable point here is that those households with size 5-9 (57% of the population) located in the first quintile group experienced a decline in their consumption.

1- There is no statistical evidence but this has been a characteristic feature of the Iranian society after implementation of the adjustment policy in 1989. For example see The Economist (1997).

2- Those who categorized under this heading are people do not have employee or employer. They are mainly dependent on government benefits and subsidies.

Table 3: Quintile Group PENNE Shares, by Head of Household's Employment Status, 1989, 1994^a

Quintile group	1989		1994	
	Employed	unemployed	Employed	unemployed
1	6.1	4.8	5.9	4.7
2	10.3	9.1	10.3	9.5
3	14.9	14.5	14.8	14.7
4	21.6	21.9	21.7	22.2
5	47.1	49.6	47.1	48.9
% of household in the sample	84.0	16.0	82.7	17.3
# of persons	56047	6646	91208	13162

a. Unemployed also includes earning without job, student, housekeeper, and other.

Source: author's calculations from SCIHBS, 1989, 1994

Table 4: Quintile Group PENNE Shares, by Head of Household's Employment Position, 1989, 1994^a

Quintile Group	employer		self- employed		government		private	
	1989	1994	1989	1994	1989	1994	1989	994
1	5.0	5.2	6.7	6.0	6.7	7.1	6.1	6.4
2	9.3	8.9	11.0	10.6	11.4	11.4	10.1	10.8
3	13.4	13.5	15.3	15.0	15.7	15.8	14.6	15.2
4	21.1	20.9	21.8	21.7	22.2	22.2	21.4	21.7
5	51.2	51.5	45.2	46.6	43.9	43.5	47.8	45.9
% of household in the sample	4.9	10.1	55.3	41.6	20.2	23.6	19.5	24.7
# of persons	2909	9281	32949	40308	10719	20894	10806	22802

a: Note: this results only refers to persons with a job ("employed")

Source: author's calculations from SCIHBS, 1989,1994.

Table 5: Quintile Group PENNE Shares, by Household Size, 1989, 1994

Quintile group	Household size									
	1		2		3-5		5-9		9+	
	1989	994	1989	1994	1989	1994	1989	994	1989	1994
1	2.1	2.3	3.9	3.9	5.3	5.6	6.6	6.5	6.9	6.9
2	4.9	6.1	8.0	8.4	9.7	10.3	10.9	11.2	11.2	11.6
3	9.3	10.9	12.7	13.8	14.7	15.0	15.6	15.6	15.9	16.2
4	18.1	20.7	22.1	22.4	22.1	21.9	22.0	22.1	21.6	22.6
5	65.7	59.9	53.2	51.4	48.2	47.2	44.8	44.6	44.4	42.6
% of household in the sample	4.9	4.2	8.7	9.3	39.8	43.9	40.2	37.6	6.4	5.0
# of persons	573	826	1996	3714	18912	35783	33112	53000	8100	11047

Source: author's calculations from SCIHBS, 1989,1994

Food expenditure made up 51.8% of the total expenditure of an average household in rural areas and the share of non-food expenditure was 48.2% in 1989. The shares for urban households were 44.9% and 56.1%, respectively. The ratios corresponding to 1994 for rural area were 49.3% and 50.7% respectively and for urban area were 32.7% and 67.3% respectively. In other words, the share of food items in the household budget decreased in both rural and urban areas.

5- Inequality in Iran, 1989, 1994

This section aims to investigate the changes that occurred in consumption inequality, looking at the countrywide distribution as well as the urban and rural distributions. Inequality measures differ according to their sensitivity to income differences in different parts of the distribution. Lorenz dominance unambiguously ranks distributions according to all inequality concepts respecting the 'principle of transfers'. Lorenz dominance of distribution x by distribution y exists if the Lorenz curve of distribution x lies nowhere below (and at least somewhere above) the distribution y . Atkinson (1970) demonstrated that if Lorenz Dominance holds, inequality in x is lower than in y according to any

inequality measure that satisfies the “Principle of Transfers” axiom (plus some other axioms).

