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Abstract

This paper explores the changes in inequality in Croatia during the period 1973-1998. The results based on the data from the Household Budget Surveys for 1973, 1978, 1983, 1988 and 1998 indicate that overall income inequality decreased in the 1973-1983 period, and increased afterwards. Gini coefficient rose from 0.286 in 1988 to 0.297 in 1998. This result challenges the general perception that inequality increased strongly during the transition period. Decomposition of Gini changes shows that the expansion of social transfers as well as absence of stronger rise in wage concentration account for only a mild increase in inequality.

INEQUALITY IN CROATIA IN THE PERIOD FROM 1973 TO 1998[*]

1. Introduction

Studies of inequality in income distribution among households and individuals are relatively rare in the Croatian economic literature. During the period of socialism, this was because the issue was rather unpleasant to the political and economic establishment. Much more attention was focused on distribution of income among industrial branches and groupings. The analysis of welfare distribution across population was limited to individual academic contributions without any continuing research. In early 1990s there was a growing interest in the analysis of the distribution effects of modern economic developments, particularly the transition process (Atkinson, 1997; Kanbur and Lustig, 2000). Unfortunately, there has been practically no research into these problems in Croatia. Until recently, when the World Bank published the results of its study (World Bank, 2000a; 2000b; 2001) no assessment of inequality in Croatia has been made, either in the transition period or the period before that, although a certain statistical basis for such assessments has been provided.

In former Yugoslavia household budget surveys were conducted every five years, and the results could be used for the analyses of inequality at the level of the individual republics (constitutional units of former Yugoslav federation), and thus also Croatia. The surveys were conducted since 1963, and the last one was carried out in 1998. To our knowledge, no inequality estimates for Croatia have been produced on the basis of these data, except for some preliminary studies conducted at the Faculty of Economics in Zagreb in early 1990s. In the period from 1988 to 1998 there were no reliable data for an assessment of individual income distribution in Croatia.

The household budget survey for 1998 provided the basis for an extensive study of poverty and inequality in Croatia conducted by the World Bank (World Bank, 2000b; 2001). The results indicated that inequality was much greater in Croatia "than that observed in successful transition and established market economies" (World Bank, 2001; 15). The study provides no information on the level of inequality during the pre-transition period. However, the World Bank (2000a; 140) and some more recent papers from the same source report that Gini coefficient was 0.36 in the period 1987-1990, and 0.35 in 1998. Unfortunately, the source of data for the former estimate is not fully known. As concerns the inequality estimate for 1998, Nestić (2002) objects to the definition of income from self-employment, arguing that it results in overestimation of inequality.

This paper aims to provide a more comprehensive picture of inequality in Croatia. The author presents the inequality estimates for Croatia over a longer period of time (1973-1998). Comparability of estimates made over the observed period was achieved by following the same estimation procedure, regardless of little bit different source of data, the five-year household budget surveys from the socialist period or the 1998 survey. The results indicate that inequality declined in the 1973-1983 period, and rose afterwards. It is surprising that inequality increased only moderately in 1998 compared with ten years ago, which challenges the general perception that inequality increased rapidly during the transition period. This can be accounted for by the characteristics of economic developments and the social policy carried out during the period. It is suggested that the income structure and concentration of certain types of income exerted only a mild pressure on the rise of inequality.

The results are presented in the following way: First, a list of data sources is given and then the inequality estimates are made and commented upon. Follows a decomposition of Gini changes into contributions from various types of income. Finally, an evaluation of results is made and suggestions are put forward concerning potential areas of further research.

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2. Data Sources

In former Yugoslavia annual and five-year household budget surveys were conducted, where the five-year survey was based on a larger sample and was much more reliable than the annual survey. The survey was representative at the level of individual republics and was therefore a reliable source of information for the analysis of inequality in Croatia. This paper is based on the officially published data from the five-year surveys for 1973, 1978, 1983 and 1988[1]. Considered is the household income distribution *per capita*, which is usually considered more appropriate for an inequality analysis than the income distribution per *household.* As there are no available data on income distribution per capita from the surveys before 1973, that period is not analysed in this paper. The survey data were available in the form of grouped data. Households are classified into ten (1983 and 1988) or eleven (1973 and 1978) income groups according to the money resources and income in kind. Apart from the income brackets and the frequency, the average income in each group is known. The consumption distribution has not been analysed in particular because it is shown only in aggregate form and groups are formed according to the income level rather than according to consumption level. Such distribution is therefore not appropriate for an inequality analysis.

Parallel with the surveys from the socialist period, data from the household budget survey (HBS) for 1998 is analysed. Although these surveys are identical, at least as concerns their title and purpose, the 1998 survey went through significant changes compared with the previous ones. However, they have enough elements in common to provide for relatively reliable and comparable inequality estimates. Unlike in previous surveys, here we had access to raw data from the sample[2]. This provided the possibility to harmonise the data and income definitions from the HBS for 1998 with the definitions used in the previous surveys. The inequality analysis is based on income aggregate called "disposable income".

