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BY THE HUNGARIAN ROTATION PANEL
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ZSUZSA KAPITÁNY AND GYÖRGY MOLNÁR

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Abstract

We investigate the trends of inequalities and mobility of income, expenditure and stock of durables between 1993 and 1998 in Hungary. In 1996-8 the stagnating level of inequalities is coupled with relatively low and decreasing mobility. The relationship between inequalities and mobility fastens the relative positions of households, increasing the share of households unable to improve their positions on the short term. The impacts of the stabilisation shock in 1995 are shown with the help of the Hungarian Rotation Household Panel, a new dataset based on Household Budget Surveys. We give a detailed description of the Rotation Panel.

KAPITÁNY ZSUZSA – MOLNÁR GYÖRGY

EGYENLŐTLENSÉG ÉS MOBILITÁS ELEMZÉS A MAGYAR ROTÁCIÓS HÁZTARTÁS PANEL SEGÍTSÉGÉVEL, 1993-1998

Kivonat

Tanulmányunk a magyar háztartások jövedelmeinek, kiadásainak, valamint tartós fogyasztási cikkekkel való ellátottságának egyenlőtlenségeit és mobilitását vizsgálja 1993 és 1998 között. A kutatást megelőző elemzések egybehangzóan arra az eredményre jutottak, hogy a kilencvenes évek elején, Magyarországon növekedtek a jövedelmi egyenlőtlenségek. Számításaink azt mutatják, hogy a kilencvenes évek második felére ez a növekedés megállt. Az 1996-8-as időszakban az egyenlőtlenségek stagnáló szintje relatíve alacsony és csökkenő mobilitással párosult. Az egyenlőtlenségek és a mobilitás között fennálló kapcsolat rögzíti a háztartások relatív pozícióit, növelve azon háztartások arányát, akik rövidtávon nem képesek pozícióikat javítani. Kutatásunk során olyan eszköztár létrehozására törekedtünk, melynek segítségével az 1995-ben végrehajtott stabilizációs program hatása és az erre adott fogyasztói reakciók is elemezhetőek. Vizsgálatainkat a KSH Háztartási Költségvetési Felvétele alapján általunk létrehozott Magyar Rotációs Háztartás Panel felhasználásával végeztük.

INTRODUCTION

The studies analysing the income and expenditure pattern of Eastern and Central European households in the early 1990s revealed that the inequalities had increased while the mobility of income and expenditure had also grown. The relative income and expenditure position of the households was changing quite rapidly.[1]

One of the fundamental questions our research aimed to answer was how these processes developed during the later period of the transition in Hungary; whether or not the relatively high mobility in the early phase of the transition slowed down and, if so, how the range and the trend of inequalities have been shaped. Moreover, the changes in inequalities and mobility were accompanied by a marked decrease in the total income and expenditure of the households.

We experience every day that people find it hard to get over a situation when they feel that their neighbours move past them in the income and even more so on the consumption hierarchy. In an expanding economy, where growth is an accessible aim for most households, the problem arises more bluntly from the point of view of social mood. However, in an economy shrinking for a longer period, growth, even if ever so small, becomes a neuralgic point. The issue of relative mobility is made particularly acute in the Hungary of the 90s by the fact that the average household saw their real incomes significantly reducing.

The studies analysing the income and the expenditure of households in Hungary during the 1990s relied on two large, comprehensive databases: the household statistics of the Central Statistical Office (CSO), and the Hungarian Household Panel (HHP) survey of TÁRKI. Many studies and articles used TÁRKI's HHP database.[2] Although the database and partly the research tools of our study differs from theirs, our conceptual apparatus is similar. Probably due to its not being a panel, the database of CSO's House-

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[1] See the comprehensive works of *Atkinson* and *Micklewright* (1992) and *Milanovic* (1998, 1999).

[2] *Förster, Szívós* and *Tóth* (1999), *Galasi* (1998), *Habich* and *Spéder* (1999), *Heinrich* (1999), Lokshin and *Ravallion* (2000), *Medgyesi, Szívós* and *Tóth* (2000), *Rutkowski* (2001*), Sik* and *Tóth* (1997), *Spéder* (1998), *Tóth, Andorka, Förster* and *Spéder* (1994).

hold Budget Survey (HBS) was less frequently used for measuring income inequalities and for tracking their changes in time.[3]

TÁRKI's HHP study focusing primarily on gathering income data was closed in 1997. Since that time no panel data of the Hungarian households have been collected. Hence the primary aim of our work was to establish a panel database for the period between 1993-5 and 1996-8 on the bases of CSO HBS[4]. We named our database *Hungarian Rotation Household Panel* (hereinafter: *Rotation Panel*) referring to the method of its creation.

The results of the analyses carried out prior to our research unanimously showed that the income inequalities had increased during the first period of the transition in the early 1990s. According to TÁRKI studies[5], after a stagnation and slight increase in the middle of the decade, income inequalities grew significantly again from 1996. However, the calculations using the Rotation Panel did not support these findings.

As the 1995 stabilisation program took place in the middle of the period under review, we intended to create a set of tools to enable us to analyse and accurately describe the impacts of such short term but drastic phenomena as a stabilisation program. That is why, focusing on Hungary, we examined the inequalities and mobility together, analysing the development of the mobility in a way that is somewhat different from the usual approach by modifying the method of transition matrices. Another new element of our approach is that we investigated inequalities and mobility also for the stock of durables.

The studies analysing inequalities and mobility generally pay more attention to the income side and less or no attention to expenditures. We aimed to strike a balance between the two sides, an effort to which the database provided excellent conditions.

In *Section 1* we give a brief account of the relevant macroeconomic trends of the 1990s. That is followed by a short introduction to the database in *Section 2*. A more detailed description of data generation methods and major characteristics is included in the Appendix.

In *Section 3*, we have examined the tendencies of income and expenditure inequalities in the light of different inequality measures. We also present the decomposition of the expenditure inequalities by major expenditure groups. *Section 4* discusses the changes in time of the mobility/immobility as well as the relationship between inequalities and mobility. The last section gives an

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[3] *Collins* and *Redmond* (1997), *Kattuman* and *Redmond* (1997, 2001), *Pudney* (1994), *Redmond* and *Kattuman* (2001).

[4] On the panels between 1993-95, see *Kapitány, Keszthelyiné Rédei* and *Molnár* (1999).

[5] See *Medgyesi, Szívós* and *Tóth* (2000).

analysis of the inequalities and mobility of the household durables using the scoring system that we have developed. The study closes with the summary of our major conclusions.

1. MACROECONOMIC PROCESSES IN HUNGARY IN THE 90S

If we accept the GDP as the most comprehensive statistical indicator of growth, then it will suggest hardly any growth in the decade of 1990. In 1999 the GDP still fell short of that in 1989 (see *table 1*). Employment in the 90s dropped significantly, by more than one quarter, while the population shrank only by as little as 3%. In 1999 there were one million less employees producing a GDP equal to that in 1989.

Taking account also of the fact that important qualitative changes occurred in the structure of GDP output and utilisation, one can state that in the background of the average stagnation of the 90s there were truly drastic and fast economic changes. These processes had a strong impact on the income conditions and reshuffled the consumption structure of the households.

The 90s fall into three stages in accordance with the timing of GDP trends. The first stage lasted from 1990 to 1993, witnessing four years of shocking decline. The second period, from 1994 to 1996, was characterised by the halting of the downward trend, and the beginning of a gentle upswing. The fall of the GDP was not accompanied by a similar decrease in real incomes, that is why the deficit of the budget and of the foreign balance of payments reached a critical level. This led to the introduction of an austerity package in March 1995, which meant to restore the equilibrium of the Hungarian economy. Partly as a result of the stabilisation measures, the third period after 1997 saw a dynamic GDP growth averaging just below 5% annually.

Employment dropped dramatically until 1993, and kept reducing until 1997 at a low rate. From 1997 onward even the employment rose somewhat, but at a lower rate than the GDP. However, the share of the registered unemployed within the economically active population only grew until 1993 to reach a rate of 13%, and to drop to 9.3% by 1999. Part of the unemployed population were not registered as they resorted into disability pension or 'decided' to stay in the household.

The decline of the real incomes more or less followed that of the GDP, while real wages reduced more drastically. Household consumption, however, moved along a different curve than the GDP. The major setback in consumption in 1990 and 1991 was followed by stagnation and a moderate rise in 1992-94. Especially expenditure on durable consumers' goods grew

in those years. The austerity measures translated into a second and likewise significant drop in household consumption levels in 1995 and 1996.

Table 1

Basic economic indicators (1989=100)

Year	GDP	Consumer price index	Employment	Real wage index per wage earners	Index of per capita real income	Index of per capita real consumption
1989	100	100	100	100	100	100
1990	97	129	97	97	98	95
1991	85	174	90	90	96	86
1992	82	214	81	89	93	86
1993	82	262	76	85	88	88
1994	84	311	75	91	91	88
1995	85	399	73	80	87	82
1996	87	493	73	76	87	80
1997	91	583	73	80	88	82
1998	95	667	74	83	91	86
1999	99	734	76	85	92	90

Source: KSH (2001)

The sudden surge of the consumers' price index early in the 90s came in the wake of price liberalisation, while abating inflation between 1992 and 1994 already reflects a more peaceful stage following the initial shock of the transition period (see *table 2*). From 1992 to 1994 the rate of inflation of durables was much lower than the general rate of inflation. Price increases of food (until 1995) and price increases of household energy (until 1998) were significantly above the average. The repeated and drastic rise of the average consumer price index in 1995 was the result of the stabilisation program.