Figure 2 shows that, for the country as a whole, there was no significant Lorenz dominance of PENNE in the years of 1989 and 1994. However in urban areas the PENNE distribution for 1994 Lorenz dominates 1989 whereas in rural areas the reverse is true. The fact that the Lorenz curve for urban areas in 1994 lies somewhere above the corresponding Lorenz curve for 1989, indicates that there has been a slight improvement in the PENNE distribution in urban areas. However the differences may not be statistically significant (for standard error statistic for Lorenz curve see Beach and Davidson 1983, and for standard error statistic for inequality indices see Cowell, 1989 and Mills and Zandvakili, 1997). The fact that the Lorenz curve for rural areas in 1994 lies considerably below the corresponding Lorenz curve for 1989 reinforces the view that the consumption distribution became more unequal in rural areas.

Since the Lorenz curves are unaffected by the mean of the distribution, they can only be used to rank distributions in terms of inequality but not social welfare. This deficiency can be fixed by looking at Shorrocks’ (1983) concept of “generalised” Lorenz curves. The Generalised Lorenz curve is the Lorenz curve scaled up by mean of the distribution ($GL(p) = \mu L(p)$). Generalised Lorenz dominance indicates that social welfare is higher in the dominant distribution. The generalised Lorenz curves corresponding to the years of 1989 and 1994 are illustrated in Figures 3. In urban areas the curves cross each other. However, in the whole country and rural areas Generalised Lorenz curve of 1989 lies over the 1994. In the case of urban areas no clear judgment can be made but in rural areas and the country as whole social welfare unambiguously decreased.

I now turn to estimate the degree of inequality using standard inequality indices. I have used five different inequality indices in order to describe changes from a variety of different perspectives. The inequality indices are members of the class known as the ‘single parameter Generalised Entropy class’ $GE(\alpha)$ for $\alpha = -1, 0, 1, 2, \dots$, plus the Gini coefficient. They differ in their sensitivities to differences in PENNE in various parts of the distribution. The more positive α