Disposable income comprises from wages, income from own business, income form other self-employment and private farming, pensions and other social transfers, income from property, winnings from games of chance and gifts, as well as consumption in kind. Disposable income also includes borrowings from other persons, reduction in savings and receipts from the property sale, although, according to the standard income definitions (e.g. *UN System of National Accounts 1993),* these categories are not considered as income, but are classified as sources of consumption financing. However, as these items were included in income in the old surveys, we will also, for comparison purposes, treat them as part of income[3]. The disposable income does not include imputed housing rent or the net value of credit.

We grouped the raw data for 1998 in the similar way as in old surveys. A selection of 10 income groups was made. Income groups, i.e. the lower and upper brackets were formed arbitrarily, taking care that the open income groups (the first and the last ones) were not too large. The width

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[1] The data were taken from *Anketa o prihodima, rashodima i potrošnji domaćinstava* u 1973 (Survey on receipts, expenditure and consumption of households in 1973), published in Statistički bilten SZS, No. 921, and the corresponding data for 1978, published in the *Statistički bilten SZS*, No. 1313. For 1983, the data were used from the *Anketa o potrošnji domaćinstava* u 1983 (Survey on consumption of households in 1983) published in *Statistički bilten SZS*, No. 1551, and the data for 1988, published in *Statistički bilten SZS*, No. 1851. The data in all bulletins are titled "Available and spent resources - averages per household member".

[2] The author expresses his gratitude to the Central Bureau of Statistics of the Republic of Croatia for allowing him access to raw data.

[3] In principle, these income items could also be excluded from the "disposable income" in old surveys. However, this would disrupt the distribution of households according to income groups and result in an error in inequality estimate. If the share of these items in the income is negligible, the error in inequality estimate is rather low, but if that share is larger, like in Croatia, the expected error is more serious. Therefore, instead of adjusting the income in the period 1973-1988, we decided to adjust the income from the HBS for 1998, by following the old definition of income. A different approach applies Milanović (1998) in his research and adjusts the disposable income aggregates for Bulgaria and Slovenia.

of income class is gradually increasing. The outcome of grouping the data for 1998 is shown in Chart 1 as a frequency distribution.

Chart 1. Frequency Distribution of Income per Capita, 1998
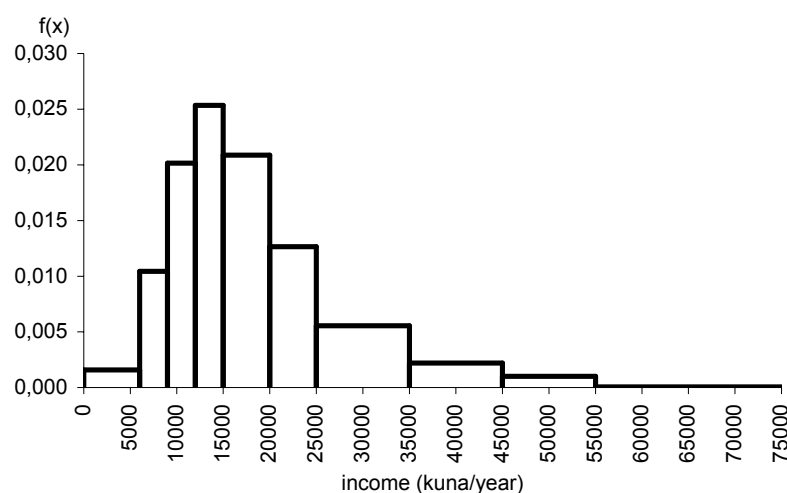
Source: The author's calculations based on the HBS for 1998

By grouping the data for 1998 and applying the same definition of income for the whole period 1973-1998, we provide a statistical base for inequality analysis. Table 1 shows basic statistical description of the data.

It is shown that the surveys covered approximately 3100 households in 1973 and 1998, and about 2800 households in other years. In the observed period the average number of household members decreased continuously from 3.24 in 1973 to 2.93 in 1998. Since inequality estimates are sensitive to the distribution at lower and at upper tails, for grouped data it is desirable that the first and the top interval are of as low frequency as possible (Aghevli and Mehran, 1981). It seems that this fact was not adequately taken into account while establishing groups in the1980s. At that time, group limits were fixed according to the average wage, but this method proved rather unsuccessful in the period of high inflation. Table 1 shows, for example, that the top income group included 10% of the population in 1983, and 11.5% in 1988, which is considered as very high. On the other hand, the first income group had substantially lower frequencies in both years, around 0.4%.

Table 1. Descriptive Statistics for the Data from Household Budget Surveys, 1973-1998

Indicator	1973	1978	1983	1988	1998
Number of surveyed households	3 186	2 785	2 800	2 800	3 123
Estimated total number of households	1 360 197	1 184 590	1 400 676	1 355 008	-
Average number of household members	3.24	3.20	3.11	3.07	2.93
Number of income groups	11	11	10	10	10
Share of population in the first income group (%)	0.2	1.3	0.4	0.4	2.2
Share of population in the last income group (%)	3.3	5.7	9.9	11.5	1.7
Mean disposable income per capita	13 007	32 743	133 931	4 121 000	19 851
Real income index (1988=100)	97.2	110.3	109.7	100.0	82.2

Mean income in USD (at current exchange rate)	804	1 767	1 397	1 518	3 068

Note: Data grouping for 1998 was prepared by the author. Estimation of the total number of households in Croatia was not available for that year. The average income for the period 1973-1988 is expressed in Yugoslav dinars and for 1998 in kuna. Real income is the result of deflation by the cost-of-living index.