In terms of households' real income tendencies 1994 and 1995 may be regarded as turning points. While in 1994 the per capita real income and the real wage index, and the real value of the average pension rose, in 1995 these same indicators suggested the substantial reduction of incomes. This is how, as regards household incomes and household consumption, the year 1995, following a crisis period of over a decade, is a real low, yielding to only a gentle rise in the second part of the 90s.

Table 2

Consumer price indices by main commodity groups
(previous year = 100)

Year	Food	Household energy	Passenger car (new)	Durable consumer goods	Total expenditure
1989	118	111	124	118	117
1990	135	128	127	121	129
1991	122	181	149	132	135
1992	119	143	111	114	123
1993	129	120	112	111	123
1994	123	112	111	112	119
1995	131	150	132	124	128
1996	117	133	115	119	124
1997	118	130	103	109	118
1998	114	118	107	108	114
1999	103	109	104	107	110

Source: KSH (2002)

2. A SHORT PRESENTATION OF THE ROTATION PANEL

The Household Budget Survey conducted annually by the Central Statistical Office since 1993 is based partly on monthly household records, and partly on post-facto annual interviews, and contains very detailed information on expenditures[6]. One third of the households rotate annually, thus about one third/quarter of households spend 3 years in the survey.

There have been serious attempts at extracting a panel from the HBS and analysing it, using the HBS data generated in the late 80s as well as in the early 90s[7]. From 1993 it has been possible to extract, from the HBS survey data, the panel database never used previously as no serious structural changes took place during that period in the surveying system.

Between 1995 and 1996 unfortunately the entire sample was replaced, and so in 1996 a new panel cycle began. The 1993-95 panel contains 3,507 households, and the 1996-98 one 1,863.

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[6] A detailed description of the full database is contained in the Appendix.
[7] *van de Walle, Ravallion* and *Gautam* (1994), *Révész* (1994).

The panel played up, if to a small extent, some of the unfavourable features of the HBS sample. The most important ones of these are as follows:

– young adults are significantly underrepresented;
– unemployed persons and pensioners are overrepresented, while active earners and especially entrepreneurs are underrepresented;
– Budapest is underrepresented significantly, and larger cities to a lesser extent;
– higher education graduates are underrepresented.

In order to restore representativity according to age, gender, activity status, schooling, and region of residence we have employed the method of generalised iterative scaling[8] to weight (calibrate) our data, using design-based weights as initial values. The weights generated apply uniformly to each member of a particular household.

No weighting will ever solve the basic sampling problem of the HBS, namely that the poorest (e.g. homeless, functional illiterate persons) with whom the interviewers could not create contact are missing from the sample. Also missing are the most affluent who often live in separation from society, and refuse to disclose information to the survey.

Without weighting the per capita average income of Rotation Panel households falls a few percentages short of the average sample computed on the basis of the full HBS sample. By applying the panel-weighing obtained from the calibration process we have managed to compensate the discrepancies between the panel and the original HBS sample as well as some of the inconsistencies resulting from the changes year on year in sampling method and weighting of the HBS.

Throughout the study we have used the *net* incomes of households, deducting the income tax and the social security contributions. The income includes consumption of self-produced food along with the net farm revenues. In addition to usual items, we also regard as income part of the cash revenues not accounted for as income by CSO classification, more specifically revenue derived from sales of movable or immovable property, taking housing subsidy granted after children, sales of restitution vouchers, and of property received as gift. This helps us avoid the appearance of negative incomes in the database.

By household expenditure we mean expenditure on consumption goods including consumption of self-produced food. Expenditures do not, consequently, include non-personal expenditures.

In the practice we must treat with reservations the theoretical statement that the difference of incomes and expenditures yields savings (positive or

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[8] See *Darroch* and *Ratcliff* (1972)

negative). In addition to forgetfulness, errors, or tax-evading attitudes of entrepreneurs, and the extrapolation of part of the annual expenditures (first of all food) from monthly data, we must mention two distorting factors.

The survey does not at all inquire about savings, and even interest and dividends are only indicated if a household collects it in cash. The other such factor is small 'family based' partnerships, including those founded chiefly with tax evasion purposes, whose incomes and expenditures are inconsistently separated from household incomes and expenditures. It often happens that the respondent is not sufficiently consistent, and evades their incomes and expenditures in a 'lopsided' fashion, i.e. they indicate items purchased from the partnership's funds but used for the purposes of the household as a household expense, but fail to take account of the related income.

We have circumstantial evidence for the above phenomenon through comparing the original sample and the panel. We have mentioned previously that those in the top income and expenditure decile fall out of scope of the panel at a higher-than-average rate. Also, those in the first *income* decile are likewise underrepresented in the panel, while the same fails to hold true for those in the bottom *expenditure* decile as there is hardly anyone in the panel from the 1st income decile whose expenditures much exceed their incomes. Entrepreneurs constitute an extreme case of this. Entrepreneurs in the first *income* decile share the first six deciles in terms of *expenditure*, while half of the entrepreneurs not in the panel, belonging to the first income decile are members of an *expenditure* group higher than this.

Is seems clear that those who conceal their incomes but do not manage to bring their expenditure records in line with it, or fail at properly timing their household incomes and expenditures with those of their partnership, and realise their error at year end, on consolidating their books, will decline their participation in the survey next year. This results in a smaller discrepancy between households' income and expenditure positions in the panel than in the entire sample.

We conclude the description of the Rotation Panel by a comparison with macro-data. The Rotation Panel registers a much greater drop of per capita real income and consumption than macro-data (see *table 3*). By way of comparison, we present also the results of computations by TÁRKI's Hungarian Household Panel. True, there is some slip of time between the Household Panel and the Rotation Panel[9], yet, the two household surveys reflect a basically similar picture, discrepant from the macro-data.

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[9] The reason of this slip may be the fact that the survey of the Rotation Panel is based on calendar years, while the HHP's on the period April to March next year.

Table 3

Per capita real income and consumption – a comparison (1993=100)

	1993	**1994**	**1995**	**1996**	**1997**	**1998**
Income						
CSO macrodata[1]	100	103	98	98	99	103
Rotation Panel	100	99	89	80	79	82
HHP[2]	100	92	86	77		
Consumption						
CSO macrodata [1]	100	100	94	91	93	98
Rotation Panel	100	99	91	87	83	84

Source: [1] KSH (2001)
[2] *Galasi* (1998)

The reason for the discrepancy is the notional and methodological difference between the National Accounts and the household surveys. The differences are truly significant not only in terms of tendencies but also in absolute values as the National Accounts reflect two times the Rotation Panel data in incomes, and 1.5 times in consumption.

The largest discrepancy is seen in owners' incomes. Bank interests and dividends increased dynamically over the years under scrutiny, from which household data only took note of sums collected in cash. This is also where the phenomena discussed above in conjunction with entrepreneurs' incomes belong. Upon preparing the National Accounts, entrepreneurs' incomes are taken into account using Tax Office data and experts' estimates.

The National Accounts take into consideration the 'speculative' rent of tenants' own flats, a sum rising considerably in the wake of the housing privatisation process in progress during the period in question. This is ignored when preparing the HBS, and we find that this is good practice.

We will not touch upon differences of methodology with a smaller effect on discrepancies between tendencies. We are of the opinion that if we disregard the group of entrepreneurs in the top income bracket, household surveys provide an accurate picture.

3. INEQUALITIES IN INCOME AND EXPENDITURE

Many investigations focused on earning inequalities in Hungary over the last years, or, in a wider context, on income inequalities of Hungarian households.[10] *Kattuman* and *Redmond* (2001) investigated the non-panel HBS data to examine income inequality in Hungary between 1987 and 1996. Their analysis showed a sharp increase in income inequality between 1991 and 1993, followed by a little growth between 1993 and 1996.

A paper by *Medgyesi, Szívós* and *Tóth* (2000) publishes a time series of Gini coefficients embracing the whole of the period under our investigation. Their data are computed with reference to the period 1991/2 and 1996/7 on the basis of the surveys of the HHP, then on the basis of two TÁRKI Hungarian Household Monitor surveys separate from each other and from the panel. Their results suggest that the Gini coefficient of equalised income[11] rose from 0.278 to 0.316 between 1992/93 and 1994/95, then stagnated at 0.309 for two years. Following that period, the Gini coefficient began to move upward again to reach 0.320 in 1997/98, and 0.343 in 1998/99.

The inequality computations with the Rotation Panel for 1993-6 give results very similar to *Kattuman* and *Redmond* (2001), however – mainly for 1997-8 – yield results that differ from that of *Medgyesi, Szívós* and *Tóth* (2000) in many respects.

Table 4 shows different inequality measures. *Unless otherwise ('per capita') indicated, we have used indices computed on the basis of equalised income or expenditure.* P90/P10 stands for the ratio of percentile 90 and 10 of the relevant parameter, GE(-1) and GE(2) are the values of the Generalised Entropy inequality index at parameters -1 and 2.[12] GE(2) is half of the square of the coefficient of variation. The GE(2) is relatively sensitive to differences appearing at the top of the distribution under investigation, and GE(-1) to those appearing at the bottom of the same, while the Gini coefficient is sensitive primarily around the mode of the distribution. In the case of some inequality measures we present bias corrected confidence intervals on 95% significance level obtained by bootstrapping.[13]

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[10] E.g. *Galasi* (1998), *Heinrich* (1999), *Milanovic* (1999*), Pudney* (1994), *Spéder* (1998), *Redmond* and *Kattuman* (2001).

[11] The income of the household is divided by a size-equivalent, in this particular case by $S^{0.73}$ where S stands for the household size. In what follows, we are going to apply the same solution when referring to equalised income or equalised expenditure.

[12] On the Generalised Entropy index, and its use in decomposition by factors and population groups, see e.g. *Shorrocks* (1982, 1984), *Jenkins* (1995).

[13] On the bootstrap method see e.g. *Efron–Tibshirani* (1993).