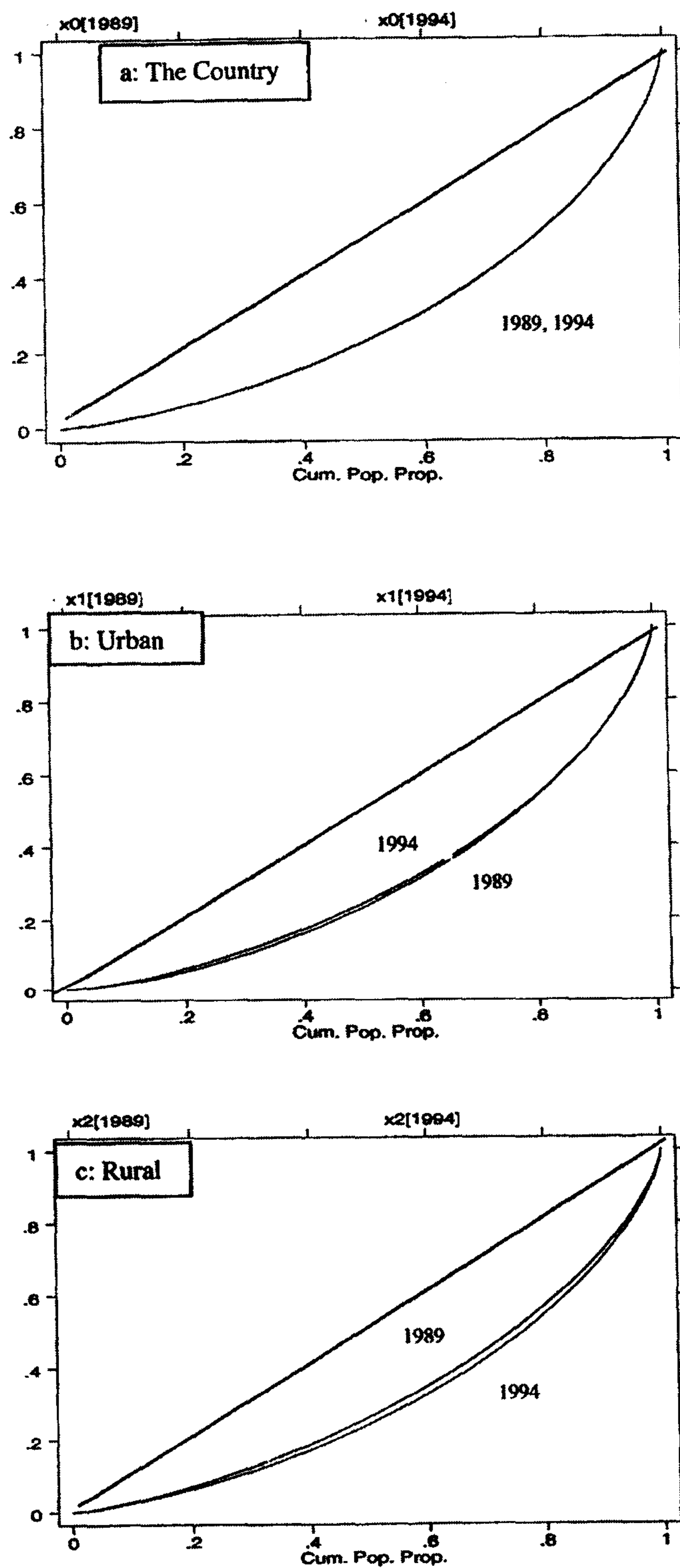


Figure 2: Comparisons of the Lorenz Curve, 1989 and 1994

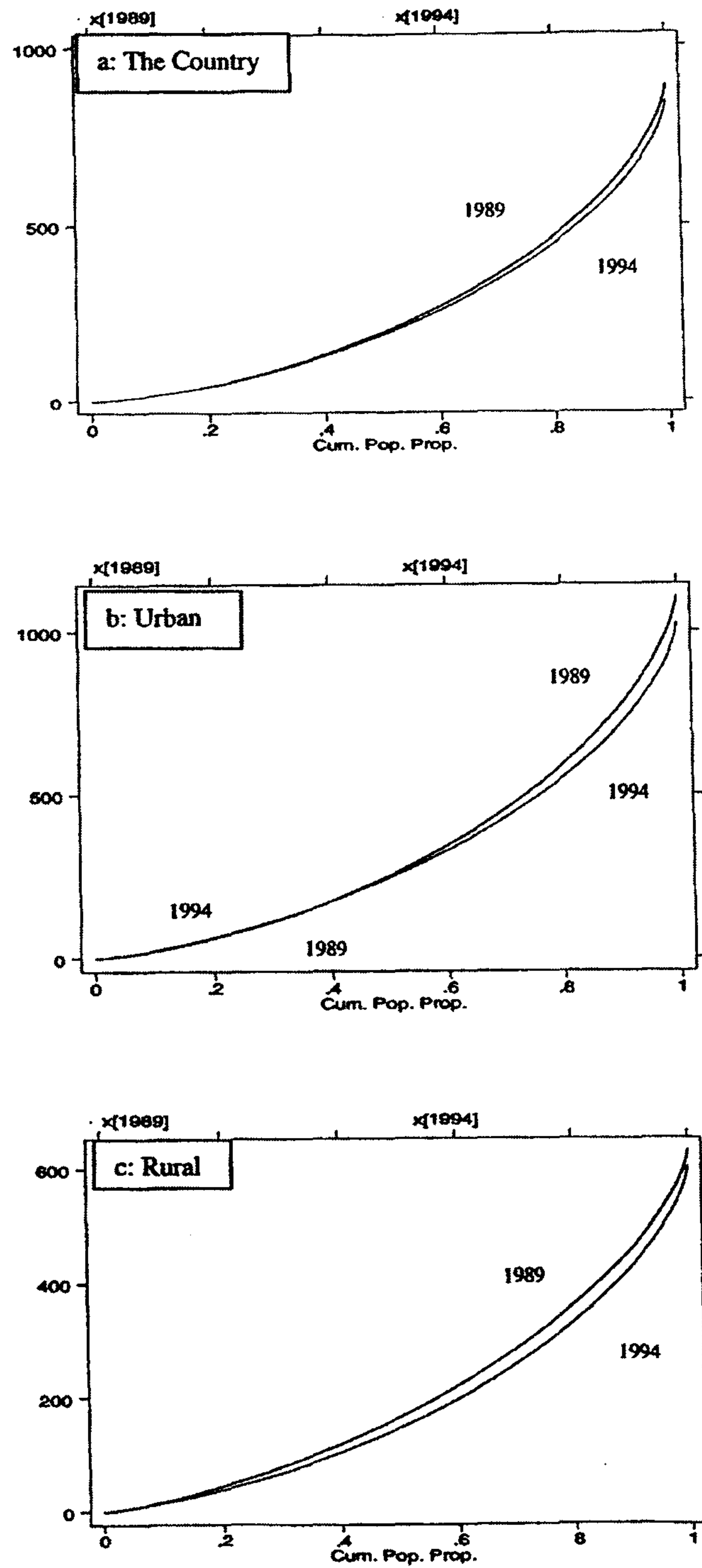


Figure 3: Iran, 1989, 1994: Generalised Lorenz Curves

is, the more sensitive $GE(\alpha)$ is to income differences at the top of the distribution; conversely, the more negative α is, the more sensitive it is to differences at the bottom of the distribution. $GE(0)$ is the mean logarithmic deviation, $GE(1)$ is the Theil index, and $GE(2)$ is half the square of the coefficient of variation. The Gini coefficient is most sensitive to income differences in the middle (mode) of the distribution (see Cowell 1995 and Jenkins, 1995).

Before turning to the estimates of this standard inequality indices, I present the percentile ratios for the distribution in Table 6. All percentile ratios indicate that there were not significant differences in the consumption distribution in 1994 as compared with 1989. In urban area all percentile ratios indicated inequality fell while in rural areas the percentile ratios suggest an opposite effect.

Table 6: Percentile Ratios for PENNE, 1989, 1994

	p90/p10	p90/p50	p10/p50	p75/p25	p75/p50	p25/p50
<u>1989</u>						
national	6.23	2.61	0.42	2.59	1.62	0.63
urban	6.47	2.50	0.39	2.67	1.61	0.61
rural	4.88	2.26	0.46	2.24	1.52	0.68
<u>1994</u>						
national	6.26	2.57	0.41	2.58	1.62	0.63
urban	5.54	2.49	0.45	2.43	1.58	0.65
rural	5.69	2.44	0.43	2.45	1.58	0.65

Source: author's calculations from SCIHBS, 1989, 1994

First I would like to look at the personal equivalent normalised needs-adjusted expenditure (PENNE) and following this, the equivalised household expenditure. Table 7 provides the estimates of five measures of inequality mentioned above for the PENNE in each of the two years on which the study is based (separate figures are given for countrywide, urban and rural areas).