Source: Household Budget Surveys (see text) and the author's calculations.

Table 1 also contains two indicators of real income – the mean disposable income deflated by the cost-of-living index and the disposable income expressed in USD (at current exchange rate). Both indicators only generally reflect the developments in living standards during the observed period. Given the observations during the long period of time that ware marked by significant economic changes and possible errors in inflation measurement, especially during the period of hyperinflation, the deflated income is not a trustworthy indicator of trends in living standards. The income expressed in current dollars was much higher in 1998 than in the period covered by the previous surveys. This does not so much reveal the change in the standard as change in economic role of exchange rate over the last twenty years[4]. However, any firm conclusions on the developments in living standard still require deeper inquiry than the above-presented example.

3. Estimation of Inequality

Estimation of inequality is based on the methods used for grouped data[5]. Analysed is the distribution of disposable household income per capita, and the unit of observation is the individual. Consequently, the frequency of each income group is the estimated number of persons living in the households whose income per capita was within the limits of the relevant group[6].

3.1. Inequality Indicators

Table 2 provides a summary of inequality estimates for the period 1973-1998. The upper and lower estimation bounds are presented, and the compromise value for six selected measures of inequality [7]. The calculation of the compromise value is based on the assumption that the distribution within a group takes on the form of split histogram density while the distribution within the top, open group has the form of the Pareto density function[8]. The calculated compromise value gives our preferred inequality estimate, which is believed to well reflect the unknown inequality index and to provide a satisfactory solution to the problem of inaccuracy of estimates owing to data grouping[9].

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[4] The economic environment and the structure of economy in former Yugoslavia differed sharply from those in the present-day Croatia, so that the economic elements relevant for the setting of exchange rate are entirely different. Therefore, it is no surprise that disposable income rise if expressed in dollars.

[5] See Cowell (1995).

[6] The frequency of a group was obtained by multiplying the estimated number of households within a group by the average number of members in that group. Instead of the original frequencies from the sample, we use frequencies after the projection on total.

[7] All calculations were made in INEQ, a program developed at London School of Economics. The program uses appropriate methods of grouped data processing.

[8] For more details, see Cowell and Mehta, 1982.

[9] The accuracy of the inequality estimate on the basis of compromise values can be tested by the data for 1998. A comparison between the inequality estimate based on raw data from the HBS and the compromise value calculated on the basis of grouped data shows that deviations are very small for all measures of inequality. The estimate of Gini coefficient from the grouped data equals that from the raw data if looked up to three decimal places. However, when interpreting the results, we must not completely disregard lower and upper limits of inequality measures, because different assumptions on unknown distribution within each group may result in any value of the inequality index between the limits.

Table 2. Inequality Indices in Croatia, 1978-1998

Measure of inequality	Lower bound	Upper bound	Compromise value
1978			
Atkinson index ($\varepsilon = 0.5$)	0.070	0.088	0.072
Atkinson index ($\varepsilon = 1$)	0.135	0.156	0.140
Mean logarithmic deviation	0.145	0.169	0.151
Theil entropy index	0.144	-	0.151
Coefficient of variation	0.572	-	0.601
Gini coefficient	0.294	0.303	0.300
1978			
Atkinson index ($\varepsilon = 0.5$)	0.067	0.092	0.070
Atkinson index ($\varepsilon = 1$)	0.131	0.174	0.137
Mean logarithmic deviation	0.141	0.192	0.147
Theil entropy index	0.137	-	0.144
Coefficient of variation	0.552	-	0.583
Gini coefficient	0.289	0.297	0.294
1983			
Atkinson index ($\varepsilon = 0{,}5$)	0.057	0.105	0.062
Atkinson index ($\varepsilon = 1$)	0.111	0.159	0.119
Mean logarithmic deviation	0.118	0.173	0.126
Theil entropy index	0.116	-	0.133
Coefficient of variation	0.507	-	0.599
Gini coefficient	0.264	0.276	0.271
1988			
Atkinson index ($\varepsilon = 0{,}5$)	0.062	0.121	0.069
Atkinson index ($\varepsilon = 1$)	0.120	0.168	0.129
Mean logarithmic deviation	0.128	0.183	0.138
Theil entropy index	0.128	-	0.150
Coefficient of variation	0.533	-	0.662
Gini coefficient	0.277	0.291	0.286
1998			
Atkinson index ($\varepsilon = 0{,}5$)	0.070	0.087	0.073
Atkinson index ($\varepsilon = 1$)	0.132	0.175	0.137
Mean logarithmic deviation	0.141	0.192	0.148
Theil entropy index	0.149	-	0.157
Coefficient of variation	0.607	-	0.660
Gini coefficient	0.290	0.300	0.297

Note: The calculation is based on grouped data on household income per capita. The compromise value has been calculated after interpolation by using the split-histogram method except for the top (open) group, for which interpolation has been made on the basis of Pareto density function.

Source: The author's calculations based on the household budget surveys (see text).