The Gini coefficients computed from the Rotation Panel are lower all along the line than those obtained from the HHP. This difference can be explained by the fact that the HHP contains a relatively larger number of high-income households than the HBS.

Table 4

Income inequalities on the basis of the Rotation Panel

	1993	**1994**	**1995**	**1996**	**1997**	**1998**
P90/P10 per capita	2.58	2.66	2.83	2.94	2.86	2.94
Conf. interval	2.49- 2.70	2.57-2.75	2.74-2.94	2.78-3.07	2.77-2.96	2.82-3.15
P90/P10	2.44	2.54	2.60	2.63	2.60	2.67
Conf. interval	2.34- 2.55	2.48-2.58	2.48-2.72	2.51-2.75	2.50-2.71	2.58-2.79
P90/P50	1.63	1.61	1.62	1.63	1.63	1.64
P50/P10	1.49	1.58	1.61	1.62	1.60	1.62
P75/P25	1.61	1.63	1.61	1.64	1.58	1.60
Gini per capita	0.234	0.218	0.238	0.247	0.229	0.242
Conf. interval	0.223-0.246	0.211-0.226	0.225-0.253	0.233-0.260	0.221-0.239	0.231-0.254
Gini	0.222	0.208	0.225	0.227	0.211	0.223
Conf. interval	0.213-0.233	0.205-0.214	0.215-0.228	0.221-0.235	0.199-0.216	0.216-0.235
GE(-1)	0.087	0.076	0.089	0.091	0.076	0.090
GE(2)	0.115	0.086	0.116	0.109	0.083	0.101
P90/P10 modified*	2.40	2.31	2.42	2.44	2.40	2.48
Gini on earnings**	0.371	0.376	0.391	0.394	0.400	0.409

* Without long-term unemployed persons family.
** Gini coefficient of those households that receive income from earnings, only taking account of this type of income. Earnings in the broad sense includes income from an enterprise, but excludes the net yield of agricultural activities.

The level of the per capita inequality indicators slightly exceeds the values for the equalised income. This is primarily explained by the fact that there are relatively many large families among the poorest groups of society where calculations based on equalised income paints a nicer picture. However, there is no difference between the changes in time using the two approaches.

The P90/P10 index shows a slow but steady growth between 1993 and 1996 followed by stagnation from 1996 to 1998. Confidence intervals unambiguously indicate that the increase is significant while the inequality fluctuation from 1996 to 1998 is not, therefore stagnation is certainly the right term to use. *The rise of inequalities indicated by the P90/P10 index is*

basically ascribable to the increasing social detachment of the poor in the period 1993-6, well indicated by the rise of the P50/P10 quotient while the P90/P50 and the P75/P25 figures kept level all through the period.

The last but one line of *table 4* corroborates our statement. When generating it, we removed from the sample all households in which there was someone unemployed in each of the three years under scrutiny, i.e. households hit by long-term unemployment. In 1993-95 3.3% of households, and 4.5% of persons belonged to this group. The corresponding data in 1996-98 are 3.5 and 5.1% respectively. The table suggests that the P90/P10 ratio calculated ignoring the foregoing reflects no rising tendency whatsoever. *The growth of the ratio of percentiles 90 and 10 in the period 1993-6 is clearly indicative of the increasing detachment of households struggling with long-term unemployment.*

The Gini coefficient significantly reduced between 1993 and 1994, to swing upward again until 1996. The range of inequality remains virtually unchanged from 1996 to 1998 with a temporary drop in 1997. The GE(-1) indicator also reflects the rise of inequality between 1994 and 1996. In the case of the GE(2) we find diminishing inequality in the middle of both three-year periods, yet, on the whole, what we really see is stagnating inequality. In this respect there is a difference between the results of *Kattuman* and *Redmond* (2001) and ours, because they calculated a moderately increasing GE(2) measure between 1993 and 1996. The GE(2) indicator, as it is, responds quite sensitively if in higher income brackets only a few households experience a larger change of income.

In an attempt to explain the fluctuation of inequality, the essential point comes up in the last line of *table 4.* This unambiguously indicates that inequality of wages follows an unbroken upward curve throughout the entire period, but more intensively in its first half. During the investigated period this inequality was more or less equalised by different kinds of social transfers. The process showed by *Kattuman* and *Redmond* (2001) and *Rutkowski* (2001) was continued after 1996.

The stabilisation package in early 1995 went hand in hand with the reduction of the real value of various social transfers, primarily through inflation. That is why rising wage inequalities between 1994 and 1996 appears in the inequality of households' incomes without the counter-effect of other factors.

With the successful conclusion of the stability measures, 1997 saw the economy back on track, and pensions rose again in real value, while the real value of earnings in the broad sense still dropped by nearly 5% in the panel. Also the temporary reduction of inequality resulted from the in-

crease of personal social incomes other than pension. As our time series does not continue for the time being, we are not in a position to know if growth in 1998, evident in all indicators is the manifestation of a new period of growing inequality or only of the fluctuation between 1996-98.

The analyses carried out with the Rotation Panel indicate that the situation changed substantially following the initial years of the transition. In 1996-8 the income inequalities of Hungarian households stabilised rather than further rising. The gentle rise and the subsequent stabilisation of inequality took place besides a major and universal shrinking of real incomes and real expenditures.

This stabilisation of income inequalities differs from the results of TÁRKI referred to early in this section. As the temporal changes of the indicators obtained from the Rotation Panel and the HHP in the period 1993-6 show a very similar picture, the possibility may present itself that growth of the inequality following 1996 apparent from TÁRKI's data stems from the mere fact that their new samples are independent from their earlier panel.

Expenditure inequalities indicated in *table 5* exceed *income* inequalities according to every inequality measure.

Table 5

Expenditure inequalities based on the Rotation Panel

	1993	1994	1995	1996	1997	1998
P90/P10 per capita	3.11	3.13	3.11	3.36	3.23	3.18
Conf. interval	3.05-3.27	3.01-3.25	3.01-3.22	3.22-3.51	3.05-3.40	3.05-3.33
P90/P10	2.89	2.92	2.93	3.01	2.90	2.90
Conf. interval	2.81-2.99	2.85 -3.01	2.79-3.05	2.84-3.17	2.76-3.12	2.73-3.01
P90/P50	1.72	1.72	1.70	1.80	1.76	1.76
P50/P10	1.68	1.70	1.73	1.67	1.65	1.64
P75/P25	1.77	1.72	1.72	1.76	1.68	1.76
Gini per capita	0.261	0.258	0.261	0.283	0.269	0.268
Conf. interval	0.252-0.273	0.248-0.271	0.254-0.269	0.269-0.298	0.258-0.282	0.258-0.281
Gini	0.247	0.245	0.249	0.266	0.251	0.247
Conf. interval	0.240-0.256	0.236-0.255	0.241-0.256	0.254-0.279	0.240-0.263	0.238-0.258
GE(-1)	0.105	0.105	0.110	0.122	0.110	0.107
GE(2)	0.135	0.129	0.129	0.170	0.132	0.124

As for expenditure, we witness an unchanged degree of inequality with a single and significant upsurge limited to 1996. This sudden growth of expenditure inequality, and its subsequent return to its original range, closely

related to the stabilisation process in 1995, definitely calls for a more detailed explanation. Before we proceed, however, let us present the way in which the structure of household expenditure in a breakdown according to major expenditure groups progressed in the period in question *(table 6).*

Table 6

Distribution of expenditure by major expenditure groups

	1993	**1994**	**1995**	**1996**	**1997**	**1998**
Food	34.1	34.7	35.4	33.4	33.5	33.4
Tobacco/alcohol/coffee	6.0	6.2	5.8	6.0	5.4	5.5
Clothing	7.9	7.3	6.3	6.3	5.9	5.9
Housing maintenance	14.1	14.0	16.0	16.9	18.9	19.1
Housing accessories	5.8	5.4	4.8	5.0	5.0	5.3
Health/fitness/cosmetics	3.6	3.8	4.2	4.9	4.7	4.6
Transports/telecommunication	12.7	13.3	12.6	12.5	13.3	13.2
Culture/entertainment	6.2	6.3	6.0	6.5	5.7	6.4
Housing construction and real estate purchase	6.6	6.0	5.5	5.0	3.9	2.3
Other expenditures	3.0	3.0	3.4	3.4	3.7	4.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
of this: durable goods	5.9	5.9	4.9	3.7	3.8	4.4

One only experiences a clear and unbroken tendency in the case of a few expenditure groups. The weight of housing maintenance expenditures was steadily growing, explained chiefly by the rise of household energy far exceeding average inflation (see *table 2)*. Expenditure on housing construction/real estate purchases continuously decreased especially in the second part of the period under scrutiny, and in 1996-97 the share of expenditure on durable goods likewise shrank. Also declining is the tendency of clothing expenditures. Even though aggregate incomes and expenditures reduced until 1997, the share of expenditure on food only rises until 1995, and stabilises at a lower level thereafter.