The five measures of inequality suggest that the inequality of consumption in the country as a whole remained unchanged between 1989 and 1994. However, the results indicate a decrease in inequality in urban and an increase in rural areas. Note that the degree of inequality in urban and rural areas converged in 1994. Due to the considerable disparity between the average household expenditure in urban and rural areas, the expenditure distribution for the country

as a whole was more unequal than in either the urban or the rural areas. For instance the Gini coefficient of the whole country was 0.410 in 1994 while these values for rural and urban were 0.391 and 0.385 respectively.

To compare the inequality estimates for Iran with other countries, Table 8 illustrates a cross-national comparison of inequality, using the Gini coefficient. In this respect, the figures for Iran happen to be compatible with the figures for the Middle East. However inequality in Iran is higher than that of 'High income countries', 'Eastern Europe' and some other developing countries in South and East Asia and Pacific and has lower inequality compared with the Sub-Saharan Africa and Latin America and Caribbean countries.

Table 7: Inequality of PENNE

	1989			1994		
	Iran	urban	rural	Iran	urban	rural
Gini	0.409	0.404	0.355	0.410	0.391	0.385
GE(-1)	0.360	0.383	0.258	0.394	0.308	0.358
GE(0)	0.283	0.284	0.212	0.287	0.256	0.253
GE(1)	0.306	0.293	0.230	0.310	0.283	0.270
GE(2)	0.485	0.440	0.349	0.511	0.464	0.416

Source: author's calculations from SCIHBS, 1989,1994.