The compromise values of all selected measures of inequality provide a consistent picture of inequality changes in Croatia. Inequality went down in the period 1973-1983, and went up in 1988 and 1998.[10] It can also be observed that over the analysed period the changes in inequality were not large. While this was not surprising for socialist Croatia, a comparison of results between 1988 and 1998 will be a surprise to many people. Contrary to the general perception that inequality increase rapidly over the last ten years, the presented data show that there was no strong increase in income inequality. The compromise value of the Gini coefficient increased from 0.286 in 1988 to 0.297 in 1998. The same is shown by other inequality measures.

To what extent is such an outcome reliable? The answer to that question may be provided by a comparison with the results of similar inequality studies.

3.2. What the Other Studies Can Tell Us about Inequality in Croatia

To the best author's knowledge, there has been no comprehensive study of inequality in Croatia during the period of socialism. However, some preliminary inequality estimates were made in the early 1990s at the Faculty of Economics in Zagreb, which is documented by some working materials and unpublished results. Thus, Ahec-Šonje (1992) reports on inequality estimates of the distribution of total disposable income for 1978, 1983 and 1988, with Gini coefficients of 0.202, 0.183 and 0.227, respectively. There is a clear difference from the data presented in this paper, a substantially lower inequality. It seems to us that the methods applied and underlying assumptions in this estimate are not suitable for analysing available data. The estimation of per capita distribution was derived from the grouped data on the distribution of household income, the procedure that can result in rather large error. Similarly, the grouped source data are brought down to averages and analysed as ungrouped, frequency-weighted data, which actually results in minimum or lower limit inequality measures.

The results of inequality estimate in Croatia may be compared with the calculations for former Yugoslavia that was made by Milanović (1990). For 1973, he obtained Gini coefficient with the lower limit of 0.354 and the upper limit of 0.424; for 1978, a coefficient between 0.345 and 0.401, and for 1983 between 0.316 and 0.389. By applying the same methodology as we use for Croatia, the data for former Yugoslavia give compromise values of Gini coefficient of 0.346 for 1973, 0.342 for 1978 and 0.316 for 1983. These estimates are close to the lower limits of the estimates by Milanović. In view of these estimates, we would expect a somewhat lower inequality in Croatia, primarily as the result of a higher economic homogeneity and less noticeable regional differences. This is confirmed by the obtained results. It can be seen that the data for former Yugoslavia, just like those for Croatia, point to a downward trend in inequality during the period 1973-1983.

According to inequality estimates for other transition countries in late 1980s, presented by the World Bank, Gini coefficients of income inequality ranged between 0.19 and 0.24 for majority of Eastern European countries, excluding Poland with 0.28 and Russia with 0.26 (World Bank 2000a; 140). The Deininger and Squire (1996) database contains the same data, with Gini coefficient of 0.254 for Poland and 0.278 for Soviet Union in late 1980s. Our estimate of Gini coefficient for Croatia in 1988 of around 0.29 seems realistic compared to other countries in the region, although the inequality is somewhat higher. This is expected for pre-transition period, due to a more pronounced market orientation of the Croatian economy compared with the above mentioned other socialist economies.

Keane and Prasad (2002) made inequality estimates based on raw data for Poland. Their results suggest that in the early stages of transition (1990-1992) inequality actually decreased, and was gradually growing afterwards to reach a moderately higher level in 1997 compared with the pre-transition period. Gini coefficient of household income distribution per capita was 0.28 in 1989 and 0.32 in 1997. There is an apparent similarity between inequality levels established for

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[10] The only exception to the above conclusion is the coefficient of variation for 1998, which indicates a slightly smaller inequality than that for 1988.

Croatia, which shows that a moderate growth of inequality in Croatia during the transition period is not necessarily an exception among Easten European economies.

Striking is the difference in the level of income inequality in 1998 between the World Bank estimates (World Bank, 2000b) and those presented in this paper. The source of data is the same – the database from the HBS for 1998. There are certain discrepancies in the definition of income. The World Bank specifies measures of inequality for several definitions of income, where income aggregate, without imputed rent and with the application of *per capita* scale, is most similar to disposable income analysed in this paper. Gini coefficient obtained by the World Bank was 0.353. Nestić (2002) argues that the World Bank used an inadequate indicator of income from self-employment in its calculations of income inequality, i.e. revenue rather than income[11]. By adjusting the income from self-employment and following the exact estimation procedure of the World Bank, we obtained the Gini coefficient of 0.287 for 1998. The difference from the Gini coefficient in Table 2 may be accounted for by the different definitions of income.

It seems that, except for a divergence from the World Bank estimates, the level of inequality presented in this paper remains within reasonable limits.

4.   In the Quest for Explanation of Changes in Inequality

A quantitative analysis of changes in inequality is, to a certain degree, limited by the available data. Therefore we will only present a decomposition of inequality by sources of income.