Returning to the investigation of expenditure inequality, *table 7* shows the progress of the GE(2) inequality index for expenditure groups, and *table 8* shows the relative weight of these groups in shaping the value of GE(2) for total expenditure.[14] In generating the data in *table 8,* the correlation between total expenditures and expenditures on individual product groups

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[14] In our computations we took advantage of *Stephen P. Jenkins'* programs available in the Stata Technical Bulletin.

also plays an important role – in addition to the values contained in *tables 6* and *7*.[15]

Table 7

**Inequality of equalised expenditure by expenditure groups,
on the basis of the GE(2) index**

	1993	**1994**	**1995**	**1996**	**1997**	**1998**
Food	0.084	0.094	0.089	0.141	0.090	0.085
Tobacco/alcohol/coffee	0.394	0.372	0.371	0.545	0.404	0.449
Clothing	0.592	0.556	0.608	0.669	0.681	0.680
Housing maintenance	0.112	0.120	0.111	0.120	0.107	0.110
Housing accessories	0.908	0.886	1.146	0.863	0.975	1.527
Health/fitness/cosmetics	0.598	0.762	0.754	0.959	1.282	2.155
Transports/telecommunication	1.542	1.855	1.638	0.984	1.075	0.999
Culture/entertainment	0.762	0.730	1.207	1.110	1.071	1.042
Housing construction/real estate purchase	5.592	4.726	8.359	9.381	7.610	4.945
Other expenditures	2.364	2.866	2.660	2.086	3.252	2.709
Total	**0.135**	**0.129**	**0.129**	**0.170**	**0.132**	**0.125**
durable goods	4.119	6.642	7.610	4.602	6.010	6.080
non-durable goods	0.114	0.101	0.109	0.158	0.114	0.106

It is obvious from *table 7* that the sudden surge of expenditure inequalities in 1996 was caused basically by the *temporary* increase of inequalities of expenditure on food, tobacco/alcohol/coffee, and housing construction/real estate purchase. From these – as *table 8* witnesses – food and housing construction/real estate purchases have a particularly important role in determining the extent of such expenditure inequality. Working an effect contrary to the foregoing, the degree of inequality within expenditure on transports, and housing accessories reflect a setback, while the weight of transport expenditure in determining the inequality index also drops temporarily. The reason for that is obviously the reduction of the inequality of

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[15] Define $y = \Sigma_f y_f$ to be the decomposition of the variable y into factors, or, in our particular case, the decomposition of expenditures into expenditure groups. We wish to decompose the inequality index GE(2) for y as GE(2)=$\Sigma_f S_f$, and to generate from that decomposition the coefficients $s_f = S_f / GE(2)$. Let σ and σ_f denote the variance of y and y_f, let ρ_f denote the correlation coefficient between y és y_f, and χ_f the ratio of the means of y_f and y. Now, based on *Shorrocks* (1982) we claim the following: $s_f = \rho_f \sigma_f / \sigma = \rho_f \chi_f \sqrt{(GE_f(2)/GE(2))}$. *Table 8* contains these s_f coefficients in a percentage form.

expenditure on durables and, at the same time, the reduction of the share of this type of expenditure (see the last two lines of *tables 6, 7*, and *8*).

Table 8

The relative weight of expenditure groups in generating the GE(2) index of total expenditure

	1993	1994	1995	1996	1997	1998
Food	13.8	15.3	14.5	18.8	15.6	13.7
Tobacco/alcohol/coffee	3.1	3.4	3.1	5.2	2.5	3.3
Clothing	8.5	6.8	5.9	6.3	7.1	7.7
Housing maintenance	4.2	4.4	5.5	5.8	7.7	8.9
Housing accessories	7.4	5.8	6.2	7.0	7.5	10.8
Health/fitness/cosmetics	2.3	2.7	2.9	4.7	5.3	6.9
Transports/Telecommunication	28.3	34.5	27.4	18.5	24.4	25.1
Culture/entertainment	7.1	6.8	8.9	10.7	9.3	11.4
Housing construction/real estate purchase	21.1	15.9	20.2	17.6	11.5	2.6
Other expenditures	4.2	4.4	5.4	5.5	9.0	9.5
Total	100.0	100.0	100.0	100.0	100.0	100.0
durable goods	17.9	24.4	19.2	8.7	13.2	15.7
non-durable goods	82.1	75.6	80.8	91.3	86.8	84.3

What is the ultimate reason for these phenomena? The austerity measures in 1995 worked their full effect in the course of 1996 following the initial shock: a 10% drop of income, inflation in excess of 20% for the second consecutive year, and this year for the first time the price increase of durables exceeds that of foods, causing the consumer confidence index to plummet.

From 1993 to 1995, and again in 1998, incomes in the Rotation Panel exceed expenditure, while in 1996 expenditures take the upper hand. This clearly indicates the reduction of savings along with the mobilisation of previously saved funds. The share of expenditure on durables drops, and within that share the relatively expensive products undergo a lowering of their purchase rate. A good example is that 1996 saw a considerable rise in sales of commercially imported Western used passenger cars, compared to 1995, to come off the sales figures of new cars. This eventually resulted in used cars outselling new cars on aggregate.

Instead of (or partly in addition to) purchasing durable items, those at the top end of the income scale invested in housing or real estate, or continued their previously undertaken construction of flats or summer resorts, while

the less affluent could not afford doing that. This explains the increase in inequality of expenditure on housing construction/real estate purchases.

The significant but temporary rise in inequality of expenditure on foods is explained by the fact that those in the higher income brackets kept their food expenditure level despite high inflation, while in the case of *those in the lower brackets and with reducing incomes even the share of food expenditure shrank* as their livelihood became so much harder that they were confined to limit their food-bill in real value.

The transition of 1995-96 is missing from the panel, but we can analyse the rearrangement of 1996-97. Real incomes in this period still showed a downward tendency overall, while the real incomes of those belonging to the first quintile increased significantly resulting in a more even income landscape in 1997. This brought about a sudden rise of average food expenditure of the poor, at a very low absolute figure until that time.

We can draw the following conclusion: *an investigation of the trends of inequalities of both incomes and expenditures reflects that the 1995 stabilisation shock was over by 1997 concerning the households' incomes and expenditures. The behaviour of inequalities make the fact likely that there are persistent differences in income and expenditure positions.*

4. MOBILITY OF INCOMES AND EXPENDITURES

The change of inequalities, and the social effect of that change are closely related to the trends of relative income and expenditure positions. The question is whether the gentle rise of income inequality between 1993-5 also meant rising inequality year on year between the *same* groups of households. Another question, no less important, is whether the stagnation of income inequality in 1996-98 results from the fact that positions more or less froze, and chances of the individual households to move higher on the income/expenditure social ladder shrank to a minimum.

We experience every day that people find it hard to get over a situation when they feel that their neighbours move past them in the income and even more so on the consumption hierarchy. In an expanding economy, where growth is an accessible aim for most households, the problem arises more bluntly from the point of view of social mood. However, in an economy shrinking for a longer period, growth, even if ever so small, becomes a neuralgic point. The issue of relative mobility is made particularly acute in the

Hungary of the 90s by the fact that the average household saw their real incomes significantly reducing.

Shorrocks (1978*b*) defines a measure of mobility and rigidity that relates to inequality measures. The range of Shorrocks' R is between 0 and 1, and the higher value of the measure indicates higher rigidity (immobility) of inequalities. It enables exclusively the comparison of rigidity in accordance to a given variable of *time intervals of identical length*. Over a longer period, including a shorter one, the value of the measure is necessarily lower. In what follows (see *table 9*), we are going to investigate the changes in Shorrocks' R of equalised income or expenditure, based on a variety of inequality measures. In the course of our computations we took account of those persons only who were in the panel all through the period 1993-95, or 1996-98.

Using the British Household Survey, *Jarvis* and *Jenkins* (1998) made the same calculations for income rigidity. As a comparison we introduce some of their results: for 1991-92 R(Gini) is 0.95, R(GE(2)) is 0.81, while for 1991-93 R(Gini) is 0.92 and R(GE(2)) is 0.73. The level of income rigidity surprisingly is almost the same in the two countries, despite of the fact that the British inequality measures (for 1991 Gini = 0.309, GE(2) = 0.198) are much higher than the correspondent values in the Hungarian Rotation Panel.

Table 9

Shorrocks' measure of rigidity

	1993-94	**1994-95**	**1993-95**	**1996-97**	**1997-98**	**1996-98**
Income						
R(Gini)	0.932	0.938	0.900	0.935	0.939	0.901
R(GE(-1))	0.828	0.851	0.769	0.848	0.833	0.765
R(GE(2))	0.814	0.786	0.721	0.833	0.868	0.773
Expenditure						
R(Gini)	0.929	0.928	0.891	0.949	0.944	0.919
R(GE(-1))	0.854	0.846	0.781	0.888	0.885	0.834
R(GE(2))	0.797	0.787	0.714	0.834	0.816	0.749

Analysing the dynamics, *table 9* provides no simple picture, and especially not as regards incomes. On the basis of the GE(2) measure the mobility of incomes was a little smaller in the years 1996-98 than in the initial period, and the other two measures present virtually identical values in both cases. In accordance with R(Gini) and especially with R(GE(-1)), the period 1993-94 had been more mobile than the two years of 1994-95, while

R(GE(2)) suggests exactly the opposite. In the second panel-cycle, however, R(GE(-1)) indicates a situation contrary to the two other.

In respect of expenditure, the situation is more obvious: *in accordance with each index, the mobility of expenditure was higher in the first than in the second three-year period.* 1994-5 seems a little more mobile than 1993-94, and 1997-8 seems more mobile than 1996-97, but differences are tiny in both cases.

In sum, we can conclude that expenditure mobility in 1996-98 was lower than in the three previous years, and there are very faint indications to suggest that the same statement holds true for income mobility as well, and what we experience there is rather just steady values. The various inequality indices, and the mobility indices based on them, are more sensitive to inequality experienced at different points of the income/expenditure scale. It seems reasonable then, to apply a method similar to the transition matrices when one investigates mobility.[16]

Transition matrices, despite all theoretical problems,[17] are a proven tool of investigating mobility among different social groups. Investigating income mobility income deciles or quintiles constitute the social groups, and we examine the chance of someone moving from one decile into another during a given period.

A characteristic deficiency of this procedure from the point of view of income/expenditure mobility is that it treats changes of very different dimensions in the same way. It fails to note it as a change of position if someone moves, e.g. from the bottom of quintile 1 to the top of the same, while it regards it mobility if someone moves, as a result of however small a rise, from the top of decile 1 to the bottom of decile 2.