Table 8: An International Comparison of Inequality (Averaged Gini Coefficient)

Region	1980s	1990s
High Income Countries	0.332	0.338
Eastern Europe	0.250	0.289
South Asia	0.350	0.319
East Asia and Pacific	0.387	0.381
Middle East and North Africa	0.405	0.380
Sub-Saharan Africa	0.435	0.450
Latin America and Caribbean	0.498	0.493
Iran	0.409	0.410

Source: World Bank (1997) cited by Deininger and Squire (1996), and author's calculation for Iran.

Let us now repeat the analysis using instead the equivalised household expenditure distribution, to get consistent estimates with previous studies in Iran. As they considered household as unit of analysis, Table 9 parallel to Table 7 lists five inequality measures, for these distributions. One difference is that all inequality measures are higher for this distribution than for the distribution of individuals, i.e. inequality among households is higher than among persons.

The other point is that both rural and urban results confirm the direction of inequality changes in these two areas reported in Table 7. However, the overall inequality shows a decrease in contrast to Table 7. The only exception is GE(-1), which is more sensitive to the bottom of the distribution, has shown an increase.

Table 9: Inequality of Equivalised Household Expenditure Among Households

	1989			1994		
	Iran	urban	rural	Iran	urban	rural
Gini	0.431	0.416	0.373	0.427	0.402	0.398
GE(-1)	0.454	0.431	0.328	0.537	0.344	0.539
GE(0)	0.323	0.304	0.241	0.318	0.274	0.278
GE(1)	0.341	0.314	0.251	0.336	0.299	0.288
GE(2)	0.571	0.502	0.375	0.551	0.485	0.445

Source: author's calculations from SCIHBS, 1989,1994.

6- Comparing the Inequality Estimates with Previous SCI Estimates

The question arises whether the inequality estimates presented in Table 8 and 9 are consistent with earlier estimates produced by SCI. The SCI estimated Gini coefficients but no other inequality indices. Also, the unit of analysis used is household rather than individual. Therefore I can only compare the results of the Gini coefficient when the unit of analysis is household (Table 9).

Figure 4 gives an overview of long-run inequality changes, showing a time series of Gini coefficient in Iran from 1969 to 1994.¹ The Figure suggests that in

1- Note that all these Gini coefficient values have been estimated based on unscaled household expenditure, i.e. household expenditure considered as unit of analysis irrespective of the differences in size and composition of the households. However this can be misleading (see Mahmoudi, 2001).

spite of a big fluctuation, the figure of inequality for the country as a whole in 1995 is similar to the one in 1965. However in rural areas inequality increased while in urban areas it decreased.