Disposable income may be expressed as a sum of various types of income received by a household (wages, income from self-employment, pensions, social transfers, etc.). Like income itself, income inequality may also be expressed as a sum of contributions to inequality of certain types of income[12]. Inequality measured by Gini coefficient can be expressed as a weighted sum of Gini coefficients of concentration, where weights are the shares of each type of income in aggregate income:

$$G = \sum_{i=1}^{k} \frac{\mu_k}{\mu} G_k^* = \sum_{i=1}^{k} \lambda_k G_k^* , \qquad (1)$$

In (1) G stands for Gini coefficient, G_k^* for Gini concentration coefficient for the component k in income, μ_k is the average of the component k of income and μ is average of total income. The change in Gini coefficient between the two periods may be decomposed as follows:

$$\Delta G = \sum_{i=1}^{k} \Delta \lambda_k G_k^* + \sum_{i=1}^{k} \lambda_k \Delta G_k^* + \sum_{i=1}^{k} \Delta \lambda_k \Delta G_k^* . \qquad (2)$$

The first term on the right side of the equation represents part of the change in the Gini coefficient that resulted from the change in income structure. The second term shows the change due to the changes in the concentration coefficients for individual types of income, and the third term is the interaction term.

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[11] Comparison between the average household income in 1998 according to the World Bank data and that according to the data published by the Central Bureau of Statistics (First Release No. 13.2.1. of 11 July 2002) reveal substantial difference. The average household income calculated by the WB amounted to 74,800 kuna per annum, while the average household income according to CBS is 55,145 kuna. A comparison of income structures from both sources suggests that the income from self-employment practically account for the total difference between the two calculations. Average disposable income of in our calculations (58,160 kuna – an average household income per capita multiplied by average household size, according to Table 1) converges with the CBS data despite the discrepancies in the definition of income.

[12] For more details on the decomposition of inequality by income sources see, e.g., Shorrocks (1982).

The fact that only grouped data are available restricts to a certain extent the possibility of the aforementioned decomposition. To keep it as simple as possible, decomposition is done only for the lower bound of Gini coefficient.

4.1 Changes in Income Composition

The first step in analysing the changes in inequality is to look at the changes in the shares of various income components. Table 3 shows the composition of disposable income in the period 1973-1998, divided into 11 income components.

The share of wages decreased after 1978. A particularly sharp decrease was recorded in the period 1988-1998, from 53% to just over 40%. The share of self-employment income (including income from farming) increased from around 6 percent in 1993 and 1978 to 9.3 percent in 1998. It can be assumed that during the 1990s, the role of individual farming was reduced, so the income from self-employment becomes an increasingly important source of income. The share of income from other self-employment (part-time jobs, author's contracts, work via the student employment agency, etc.) increased over the last decade. The property income increased its share in transition period.

Table 3. Composition of Disposable Income (%)

Income Source	1973	1978	1983	1988	1998
Wages and salaries	50.6	56.2	53.1	53.0	40.7
Income from self-employment (handicrafts and indiv. farming)	6.1	6.1	8.3	8.7	9.3
Other self-employment	3.2	2.4	2.1	2.4	3.6
Pensions	13.2*	12.6	11.2	11.7	18.3
Other social transfers	-	2.2	1.9	1.7	3.4
Income from property and the sale of property	1.9	1.5	1.4	2.0	7.1
Transfers from abroad	4.6	3.1	2.9	3.4	1.5
Gifts, winnings, etc.	1.2	0.9	1.5	1.9	4.4
Reduction in savings	3.9	2.7	4.0	3.2	4.0
Borrowings	0.7	0.3	0.5	0.6	0.8
Income in kind	14.6	11.8	13.2	11.4	6.8
Total disposable income	100.0	100.0	100.0	100.0	100.0

* Includes all social transfers, not only pensions.

Source: The author's calculations based on household budget surveys (see text).

The share of pensions grew significantly over the transition period, from around 12% during the socialist times to more than 18% in 1998. Following a gradual decline in the 1980s, the share of other social transfers increased significantly during the transition period. In 1998 it reached 3.4%, which is double the rate from ten years earlier.

In the past, gifts, winnings, and similar types of income had a minor role in household income, but recently their importance has grown considerably. This is confirmed by more than twice as large increase in the share over 1998 compared with the pre-transition period. However, given the heterogeneity of this income category, it is difficult to draw a firm conclusion about underlying forces. It is conceivable that, after the end of the war and a decline in real total income during the transition period, a much stronger social connections within society are present now. In our case, this would be reflected in a greater significance of gifts and assistance, probably among households with family links. However, increased share may be a consequence of an increasing

importance of games of chance and winnings from them. After having a relatively stable share in total income during the 1980s, transfers from abroad declined markedly. We are inclined to explain this by means of the statistical base, i.e. the household budget survey for 1998. Specifically, unlike in the old surveys, the questionnaire on income for that year does not include an explicit question about the cash remittances of persons temporarily employed abroad, i.e. about the receipts of a household or its members from a household member temporarily working abroad. There is a question on "receipts from abroad related to winnings and gifts in cash and in kind". It is hard to expect that the surveyed households, whose member is temporarily employed abroad and remits certain amounts of cash to the other household members, will report such remittances as winnings or gifts. We therefore believe that this type of income is not appropriately covered by the HBS for 1998.

Borrowing and reduction in savings are not "true" income categories, but they are means of consumption financing. Their moderate growth in 1998 may be accounted for by deepening financial markets. The share of income in the form of benefits in kind and consumption of goods produced in own household (income in kind) followed a downward trend, particularly in the period from 1988 to 1998. Such developments in recent years are probably a sign of market economy enhancing, but also a sign of decline in small-scale agricultural production, which was largely intended for consumption by the agricultural households themselves.