Therefore, *we adopt a different approach* when examining mobility, and look at the extent of relative changes of position. We establish a sequence of the persons in the sample from the point of view of the variable under investigation, e.g. the equalised income, regarding also weighting. We associate the same serial numbers to persons with identical income, e.g. to mem-

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[16] We have also tried the method proposed in *Fields* and *Ok* (1998) that measures not relative but absolute mobility. It is perhaps not irrelevant to mention that their procedure cannot be so well used in cases where the change of average incomes is really large from one period to the other as this will basically determine the size of their mobility indicator. If, however, we apply the breakdown *income movement = social utility growth + social utility transfer* in a way suggested by them, then the social utility transfer thus obtained will be highest when the change of the average income is the lowest, and the other way around.

[17] See e.g. *Shorrocks* (1978*a*).

bers of the same household. We finally normalise the sequence between 0 and 100%. We name the value thus received the *relative position* of the person in question. *We regard the person immobile at 10% range, if his/her relative position in the period under scrutiny changed less than 10 percentage points*. Consequently, we will regard such persons as 10% downwardly or upwardly *mobile* if the change is equal or more than 10 percentage points.

In what follows, we will examine the mobility of equalised income/expenditure, and sometimes per one person, at 10 and 20% range, examining what percentage of the persons, who are in the sample in both the initial and the closing year of the period in question, is mobile. Table 10 contains the 10 and 20%-range mobility of equalised income as a percent of those belonging to the individual income quintiles, respectively.

Table 10

10%-range mobility of equalised income by income quintiles, %

Quintile	1993-94		1994-95		1996-97		1997-98	
	Down	Up	Down	Up	Down	Up	Down	Up
1	6	38	5	31	2	37	3	37
2	23	37	22	38	24	35	20	41
3	34	28	28	30	27	34	32	29
4	38	21	36	22	38	16	37	21
5	34	4	33	3	40	3	27	3
Average	27	26	25	25	26	25	24	26
Total	53		50		51		50	

20%-range mobility of equalised income by income quintiles, %

Quintile	1993-94		1994-95		1996-97		1997-98	
	Down	Up	Down	Up	Down	Up	Down	Up
1	0	26	0	16	0	22	0	19
2	9	23	4	21	6	21	6	21
3	19	18	15	18	15	18	21	15
4	22	4	22	9	20	3	22	4
5	20	0	19	0	21	0	16	0
Average	14	14	12	13	13	13	13	12
Total	28		25		26		25	

In the first panel cycle the average mobility of 10%-range drops from 53 to 50%. This is mainly the result of a major drop in the upward mobility of those in the first quintile, from 38% in the 1993-94 transition to 31% in 1994-5. This second transition reflects the developments of the first year of the stabilisation shock: *a nearly 10% drop of the income goes together with the decrease of the relative upward mobility of the poorest.*

The 10%-range average mobility in the second panel cycle kept level at 50%. This stagnation is a phenomenon worth noting as the incomes began to rise *between 1997 and 1998, which as we can assume, did not imply the intensification of mobility; mobility remained at its earlier level.*

The stagnation is experienced also in respect of the poor as the mobility of those in the first quintile did not change between the transitions of 1996-97 and 1997-98. However, it is a new phenomenon in this period that the downward mobility of the richest sank significantly between 1996-97 and 1997-98. *An increasing share of those with the highest incomes managed to stabilise their positions.*

If one looks at mobility at a 20% range (see second part of *table 10*), it will reflect a decreasing share of mobile persons, but the tendency of changes will be similar to what we have presented so far. At a 20% range, the decrease of the upward mobility of the poorest is a great deal more manifest.

Presenting the tendency of mobility not only for equalised but also for per capita income promises interesting conclusions (*table 11*). In this case the decrease of mobility is more intensive within both panel cycles, and it is particularly obvious that between 1996-98 and 1997-98 – contrary to what *table 10* reflects – the upward mobility of the poorest greatly reduces. To understand the phenomenon it is worthwhile making a short detour.

Table 11

10%-range mobility of per capita income by income quintiles, %

Quintile	1993-94		1994-95		1996-97		1997-98	
	Down	Up	Down	Up	Down	Up	Down	Up
1	3	36	4	30	4	34	5	27
2	22	37	20	28	18	35	16	41
3	38	26	25	34	30	32	32	23
4	36	22	34	19	37	18	31	20
5	37	5	33	5	31	0	28	3
Average	27	25	23	23	24	24	22	23
Total	52		46		48		45	

The divergence of the mobility of the two types of indicators originates from the changed situation of those with large families i.e. mostly a couple with 3-4 children. In the case of some of them a slight improvement of the relative income position is perceptible between 1997 and 1998. This improvement remains below 10% in terms of per capita income, and thus it has no bearing on mobility. However, in the case of equalised income, families larger than the average can have their relative positions improved even at smaller rises of their specific income.

The average number of children reflects a negative correlation with income deciles not only in the case of per capita income – which is quite natural – but also in the case of equalised income. This presents itself rather acutely at the two extremes of the scale: the number of children in the first decile is well above the average, while in the tenth it remains much below. In the period 1993-95 the average child-number of households in the first equalised income decile rises from 1.5 to 1.8 in 1993-95, then, in the period 1996-8, primarily in 1998, this same value drops from 1.7 to 1.5.

Expenditure mobility exceeds corresponding income mobility every year (*table 12*). This is quite understandable as dissavings, purchasing on credit, or the other way around, beginning to save up prior to purchasing some expensive item ensures more leeway in comparison to the income, in the case of expenditure.

Table 12

10%-range mobility of equalised expenditure by expenditure quintiles, %

Quintile	1993-94		1994-95		1996-97		1997-98	
	Down	Up	Down	Up	Down	Up	Down	Up
1	4	37	3	35	5	33	3	32
2	21	43	20	42	19	38	23	41
3	36	32	36	35	28	32	32	35
4	37	23	40	23	40	25	40	23
5	46	3	41	2	35	2	33	1
Average	29	28	28	27	25	26	26	27
Total	57		55		51		53	

The average expenditure mobility shows a downward trend in the period in question, and rises only during the last transition, and even so, it remains below the mobility indices of the first panel cycle. 1998 used to be the first year in which household expenditure grew in real terms. It is still an open issue if increasing mobility that year marks the beginning of a new trend or is it merely normal fluctuation.

Upward mobility of those in the first expenditure quintile gradually de-creases, same as the downward mobility of those in the fifth quintile. This latter process is particularly intensive. Rising average mobility in the last year is obviously ascribable to the fact that mobility in both directions of those in the second and third quintile increased. That witnesses growing un-certainty of those 'in the middle', which may be pregnant with dangers as well as opportunities.

Changes of relative position of income/expenditure from one year to the other may be caused by numerous temporary phenomena. On the other hand, immobile may be regarded those households that change their places in small steps in the hierarchy. To filter out these phenomena, in table 13 we present the share of those whose relative income/expenditure position re-mained within the 10 or 20% neighbourhood of their initial position for three years, respectively. So e.g. the difference of their relative income po-sitions in 1994 and 1993, and in 1995 and 1993 remains likewise below 10%. We will continue to refer to them briefly as the *long-term immobile persons*.

Table 13

**The share of long-term immobile persons by income
and expenditure deciles, %**

Decile	Equalised income				Equalised expenditure			
	10%-range		20%-range		10%-range		20%-range	
	1993-95	1996-98	1993-95	1996-98	1993-95	1996-98	1993-95	1996-98
1	44	45	64	66	54	52	73	72
2	34	35	63	66	24	25	54	63
3	25	26	50	61	19	17	43	49
4	17	11	47	47	8	15	35	43
5	19	18	50	43	16	13	40	45
6	14	19	39	50	13	18	39	55
7	15	20	48	54	16	11	45	53
8	21	26	56	55	16	15	54	57
9	33	34	66	56	24	36	47	64
10	52	61	64	75	47	54	62	70
Average	28	30	55	57	24	26	49	57

The share of the long-term immobile persons shows a gentle growth, except for the 20% range expenditure mobility where that share rises significantly. The income immobility of the poorest moves upward somewhat, but their

expenditure immobility reduces slightly between the two periods. It is quite conspicuous that in their case the expenditure immobility much exceeds the income immobility. With those belonging to the second decile the expenditure immobility grows also, especially at the 20% range.

Looking at the 20% range – except for the first decile – the share of the long-term immobile follows an upward trend in the case of every decile. This may lead us to assume that *by the second part of the decade the time of the major reshuffling was over.* The group of the most affluent also seems to close: in the case of those belonging to the tenth decile the share of the long-term immobile significantly grows in each case presented.

Summing up the above, we can conclude that *relative mobility decreased on aggregate. The significant reduction in incomes experienced between 1993-96 along with the gentle rise of the inequalities appeared simultaneously to higher mobility. However, the beginning of the growth together with the stagnation of inequalities resulted in sinking mobility, especially in the case of the most affluent. There are certain indications that between 1997 and 1998 relative mobility rises among the poorest.*

This last statement clearly calls for a supplement. So far we have been referring to *relative* mobility, but these processes took place beside decreasing real incomes and expenditures. In other words, the poor in 1997 were much poorer than those in 1993.

For the sake of comparability of relative and absolute changes let us select – in an arbitrary fashion – the upper limit of the first quintile in 1993 as the *poverty line*, and the upper limit of the first decile as the *extra poverty line*. *Table 14* shows the percentage of the population in later years for which it was true that their income/expenditure in real terms remains below these limits. In other words, we treat the 1993 relative poverty line as the absolute poverty line in the other years.