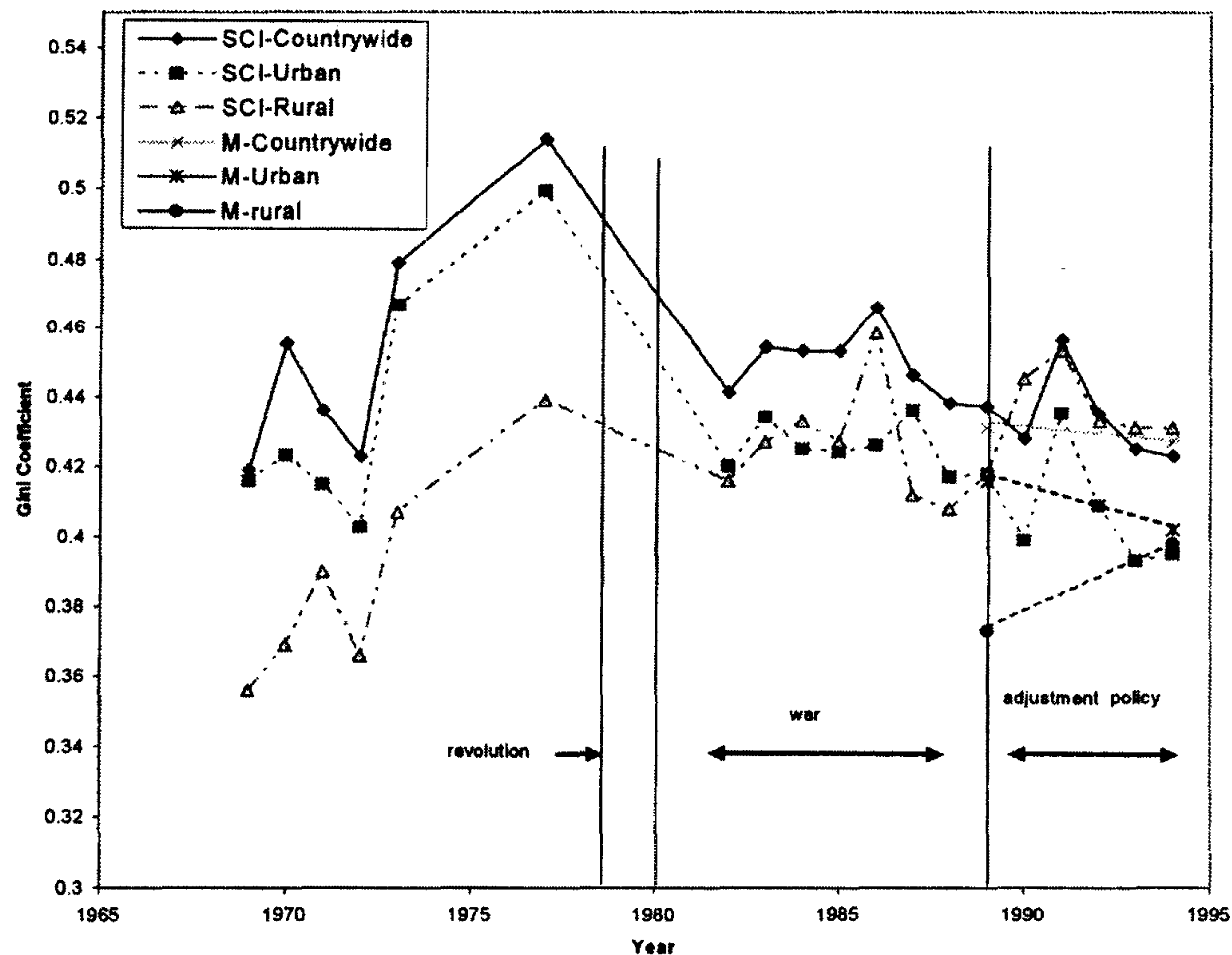


Figure 4: The Gini Coefficient for Household Expenditure in Iran (1969-1994)