4.2. Changes in Concentration Coefficients

Now we can focus our attention on the other component of inequality from equation (1), i.e. Gini concentration coefficient for different sources of income[13].

Table 4 provides concentration coefficients for Croatia in the period 1973-1998. The last row in the table presents concentration coefficient for total disposable income, which in this case, equals the Gini coefficient.

Wage concentration follows a similar trend as the total income concentration. In 1973 and 1978, wage concentration was relatively high, much higher than in the following period, while in the concentration of income from both categories of self-employment we have the reverse situation. In these years, income in kind was over-proportionally present among poor individuals on aggregate, rather than the rich, which is suggested by the negative sign of coefficient.

Table 4. Concentration Coefficients

Income Source	1973	1978	1983	1988	1998
Wages and salaries	0.396	0.370	0.264	0.278	0.292
Income from self-employment (handicrafts and indiv. farming)	0.117	0.212	0.412	0.407	0.524
Other self-employment	0.221	0.174	0.277	0.407	0.491
Pensions	0.221*	0.298	0.182	0.137	0.126
Other social transfers	-	0.037	-0.052	-0.137	-0.039
Income from property and the sale of property	0.502	0.474	0.514	0.649	0.599
Transfers from abroad	0.392	0.325	0.656	0.642	0.398
Gifts, winnings, etc.	0.238	0.086	0.285	0.403	0.265

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[13] Gini concentration coefficient is computed in a similar manner as the original Gini coefficient, but calculation is conducted after the population is ranked by the total income and not by the income component for which the coefficient is calculated. The concentration coefficient implies the inherent inequality in the distribution of a certain type of income, but also its correlation with total income (Pyatt et al. 1980). This coefficient vary from –1, when the total amount of a certain income component is received by the poorest person, to 1, when the total amount goes to the richest person measured by the total income.

Reduction in savings	0.533	0.450	0.553	0.513	0.388
Borrowings	0.452	0.324	0.413	0.407	0.501
Income in kind	-0.032	-0.049	0.078	0.080	0.048
Total disposable income	0.294	0.289	0.264	0.277	0.290

* Includes all social transfers, not only pensions.

Source: The author's calculations based on household budget surveys (see text).

During the 1980s, concentration coefficients for wages and income from handicrafts and individual farming were relatively stable, with the concentration for wages being considerably lower than for income from handicrafts and farming. In these years, the concentration of property income and transfers from abroad, as well as reduction in savings was relatively great. Income in kind was evenly distributed. Towards the end of the 1980s, concentration of pensions turned downwards, while concentration of other social transfers decreased, as suggested by their negative sign. In other words, other social transfers (excluding pensions) were well targeted towards lower-income population groups.

Analysis of changes in concentration coefficients over the transition period is of particular interest. Contrary to expectations, a strong increase in wage concentration obviously did not come true. The wage concentration coefficient rose from 0.278 in 1988 to 0.292 in 1998, which is a modest increase given the transformation from a planned socialist economy to a market-led one. In both years, wage concentration coefficients were similar to the Gini indices for total disposable income.

The conclusions about the concentration in wage distribution may be enforced by a comparison with the inequality estimates based on another source of data. The Central Bureau of Statistic, within its regular annual surveys on employment and wages, collects data on wage distribution by enterprise survey (RAD-1G Form). Based on the previously set income groups, each enterprise reports on the employee number by these groups. Unfortunately, there is no information on average wages within groups, while the average wage for the population can be taken from other data source, monthly survey. The low information content of these data resulted in a rather wide gap between the lower and upper bounds for inequality estimate, as shown in Table 5.

Table 5. Inequality in Wage Distribution in 1988 and 1998

	1988.			1998.		
Inequality measure	Lower bound	Upper bound	Compromise value	Lower bound	Upper bound	Compromise value
Atkinson index ($\varepsilon = 0.5$)	0.030	0.189	0.047	0.036	0.214	0.053
Atkinson index ($\varepsilon = 1$)	0.059	0.489	0.087	0.072	0.443	0.102
Mean logarithmic deviation	0.061	0.671	0.092	0.074	0.586	0.107
Theil entropy index	0.059	-	0.102	0.073	-	0.114
Coefficient of variation	0.347	-	0.542	0.391	-	0.549
Gini coefficient	0.195	0.330	0.234	0.215	0.367	0.253

Source: The author's calculation based on grouped data on wage distribution from the CBS enterprise surveys (RAD-1G Form).

If we take compromise values as the most appropriate estimate of inequality, we can observe a mild increase in inequality in wage distribution over the period 1988-1998. Gini coefficient rose from 0.234 in 1988 to 0.253 in 1998. Such trend corresponds with slight changes in the previously calculated wage concentration coefficients. It could therefore be concluded that there was no strong increase in wage concentration and, consequently, there was no substantial pressure on the rise of overall inequality in Croatia from this source.