To 1993 standards, in 1997 nearly half of the population could be said to be poor. Considering the threshold for the 1993 extra poverty line then, the situation was even worse because in 1996 three times as many persons failed to reach that income level as in 1993. A similar situation prevails in the case of expenditure, even though there the rise is somewhat more modest.

Table 14

The share of those below the poverty line and the extra poverty line, %

	1993	1994	1995	1996	1997	1998
Equalised income						
Based on the first decile	10	12	21	30	29	28
Based on the first quintile	20	20	32	42	43	40
Equalised expenditure						
Based on the first decile	10	12	16	21	21	22
Based on the first quintile	20	21	27	35	37	36

A particularly important issue is the share of the poor all through the investigated period. Between 1993 and 1995 just over 4% in terms of income are steadily below the extra-poverty line, and 11% below the poverty line. This means that over half of those belonging to the first quintile in 1993 could not move above the line in any of those years. The situation is no different with expenditures where the corresponding values are 5, and 10%, respectively.

Between 1996 and 1998 we obtain much higher shares: 14% are *permanently* below the extra poverty line, and 26% below the poverty line. *So between 1996 and 1998 there is a much higher share of those who have always been below the relevant poverty line than those whose income remained below this line in 1993.* As for expenditure, the corresponding shares were 10, and 20%.

5. CHANGES IN THE HOUSEHOLD DURABLES

The question we are attempting to answer in this section is how the changes that occurred in the income positions of the households modify their asset positions. The available database does not allow us to examine either the savings held in cash or in securities, or the value of their real estates. Hence, the analysis of the stock of durables may be considered as a proxy for reviewing the asset positions of households.

The HBS database provides a limited means to measure household durables. Since the share of those refused to answer was the highest among those living in the best financial and material conditions, the real frequency of the goods are somewhat underestimated. We do not have data concerning the distribution of durables by age, either.

The analysis of the number of durable goods held, however, has a great advantage over income or expenditure, namely that the families are willing to declare their durable goods and remember clearly the circumstances of purchase. Thus, the examination of the changes in durables is suitable for analysing the development of inequalities and mobility, for confirming or questioning our previous findings based on income and expenditure data.

For the purposes of defining the asset score, we used those 29 goods in the survey that best characterise the stock and dynamics of the durables. In table 15 there are four frequency figures under the name of each item: the first one is for 1993, the second (in brackets) for 1995, then for 1996 and 1998. Non-availability of data means that the item was not yet included in the survey that year. The goods surveyed in both panel cycles are hereinafter referred to as comparative assets while those including all the goods in the table are called total assets.

Table 15

The share of households with the 29 most typical durable goods, %

1993	(1995)	1996	1998	1993	(1995)	1996	1998	1993	(1995)	1996	1998
Refrigerator				Freezer				Refrigerator + freezer			
97	(98)	85	85	59	(62)	54	60	–	(–)	19	20
Gas/electric oven				Gas and electric oven				Microwave oven			
94	(97)	98	99	1	(0)	1	1	17	(22)	26	37
Non-automatic washing machine.				Semi-autom./automatic washing machine				Automatic washing machine+dryer			
57	(59)	52	50	46	(44)	51	55	–	(–)	1	1
Vacuum cleaner				Boiler/hot water				Cleaning machine			
89	(89)	90	91	82	(84)	87	88	–	(–)	2	5
Black and white TV				Colour TV				Parabolic antenna			
39	(33)	26	20	70	(78)	82	88	–	(10)	15	17
				Telephone line				Mobile phone			
				26	(41)	50	71	–	(1)	3	7
Bicycle				Motorbike				Car			
63	(63)	65	63	10	(5)	10	8	33	(34)	36	34
Radio/with cassette				Stereo radio				HI-FI SET			
84	(85)	86	88	32	(33)	32	33	13	(12)	19	21
Camera				VCR				Video camera			
45	(42)	47	49	33	(34)	43	44	0	(1)	2	2
Record player				CD player				PC			
20	(18)	16	16	–	(–)	4	9	6	(6)	8	9

The frequency of the goods essential for satisfying basic needs generally increased while the frequency of outdated items decreased during the six years under review. The number of automatic washing machines definitely grew in the period as well as the number of colour televisions, boilers and videos. There was a boom in the number of telephone lines[18], while the frequency of cars stayed unchanged.

The aggregate measure of assets is generated by assigning a quality score to the goods held by the households. In our calculations, we assigned 1 to the goods in the first column, 3 in the middle and 5 in the third column of table 15, except for cars that scored 15. That also means that we considered the different needs equal and there is no difference between their scores, while the up-to-dateness of goods is classified by this simple scoring system. The total score of the goods gives the score of the stock of durables, hereinafter the *asset score*. When calculating the asset scores, we noted cases where there was more than one of the given item in the household.

The difference between asset scores at two different points in time reflects the change in the total score of goods from one period to the other. Its positive or negative value is the simplest measure of enrichment or impoverishment. For the period 1996-98, we computed both the comparative scores with the first panel cycle and the scores of the total assets. When generating the comparative scores, we took into account that certain goods were previously grouped differently (e.g. combined refrigerator-freezers were classified as refrigerators before 1996).

The categories of household groups we introduced for the purpose of the analysis of durables take into account the changes in real income and expenditure. Table 16 shows the changes in time of real income and expenditure. There was a fall in real income in more than 50% of the population in the periods 1993-1994 as well as 1994-1995 and also in the first transition of the second cycle, between 1996 and 1997. The downturn in real income affected the largest number of people between 1994 and 1995. In that period, the real income of almost three quarters of the population decreased: to a large extent for 31% and to a lesser extent for another 43%. An improvement occurred only at the end of the second panel cycle in 1997-98, when the real income of 58% of the population increased.

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[18] This rate of increase of supply of land-line telephones is not explained by a change in consumers' behaviour. Prior to the political changes the telephones were a typical shortage-item. The privatisation followed by a rapid upgrade of the network created the conditions of the expanding telephone service.

Table 16

**Distribution of households by changes in real income
and expenditure, %**

Changes in real income	1st panel cycle		2nd panel cycle	
	1993-94	1994-95	1996-97	1997-98
– –	18	31	17	13
–	33	43	36	29
+	28	16	28	35
+ +	21	10	19	23
Total	100	100	100	100

Changes in real expen-diture	1st panel cycle		2nd panel cycle	
	1993-94	1994-95	1996-97	1997-98
– –	23	31	22	19
–	28	32	33	28
+	24	19	26	27
+ +	25	18	19	26
Total	100	100	100	100

Key: – – : real income/expenditure of the final year is less than
80% of the starting year real income and real expendi-
ture, resp.
– : between 80 and 100%,
+ : between 100 and 120%,
+ + : exceeds 120% of the respective value.

We observed a similar tendency for the changes in time of real expenditure. Between 1994 and 1995, the real expenditure of 31% of the households radically shrank, while 63% of the households decreased their real expenditure. Even in the period between 1996 and 1997, the fall in real expenditure continued in 55% of the households. It occurred only during the transition of 1997-1998 that more than half of the population were able to increase their real spending.

We would expect that the majority of households limit their expenditure on durable consumer goods and spend only on basic and necessary items during inflation when there is a permanent fall in the real income and real expenditure and the asset scores of average households stagnate. However, the total asset score of households increased in the 1993-94-period, then in

1994-5 there was a significant drop, while during the 1996-97 transition the score turned positive again (see *table 17*).

Before 1995 the worsening economic conditions generated pessimistic expectations in the majority of households. This, together with the relatively low inflation on the durables market, caused that in 1994 the households spent more on durable consumer goods then in 1993. In 1994-5, however, the reaction of the majority of households was just the opposite: even if their real expenditures increased, they let the level of their household assets decrease and postponed their purchases of durables. In this period, even the households, increased their real expenditure to the greatest extent, reduced their stock of durables.

Following the low in 1996, consumer reactions of 1996-97 were similar to those observed in 1993-94. Although the real income and real expenditure of the majority of households still fell, the asset score differences were mostly positive. Postponed purchases were now realised.

Between 1997 and 1998 such a common reaction of the households was no longer observable. Although real income and real expenditure increased in the majority of households, total asset scores increased at a lesser degree than in the previous year. The asset scores of the households that reduced their real spending at a significant rate definitely decreased. They were not able to replace discarded goods or, what is worse, they were forced to sell their goods in order to supplement their lower income.

Between 1997 and 1998, approximately one third of the households that suffered severe decrease in real income reacted by cutting back their real expenditure while their stock of durables decreased from one year to the other. If we examine the changes in time in asset score differences by the categories of changes in real expenditure, we can see that the score of assets grew simultaneously with increasing real expenditure. The values in *table 17* suggest a close connection between the increase in real expenditure and the positive changes in asset scores. If, however, we analyse the changes in asset score differences by the categories of changes in real income, the tendencies are less clear-cut: there is no direct relationship between the changes in real income and the growth in stock of durables.

The analysis of *table 17* may raise doubts in the reader that the changes in time of asset score differences are due to the occurrence or lack of only the car. In order to avoid it, we also calculated the asset scores except cars. The changes in time of asset score differences showed exactly the same trend.

Table 17

**The changes in asset scores by real income
and expenditure change categories**

Changes in real income	1st panel cycle		2nd panel cycle	
	1993-94	1994-95	1996-97	1997-98
– –	1.8	-1.3	-0.2	0.7
–	1.6	-1.3	1.6	0.1
+	2.3	-1.0	2.1	0.7
+ +	4.0	-0.9	1.7	0.9
Total	2.3	-1.2	1.5	0.5

Changes in real expen-diture	1st panel cycle		2nd panel cycle	
	1993-94	1994-95	1996-97	1997-98
– –	0.5	-2.7	0.4	-2.6
–	1.7	-0.8	1.0	-0.3
+	2.7	-0.3	1.8	1.7
+ +	4.3	-0.2	2.9	2.6
Total	2.3	-1.2	1.5	0.5

See key for previous table.