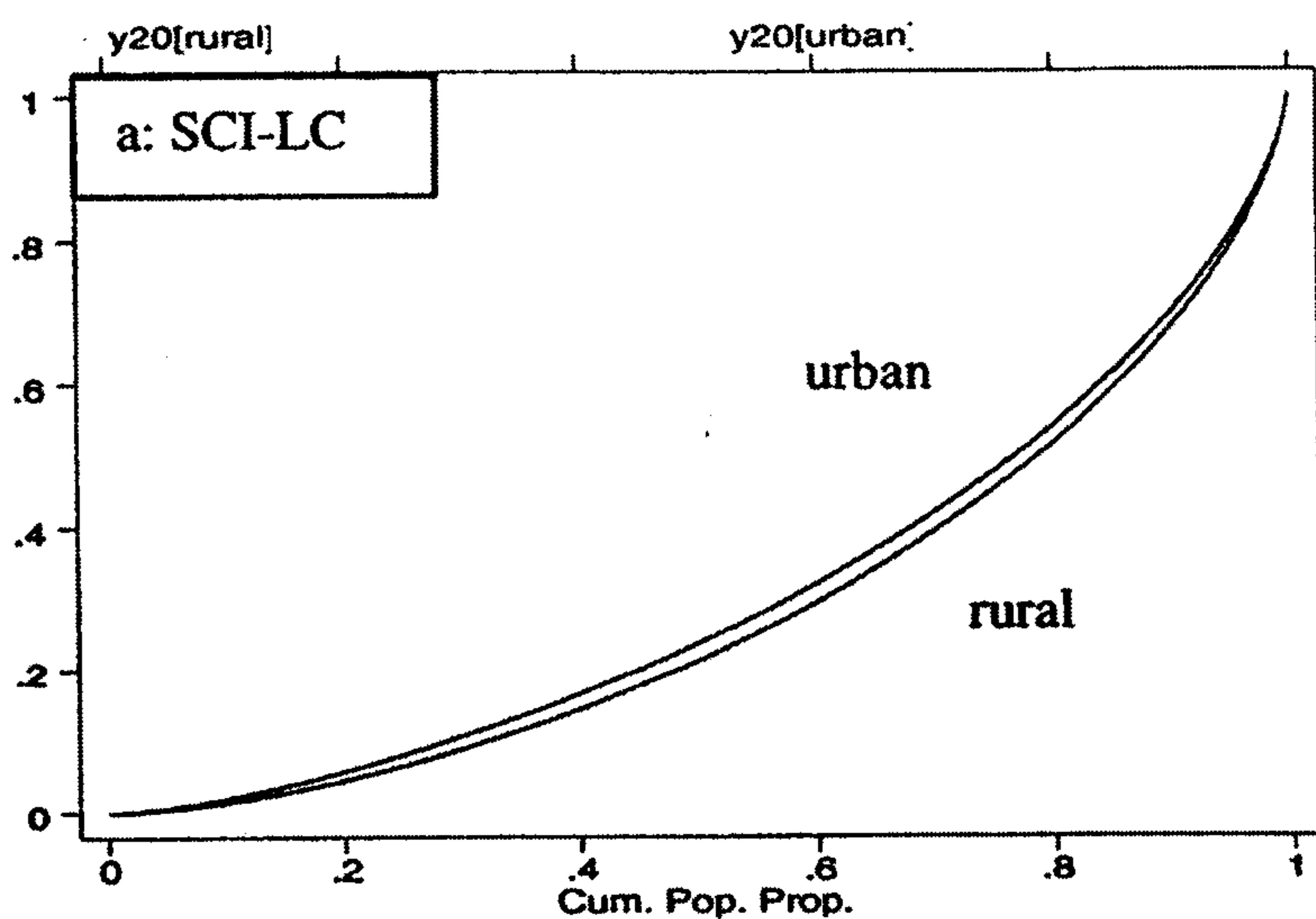
Note: Curves with the initial M definition in this figure and Figure 5 are my own calculations.

Source: Statistical centre of Iran (SCI), 1969-1994, and author's calculations from SCIHBS, 1989,1994

Regarding the direction of inequality between 1989 and 1994 my estimates are compatible with SCI estimations. However there are two differences: First, quantitatively my results are not consistent with the SCI results. SCI's estimates for rural areas are an overestimate for both 1989 and 1994 compared to my results. The figures corresponding to urban areas as well as the whole country are an underestimation for 1994. Secondly, according to SCI's estimates the Gini coefficient for the years 1989-1994 showed that inequality in rural areas is higher than that of urban areas, but according to my results it is reversed (Table 9 and also see Figure 4 for a comparison of the results during the adjustment

policy period).¹ This is also confirmed by Figure 5. In other words, according to SCI the Lorenz curve of urban areas dominates the rural one in 1994 (panel a) while my estimation shows a reversed result (panel b).

Further, Figure 4 indicates that egalitarian policies adopted after the revolution were not very successful due to the various socio-political reasons such as restructuring immediately after the revolution, war imposed by Iraq (1980-1988), economic sanction (1980-), and structural adjustment policy (1989-).