The concentration coefficients for income from self-employment (handicrafts and individual farming, and other self-employment), shown in Table 4, point to a relatively strong growth over the transition period, which is an expected outcome. A slight decrease in concentration of pensions could be accounted for, first, by minor changes in the concentration of wages, as their distribution is the basis for the distribution of pensions, and second, by certain economic policy measures. As regard the later, in the transition period pensions in Croatia were gradually transformed from insurance-based benefits into pure social transfers under a strong influence of the Government. This resulted in the introduction of early retirement, abolishment of wage-indexation of pensions and a noticeable increase in direct budget transfers to the pension fund. The pension distribution policy was aimed at equalising pension benefits by increasing the minimum pension, introduction of means-tested supplement to pension and a 100-kuna allowance to all pensioners. Despite their dubious effects on the overall efficiency of the economy and public finances, these measures obviously contributed to the reduction in pension concentration, which then resulted in easing the pressure on the rise of overall inequality.

In 1998, just like in 1988, other social transfers were pro-poor distributed decreasing thereby the overall inequality. That means that these transfers (e.g. social welfare, or unemployment benefit) were relatively higher for the lower-income population. In so far, other social transfers were well targeted. However, in the transition period targeting of these other social transfers has worsened.

As shown in Table 4, concentration of other types of income (excluding borrowings) weakened in the period from 1988 to 1998. As concern income from property, this is relatively unexpected, given the development of the capital and real estate markets. In view of a still high concentration, this can be attributed to statistical error[14]. Concerning income from abroad, we already mentioned the possibility that they were underestimated in the HBS for 1998, so the concentration coefficients are also questionable. On the other hand, a decrease in the concentration of gifts and winnings can be a sign of growing solidarity in the society in the form of larger private transfers to relatively poor households. In 1998, income in kind was evenly distributed among all members of society, and therefore contributed to a slowdown in the rise of overall inequality.

4.3 Decomposition of Overall Changes in Gini Coefficient

Changes in income structure and in concentration coefficients of individual income components are reflected in the change of Gini coefficient for the total disposable income. Table 6 shows the results of decomposition of changes in Gini coefficient between the two consecutive observed periods.

Table 6. Contribution to Inequality by Income Sources, 1978-1998
(Decomposition of the Change in the Gini Coefficient)

Source of inequality	1973-1978	1978-1983	1983-1988	1988-1998
Change in composition of income	0.008	-0.007	0.006	0.012
Change in concentration coefficient of:				
Wages and salaries	-0.013	-0.060	0.008	0.007
Income from self-employment (handicrafts and individual farming)	0.006	0.012	0.000	0.010
Other self-employment	-0.001	0.003	0.003	0.002

[14] It is noticeable that the concentration is relatively high in items that actually do not constitute the "true" income, but can rather be concerned as financing, like loans, reduced savings or sale of property. Over the last ten years their share in disposable income was growing. Had these financing items been excluded from income (see footnote 3), then the overall inequality indices would have been somewhat lower. Thus, the exclusion of savings and loans and the appropriate adjustment of income brackets would result in a compromise estimate of Gini coefficient of total income of 0.276 in 1988 and 0.291 in 1998.

Pensions	0.005	-0.015	-0.005	-0.001
Other social transfers	-	-0.002	-0.002	0.002
Income from property and sale of property	-0.001	0.001	0.002	-0.001
Transfers from abroad	-0.003	0.010	0.000	-0.008
Gifts, winnings, etc.	-0.002	0.002	0.002	-0.003
Reduction in savings	-0.003	0.003	-0.002	-0.004
Borrowings	-0.001	0.000	0.000	0.001
Income in kind	-0.003	0.015	0.000	-0.004
Residual	0.003	0.013	0.002	0.000
Overall change in Gini coefficient	-0.005	-0.025	0.013	0.013

Source: The author's calculations based on HBS (see text).

The change in income structure has usually contributed to the increase in inequality. Only in the period 1978-1983 structural processes resulted in a decrease in overall inequality, which coincided with the outbreak of the economic crisis in former Yugoslavia. Thus, the arrested growth of national income seems to have facilitated further decrease in inequality in that period.

Decomposition of inequality changes in the period 1988-1998 is interesting. In this period, a remarkable contribution to the growth of Gini coefficient was made by changes in the composition of income. Of the overall Gini changes of 0.013 points (the lower bound Gini coefficient was raised from 0.277 in 1988 to 0.290 in 1998), the change in income structure accounts for 0.012 points, while all changes in individual concentration coefficients together account for the increase of 0.001 point. The contribution of the residual to the change in Gini coefficient is negligible. Over the last ten years the change in income structure had adverse effects on equality. This primarily relates to the increase in the share of property, and self-employment income. The increase in inequality owing to the change in income structure would have been even higher, had the share of wages not fallen sharply, and had the share of pensions and other social transfers not grown.

Despite the minor contribution of the change in concentration of individual income components towards the overall inequality, the rising concentration of wages and income from self-employment stimulated the increase in Gini coefficient. On the other hand, a decrease in concentration coefficients for income from abroad, consumption in kind, reduction in savings and gifts and winnings had the opposite effect. The changes in concentration coefficients for other types of income did not strongly influence the overall change in Gini coefficient.