We can also use the asset scores to examine the inequalities of stock of durables. Similarly to *table 4*, we calculated the Gini coefficient and the Generalised Entropy index for -1 and 2 parameter values. *Table 18* contains the inequality indices for both the comparative and the total assets.

The series of Gini coefficient reflects a slow but permanent decrease for the full period. The GE indices show a slight fluctuation during the first panel cycle. The GE(-1) index temporarily grows in 1994. This measure is relatively more sensitive to lower values and its growth may be due to the fact that the positions of those with lower asset scores was worse than the average positions during that period. The GE(2) index, that is more sensitive to higher values, grew temporarily in 1995 when income inequalities were also relatively high. With regard to total assets however, where scores include newer, somewhat more modern equipment, the rate of decrease in inequality indices is lower than that of the comparative scores.

Inequality indices calculated for the asset scores

	1993	1994	1995	1996	1997	1998
Comparative household durables						
Gini	0.309	0.304	0.302	0.296	0.293	0.282
GE(-1)	0.254	0.264	0.242	0.237	0.223	0.208
GE(2)	0.150	0.142	0.152	0.138	0.134	0.123
Total household durables						
Gini				0.302	0.298	0.295
GE(-1)				0.252	0.235	0.231
GE(2)				0.144	0.139	0.137

We examined the development of differences in asset scores from another aspect as well. For that we have to refer back to *table 13* that presents the permanently immobile households with regard to expenditure. We have generated the quotient of the asset scores of those permanently immobile around decile 10 and around decile 1 for both panel cycles. In case of a 10% mobility range, this quotient grew from 3.6 to 4.2 between 1993 and 1995 then dropped from 4.4 to 4.1 between 1996 and 1998.

The stock of durables changes more slowly than the income or expenditure, and savings do not manifest solely in the household durables. Taking into account all these aspects, we can establish that *our computations concerning the inequalities of stock of durables confirm our previous findings: in the second panel cycle investigated, the growth of income inequalities halted and inequalities stabilised.*

The development of income and expenditure inequalities as well as stock of durables inequalities are strongly related to the trends of asset positions. For the asset scores, our interpretation of the degree of relative changes in positions is similar to the interpretation regarding income and expenditure in the previous section.

The 10%-range mobility of household durables fall from 37 to 34% in the first panel cycle (see *table 19*). It was primarily due to the decreased upward mobility of those significantly increasing their real income and real expenditure. In the second panel cycle, the average of the 10%-range mobility of durables slightly decreased, then stagnated, despite the growth in real income and real expenditure that started between 1997 and 1998. *So the increase in income and expenditure was not accompanied by a more vigorous mobility of stock of durables.* The upward mobility of those with significantly increasing real income and real expenditure did not grow, and their

downward mobility did not fall either. These people managed to stabilise their asset positions.

Table 19

**10%-range mobility of comparative assets
by real income categories, %**

Category	1993-94		1994-95		1996-97		1997-98	
	Down	Up	Down	Up	Down	Up	Down	Up
− −	19	14	20	19	18	11	20	19
−	22	15	15	15	14	15	17	13
+	15	17	15	16	13	19	11	12
+ +	18	27	19	22	16	18	16	18
Average	19	18	17	17	15	16	15	14
Total	37		34		31		29	

**10%-range mobility of comparative assets
by real expenditure categories, %**

Category	1993-94		1994-95		1996-97		1997-98	
	Down	Up	Down	Up	Down	Up	Down	Up
− −	22	9	21	14	20	15	25	7
−	20	16	16	18	16	14	20	12
+	15	18	13	21	12	15	8	15
+ +	17	27	15	19	10	21	11	22
Average	19	18	17	17	15	16	15	14
Total	37		34		31		29	

However, the upward mobility of those, who suffered a reduction of real income and real expenditure, fell significantly between 1997 and 1998. During 1996-97 upward mobility of those who suffered a reduction in real expenditure was around 30% while, in 1997-98, was around 20%.
We can establish that the mobility of stock of durables definitely decreased during the periods under review. The fall in the income and expenditure and the continuos decrease in asset inequalities experienced between 1993 and 1996 were coupled with relatively high mobility. The commencement of growth and the further decrease in the inequalities of assets were accompanied with reduced asset mobility, particularly with those coping with a significant downturn in real expenditure. *The relationship between inequalities and mobility, however, fastens asset positions which renders some households unable to improve their positions on the short term. Hence the short*

term income and expenditure shocks occurring in 1995 and 1996 had a multiplier effect on the long term. In spite of lower inequalities in household durables, the freeze of positions may increase the sense of inequality and may, later on, when inequalities slightly increase, suggest a higher degree of inequality and may even create frustration.

6. SUMMARY

Between 1996-98 the inequalities of the income and expenditure and the stock of durables of the Hungarian households did not increase any further but rather stabilised. Different inequality indices show a slight increase in inequalities between 1993 and 1996, and the comparison of them suggests that the inequalities grew at the ends of the scale only. This process also stopped between 1996 and 1998. The increase in the ratio of income percentiles 90 and 10 between 1993 and 1996 was due to fact that the families suffering from long-term unemployment fell further behind.

The level of expenditure inequalities is significantly higher than the level of income inequalities. Due to the 1995 stabilisation, the expenditure inequalities temporarily peaked in 1996. The decomposition of expenditure inequalities enabled us to analyse accurately the reshuffling process of inequalities stating that the shock caused by the 1995 stabilisation measures ceased by 1997 at the level of income and expenditure of households. The decrease in the inequalities of stock of durables is more clear-cut than that of the income inequalities, which in fact presents a further confirmation of our findings.

The stagnation of inequalities is coupled with decreasing mobility, which may also account for the stabilisation of inequalities. This process may be observed in every income and expenditure decile. Immobility is particularly strong at the ends of the income and expenditure scales. The poor have less chance to improve their positions, and even the commencement of economic growth failed to increase their mobility. Further analysis is required to determine whether or not a longer term growth can increase the upward mobility of the poor. It is obvious that the richest families were able to stabilise their positions permanently.

With relatively low and decreasing mobility measures, we cannot expect a decrease in inequalities in the future. Hence this process may result in the stabilisation of the income/expenditure and the asset positions of the households. Our results suggest that while there was a general and accelerating restructuring of the income and expenditure of households in the early phase of the transition, this process slowed down during the period under review and was coming to a halt at the end of the 1990s.

APPENDIX

A.1. MOST IMPORTANT FEATURES OF THE SURVEY AND OF THE SAMPLES

The Household Budget Surveys (HBS) of the Central Statistical Office look back on a past of over 50 years. Such surveys had been conducted annually up to 1983, from that year until 1993 in every odd year, and from 1993 they are prepared again on an annual basis. First we describe some important features of the full sample of HBS[19]. The basic population of the survey is the entirety of the Hungarian citizens living in households in Hungary, i.e. the survey does not cover those in so-called institutional households. The basic unit of our selection is the flat, that of our observation the household. (This entails that the temporal follow-up of demographic processes of the households is only possible in the case of those who stayed in the same flat.)

One twelfth of households participating in the survey maintain a household accounts record for one month each, this is followed by an interview concerning the whole year at the end of the year, and two more interviews with each household in the survey in the first quarter of the following year. The final database will have the 12-fold of the values obtained from the monthly records on food, tobacco/alcohol/coffee, and part of clothing, while the rest of the expenditures as well as incomes come from the annual interview.

The sampling districts are selected in a one or two-tier process depending on the size of the settlement, and all settlements with a population in excess of 15,000 are integrated in the survey. At the same time, the number of settlements in the survey has been seriously reduced since 1996 for financial reasons.

The master sample is not proportional thus the master sample/population quotient in Budapest is half, and in settlements larger than 50,000, 3/5 of that employed in small settlements. This is explained by the fact that – following a tradition of several decades – the population of Budapest and the large cities had been assumed to be more homogenous than that of small settlements. This massive routine only changed in 1998, and proved to be a hindrance already in the 90s as refusals to respond or alternative

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[19] In preparing that we have relied on the methodological sections of the CSO's publications titled Household Budget Survey as well as on CSO (1997). For an English description of the sampling technique see *Mihályffy* (1994)

reasons for inconclusive interviews reached outstanding rates in Budapest. Successful interviews oscillated around 60% in the entire period, while those in Budapest were only in the ballpark on 1/3. A result of that, already in the original (non-panel) sample, the share of the capital city is no more than 7-8%, where in fact 18-19% of the country's population live.

As regards the reliability of HBS data one needs to state first of all that they fail to take account of the data of some marginalised social groups such as the homeless, the poorest unable or unwilling to communicate with the interviewer, or data of the most affluent living in separation from society. These internationally known characteristic features become a problem upon the appearance of sudden and significant social changes.

The introduction of personal income taxation, the expansion of the informal or the black economy, economic/social changes, the differentiation of incomes and of people's property status, the appearance of entrepreneurial lifestyles, and the deterioration public safety compromised the quality of the outcome of the HBS and of the willingness to respond as regards both the concealment of income items, or occasionally some expenditure items. Further deterioration of quality came through the fact that households undertaking to maintain account records lose momentum over the years. Those refusing to respond are mainly the those in the higher income deciles, those with higher schooling, entrepreneurs, and city dwellers, particularly residents of the capital city.

All these phenomena have gathered considerable significance in the panel, and have been much intensified by the rotation of the participants in the period 1996-8, and the deficiencies through the replacement of participants selected in the panel but replaced for lack of willingness to respond. This is why between 1996 and 1998 only about one quarter of the original 1996 sample entered the panel instead of the theoretical one third. On the whole, the 1993-95 panel contains 3,507 households, and the 1996-8 panel 1,863, which is 1, and 0.5 per thousand of all households, respectively. In the course of generating the panel, we regarded identical those which had at least one permanent member.