Note: author's re-estimates based on SCI's definition from SCIHBS, 1989,1994

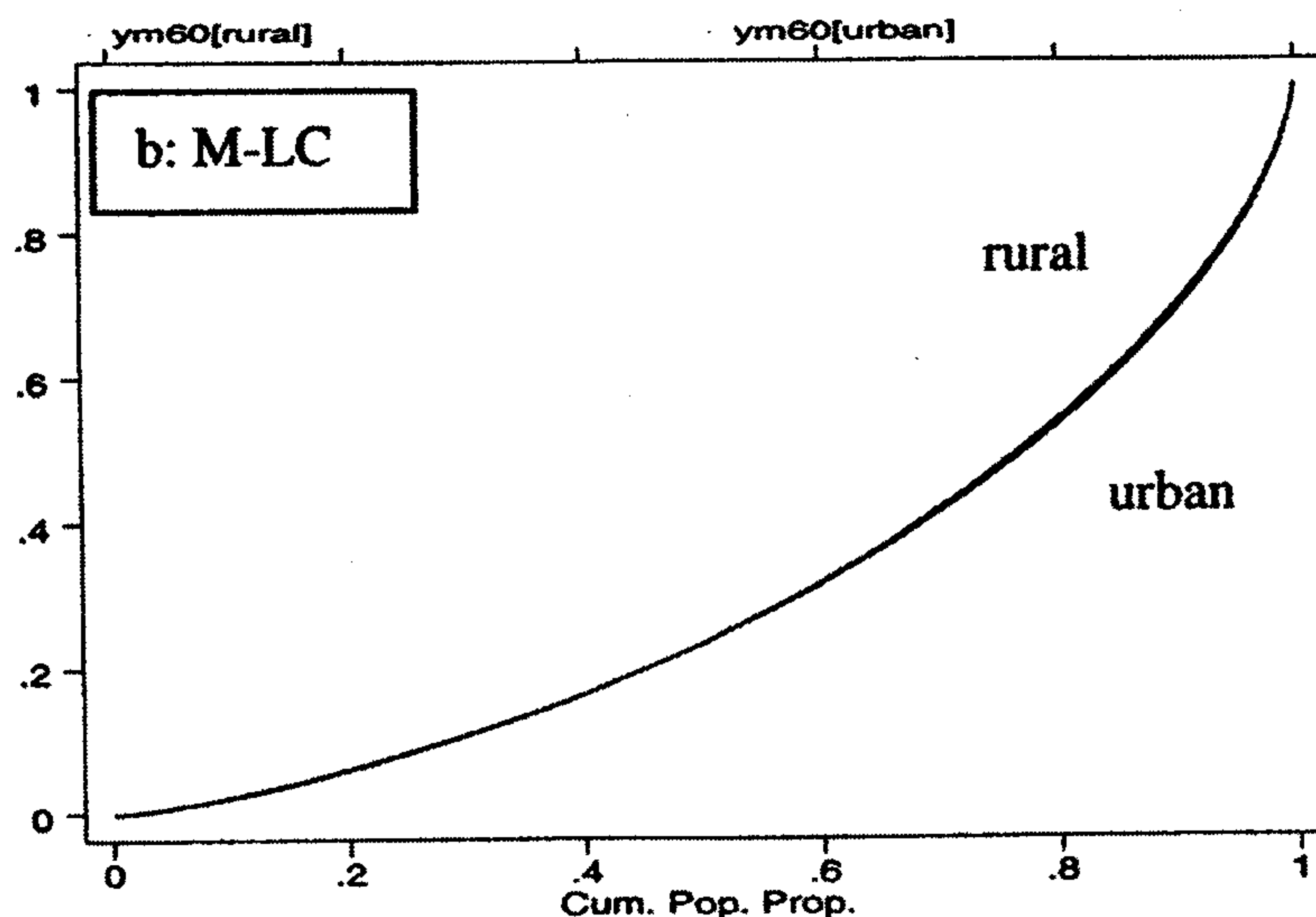


Figure 5: Comparisons of Urban and Rural Lorenz Curve in 1994

1- I re-estimated the Gini coefficient using the SCI's unit of analysis (unscaled household expenditure). The same results were obtained. This indicates that the differences between my estimates and the SCI's one on Gini coefficient and Lorenz curve estimates are due to using different units of analysis rather than any likely mistake in the process of estimation.

7- Conclusion

The shape of the PENNE distribution in Iran is quite skewed to the right and there is a large gap between the average level of consumption in rural and urban areas. Inequality in Iran is relatively high and there were no significant changes in inequality in the whole country during the Islamic Republic's first five-year plan (1989-1994). This estimate for the whole country masks a decrease in inequality of urban area and an increase in rural areas.

It seems that the egalitarian policies introduced after the revolution and their continuation during the adjustment policy period, which began in 1989, have had no effect on such high-level inequality in the whole country. The results of the paper have also shown a negative effect on inequality and social welfare in rural areas.

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