The changes in the share and concentration of wages, self-employment income, income from property and income from abroad had the largest impact on inequality trends in Croatia. As concerns wages, a reduction in their share in aggregate income led to a slowdown in the growth of Gini coefficient. An increase in the share of self-employment income in aggregate income and the growing concentration pushed up overall inequality. Due to high concentration, an increase in the share of income from property contributes to the increase in overall inequality. Owing to its reduced share and a reduced concentration coefficient, income from abroad contributed to a decrease in Gini coefficient. However, aforementioned difficulties in the collection of data on this type of income are likely to result in an underestimation of the increase in inequality in the period 1988-1998.

The described background to the changes in Gini coefficient in Croatia during the transition period differs from the developments in other transition countries in Central Europe. Milanović (1998) demonstrates that the increase in Gini coefficient in these countries was mainly influenced by the growth of wage concentration coefficient, while the change in income structure contributed to the decrease in inequality. The sole change in the income composition in Croatia is similar to the changes in other transition economies. A decrease in the share of wages and an increase in the

share of pensions, other social transfers and other personal income (excluding wages) during the transition period are obviously common to all transition economies. However, the changes in concentration coefficients were rather unique in Croatia. Milanović (1998) demonstrates that there was a considerable increase in wage and pension concentration in transition countries. Slight increase was observed in concentration of other private income, while all other social transfers strongly contributed to the decrease in inequality. At the same time, Croatia saw a weak increase in wage concentration and a mild decline in pension concentration. The equalising effect of other social transfers weakened, while the concentration of other private income (income from self-employment and from property) grew markedly.

5. Assessment of Results and Proposals for Further Research

A moderate increase in inequality in Croatia over the transition period, as follows from our research, is rather surprising. The general perception was that inequality went up strongly, although there was no empirical evidence either for or against such expectation. Even the World Bank study (World Bank, 2000b, 2001), implying a relatively high level of inequality in Croatia in 1998, does not provide any data on the changes in inequality over the transition period. There are two possible explanations to the discrepancy between the general perception of inequality and the presented results: 1) the obtained results convey an inaccurate picture of the actual changes, or 2) the general perception of inequality for entire population is wrong.

What could be the problem with the presented estimates of inequality? First, the household budget surveys may provide the data without full coverage of income. More specifically, income from abroad is probably underestimated because it may be inadequately covered by the questions in the household budget survey for 1998. There seem to be problems with the coverage of income from small businesses. Second, the HBS for 1998 failed to cover some 10 percent of the Croatian territory (the areas most severely devastated by war), which might have resulted in defective data. However, this impact on results cannot be strong, given the sparse population of these areas (according to some statistical estimates, 2-5 percent of the total Croatian population lived in these areas). Still, despite the fact that the assumed lower income of citizens in these areas might have resulted in underestimation of the actual inequality in 1998, it is hard to believe that this could pose a serious challenge to the basic conclusions.

The economic and social developments in Croatia during the 1990s indicate that the resulting inequality estimate could be realistic. On the one hand, the movements of inequality are, to some extent, determined by the overall economic trends. A sharp economic downturn in the early 1990s, a substantial decrease in employment and a relatively poor development of the financial markets, accompanied by an overall underdevelopment of the market economy[15] failed to provide a basis for the expansion of major sources of inequality in income - inequality in the distribution of wages and self-employment income, as well as inequality in the distribution of income from property and property rights. Despite a rather high concentration of the distribution of the latter two types of income in Croatia, their share in aggregate income was rather small, so they did not contribute to strong increase in inequality. Had their share in aggregate income been larger, and the share of pensions lower, inequality would have been higher. It is still not clear why there remains rather low wage concentration in Croatia during the past ten years. The answer to that question should be provided by further research.

Certain economic and social policy measures also relieved the pressure on the growth of inequality. Generous conditions for early retirement, introduction of minimum pension that resulted in higher pension for a large number of pensioners, widening of various types of direct

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[15] The progress in the development of market economy can be measured, e.g., by the EBRD transition indicators. According to the recent EBRD estimates, Croatia has ranked in the middle by majority of all criteria, which means that it is lagging in progress compared with its higher rank in the early transition period. According to Mervar and Nestić (2000), who averaged out eight criteria for measuring the progress during transition, Croatia took ninth place in 1998, following Hungary, Poland, Czech Republic, Estonia, Slovenia, Latvia and Lithuania.

and indirect social and capital transfers to households, all these reduce the pressure on an increase in inequality[16].

The discrepancy between the subjective and objective perceptions of inequality in Croatia could be an interesting subject for sociological research. It is possible that, owing to a relatively sharp decrease in income and the war with which Croatia was confronted in the early 1990s, the public is very sensitive about any, even moderate, inequality. If this is added to the assumed increase in social mobility, we can understand the great sensitivity to inequality, even when it is not too high compared with other countries, or when it has not increased substantially compared with the previous period. Although the individual or general perception may not closely reflect the actual situation, it can certainly reveal to us how sensitive the Croatian society is to recent changes to inequality.

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[16] According to Keane and Prasad (2002), a moderate increase in inequality in Poland during the transition period can be accounted for by growing social transfers. Trends in inequality in Croatia are comparable with those in Poland. Like Poland, Croatia entered the transition with a relatively high level of inequality and with a noticeable market orientation of its economy. A stronger growth of inequality during the transition period is therefore not needed, especially given the relatively broad scope of social policy.

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