It is worthwhile comparing the panel sample with actual data in a few important respects. We would like to highlight those with particular significance from the point of view weighting: features concerning age, sex, region, schooling, activity, and type of household. We present the comparative data for the first years of the panel cycles (i.e. for the periods 1993-95 and 1996-98).

Table A.1

**Ratios of the panel sample and fact figures compared to
the average sample/fact ratio, by age and sex** (%)

Age (years)	1993			1996		
	Men	Women	Total	Men	Women	Total
0-19	92	96	94	102	107	105
20-34	75	84	80	78	84	81
35-54	92	101	96	91	100	96
55-X	125	127	126	111	119	116
Total	96	104	100	95	104	100

Source of fact figures: CSO Demographic Yearbooks, adjusted by the expert estimate
concerning institutional residents, prepared by CSO staff.

As regards age, the most important phenomenon is the significant underrepresentation in the sample of young adults and overrepresentation of those beyond retirement age. Women are slightly overrepresented (see *table A.1)*.

The most serious difficulty with the sample is the underrepresentation of Budapest and – to a smaller extent – of the other major cities [20] (see *table A.2*). Thus for instance in the period 1993-95 the representation of the capital city in the sample is no more than one seventh of the corresponding figure of those not living in major cities. This issue is particularly meaningful for our subject as in the unweighted panel sample, in the period 1993-95 the average income of Budapest residents exceeded those in other settlements by 13-16%, while that of residents of major cities only by 7-9%. The same situation is shown even more conspicuously in the 1996-98 panel where the relevant ratios move around 20% and 15% p.a. In the case of per capita expenditures the same differences are even greater.

Table A.2 points at the overrepresentation of pensioners and unemployed persons and at the underrepresentation of active earners. A particular problem is the very low number of entrepreneurs in the sample.

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[20] Major city is meant to refer to the county seats and non-county seats but having a population in excess of 50,000, totaling 22 settlements.

Table A.2

Ratios of the panel sample and fact figures compared to the average sample/fact ratio, by activity type and settlement

	1993				1996			
	Budapest	other major cities	other set-tlements	Total	Budapest	other major cities	other set-tlements	Total
Employed+ Cooperative member	15	55	125	**85**	23	58	119	**86**
Entrepreneur+ Helping family member	5	19	65	**40**	16	30	60	**43**
Active earners total	**13**	**50**	**115**	**78**	**22**	**55**	**110**	**80**
Pensioner	32	74	169	**123**	43	76	150	**116**
Unemployed	34	58	166	**128**	33	64	186	**145**
Recipients of benefits paid after children	22	62	133	**102**	31	62	127	**101**
Pupil	21	55	146	**98**	30	65	157	**112**
Child not at-tending school	17	56	123	**91**	25	53	127	**96**
Total	**21**	**59**	**141**	**100**	**30**	**63**	**133**	**100**

Source of fact figures: microcensus of 1996, and computations of *Mária Keszthelyi-Rédei* (CSO) based on the extrapolated data of the 1990 census, data of labour force surveys of various years, and of the address checks conducted by the CSO.

Incomes and expenditures are closely related to the highest schooling range of the active earners in the household, data also strongly differenti-ated according to settlement types. This is why the facts presented in *table A.3,* chiefly the major underrepresentation of higher education graduates in the sample are of particular significance to us. This was mainly character-istic for residents of Budapest and other major cities in the initial period, while in the second the same phenomenon came to characterise residents of other settlements as well. A feature characterising both cycles is that the highest willingness to respond in Budapest and the major cities was char-acteristic of residents with secondary schooling, while in other settlements the same is seen among those with only primary education.

Table A.3

Ratios of the panel sample and fact figures per type of settlement, compared to the sample/fact ratio of active earners, by educational qualification (%)

Highest educational qualification*	1993				1996			
	Buda-pest	Other major cities	Other settle-ments	Total	Buda-pest	Other major cities	Other settle-ments	Total
Primary	87	102	105	114	92	93	108	116
Secondary	134	111	91	90	128	119	91	92
Tertiary	71	75	92	66	71	84	76	62
Active earners total	100	100	100	100	100	100	100	100

* Primary education: 8 years of primary education or less, vocational school; secondary: GCSE holders; tertiary: holders of a college or university degree.

Source of fact data: for 1996 the data of the 1996 microcensus; for 1993, regarding the total column above, the data of the 1993 statistical yearbook; for internal distribution our own computations based on the data of the 1990 census, the 1996 microcensus, and the 1992, and 1994 wage tariff survey.

F.2. Calibrating the data

Due to the above presented problems of the database, the calibration process and the selection of the appropriate control variables proved to be an especially sensitive task. In selecting the calibration procedure, our basic point of view was to see that it suits the practice of the CSO to date and the one under transformation, i.e. the calibration procedure of the original HBS sample.[21]

Since 1993, the CSO has been using the generalised iterative scaling process to calibrate databases of household statistics (see *Darroch* and *Ratcliff* (1972)).

One of the most important advantages of the procedure is that it preserves the feature of design-based weights whereby all members of the individual

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[21] We would like to thank hereby *László Mihályffy* for the invaluable information he shared with us concerning calibration, and *Mária Keszthelyi-Rédei* for her assistance in specifying the value of the control variables. For written information on the calibration procedure applied in the course of the HBS see the English Appendix of the CSO Household Budget Survey, 1999.

households are of the same weight. A further advantage is that it ensures, by definition, the non-negativity of weights, and provides a way of keeping them within reasonable limits. The procedure solves the following problem:

$$\min \sum_{j=1}^{n} \left[w_j \left(\log w_j - \log w_j^0 \right) - \left(w_j - w_j^0 \right) \right] \qquad (1)$$

subject to the calibration functions

$$\sum_{j=1}^{n} w_j q_{ij} = c_i , \quad i = 1, 2, \ldots , m \qquad (2)$$

and the optional constrains

$$l \leq w_j \leq u , \quad j = 1, 2, \ldots , n \qquad (3), \text{where}$$

- n denotes the number of households in the sample;
- w_j^0 and w_j are the original design-based, and the calibrated weights, resp.;
- q_{ij} is the value of the i-th control variable in the j-th household;
- c_i is the value of the i-th control variable in the entire population;
- l and u are the lower and the upper limits, respectively, for calibrated weights.

We have used the following control variables in the course of the calibration process:

1. 4 age groups in a breakdown by sex, for 7 regions of Hungary (NUTS range II) (a total of 56 variables). The 4 age groups are as follows: 0-19, 20-34, 35-54, and 55-X (see *table A.1*).
2. Active earners with primary, secondary and tertiary education, in a breakdown by Budapest – major cities – other settlements (table A.3)
3. Total population of Budapest, the major cities, and other settlements.
4. Number of entrepreneurs, pensioners, those on child nursing benefit, pupils/students, and children not attending school without a regional breakdown (see *table A.2*).
5. Number of households, one-person households and households with children similarly without a regional breakdown.

Our original plan was to carry out the calibration in a breakdown by Budapest – major cities – other settlements, but the small size of the Budapest sample unfortunately prevented this exercise.

We note at this point in conjunction with the 4th group of variables that it implicitly contains – together with the 2nd group – employees as well because active earners consist of these and of entrepreneurs.

In respect to the specification of control variables, we still need to address the problems of the unemployed. A household-statistics survey regards unemployed those persons who pursue no activity to serve as their main source of income, and who, in response to the question on the type of their inactivity, select the answer 'seeking work'. It becomes obvious from the

microanalysis of the data that, from the point of view of actual unemployment, this latter group is hard to separate from those who selected the answers 'managing a household', or, especially, 'does not wish to work' A further difficulty is that macro-range data on unemployment are hard to bring in line with these categories. Thus we have found that the most reasonable solution is to treat the unemployed and other dependants as one category from the point of view calibration.

We did the calibration for the first year of the cycle for both periods, and we applied the weights thus obtained for the two subsequent years as well.

As lower and upper limits for the 1993-95 period we used the values 400 and 12,000, and in the 1996-98 period (whose sample was significantly smaller) 650 and 13,000. The point of setting limits was to possibly reduce the relative difference of the weights. Lowering the upper limit resulted in the fact that tasks (1)-(3) presented above had no solution. The lower limit could have been raised, but it would have implied a considerably greater error and distortion in the estimation of income deciles.

By way of comparison we note that the original sample weights of the panel in 1993 come within the 204-6,440 bracket, and in 1996 in the 501-10,309 one. The calibrated weights of the full HBS sample in 1993 were between 72 and 3,932, and in 1996 between 121 and 2,186. This means that in the case of the calibrated weights we have managed to keep the ratio of the highest and the lowest values of the design-based weights.

Table A.4. contains calibrated data referring to errors and distortions of income deciles computed with calibrated data, obtained with by applying the bootstrap method. We provide the values for 1998 as these are the worst.

Table A.4

Bootstrap statistics of income deciles, 1998

	Value(in 1000 HUF)	Relative error (%)	Bias/standard error (%)	95% bias corrected confidence interval (in 1000 HUF)	
Decile 1	162	3.0	-16	153	170
Decile 2	196	2.6	0	186	206
Decile 3	226	2.3	1	216	235
Decile 4	252	2.5	26	242	266
Decile 5	282	1.8	27	274	294
Decile 6	310	1.4	6	302	322
Decile 7	345	2.1	18	331	361
Decile 8	398	2.3	4	382	415
Decile 9	476	4.0	24	452	516

We have done the computations with the STATA 6.0 software, applying 3000 replications.

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