COMPSTAT 2010
19TH INTERNATIONAL CONFERENCE ON COMPUTATIONAL STATISTICS
Paris – France
August 22-27

INFLUENCE OF THE CALIBRATION WEIGHTS ON RESULTS OBTAINED FROM CZECH SILC DATA

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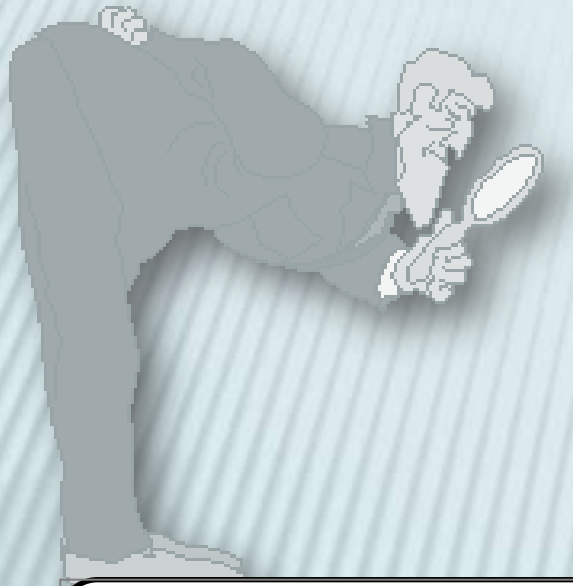
OBJECTIVE OF THE CONTRIBUTION



To reveal the connection between values of calibration weights and chosen statistical characteristics of the Czech households.

Basic statistical characteristics of calibration weights.

Influence of calibration weights on the income distribution in Czech Republic.

Influence of the calibration weights on the measurement of monetary poverty in the Czech Republic.

CONTENT

National variant of european survey **EU-SILC** as a continuation of former **MICROCENSUS** survey.

Construction of calibration weights for sample survey in Czech Republic.

Dependence of calibration weights on chosen variables.

Influence of the calibration weights to the results of survey.

REASONS FOR USE OF CALIBRATION WEIGHTS

- Table 1: Rate of successfully surveyed households according to the region of the Czech Republic

Successfully surveyed flats (%)							
Region	2002	2005	2008	Region	2002	2005	2008
Capital Prague	61,9%	51,1%	69,5%	Hradec Králové	65,9%	62,9%	81,3%
Central Bohemian	67,8%	63,7%	84,4%	Pardubice	80,7%	68,1%	85,0%
South Bohemian	76,2%	62,9%	87,0%	Vysočina	78,7%	73,5%	90,0%
Plzeň	77,0%	73,3%	82,3%	South Moravian	69,8%	60,0%	83,6%
Karlovy Vary	81,3%	61,1%	83,6%	Olomouc	77,5%	74,4%	84,0%
Ústí nad Labem	84,0%	64,6%	84,1%	Zlín	78,6%	67,3%	88,1%
Liberec	68,8%	64,0%	83,3%	Moravian–Silesian	73,8%	73,9%	86,9%

Source: Mikrocensus 2002, EU - SILC 2005 and 2008

CONSTRUCTION OF CALIBRATION WEIGHTS

- number of permanently occupied flats
- number of inhabitants per flat
- number of retirees (both working and not working)
- number of unemployed
- number of self employed
- age of the leading person
- size groups of municipalities

BASIC STATISTICAL CHARACTERISTICS OF CALIBRATION WEIGHTS

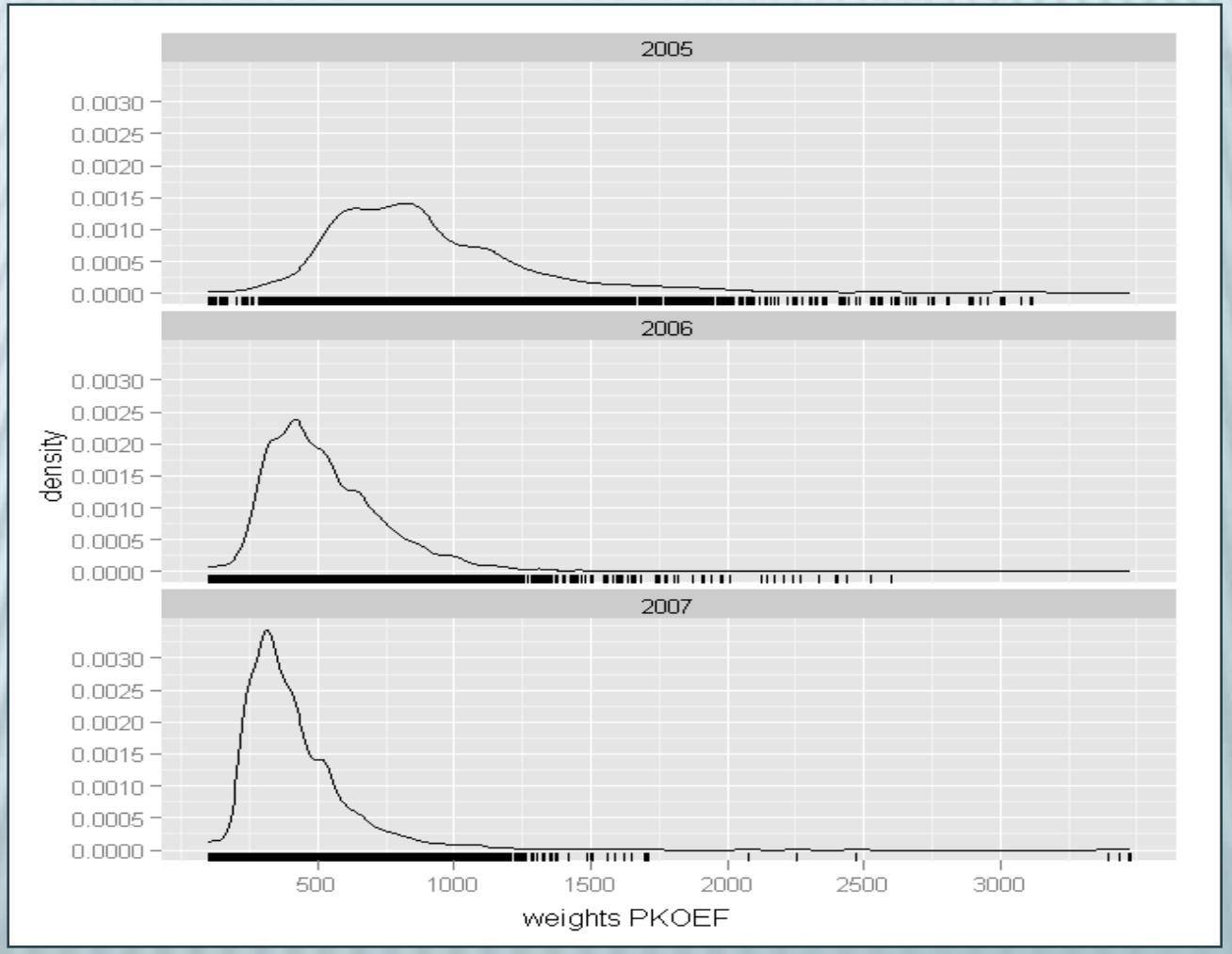
- Table 2: Basic statistical characteristics of calibration weights

Minimum 100.0	**1st quartile** 294.6	**St. deviation** 205.5
Mean 417.9	**Median** 369.8	**Weight sum** 4043341
Maximum 3475.0	**3rd quartile** 493.6	

Source: EU - SILC 2007

DISTRIBUTION OF CALIBRATION WEIGHTS IN DEPENDENCE ON INCOMES

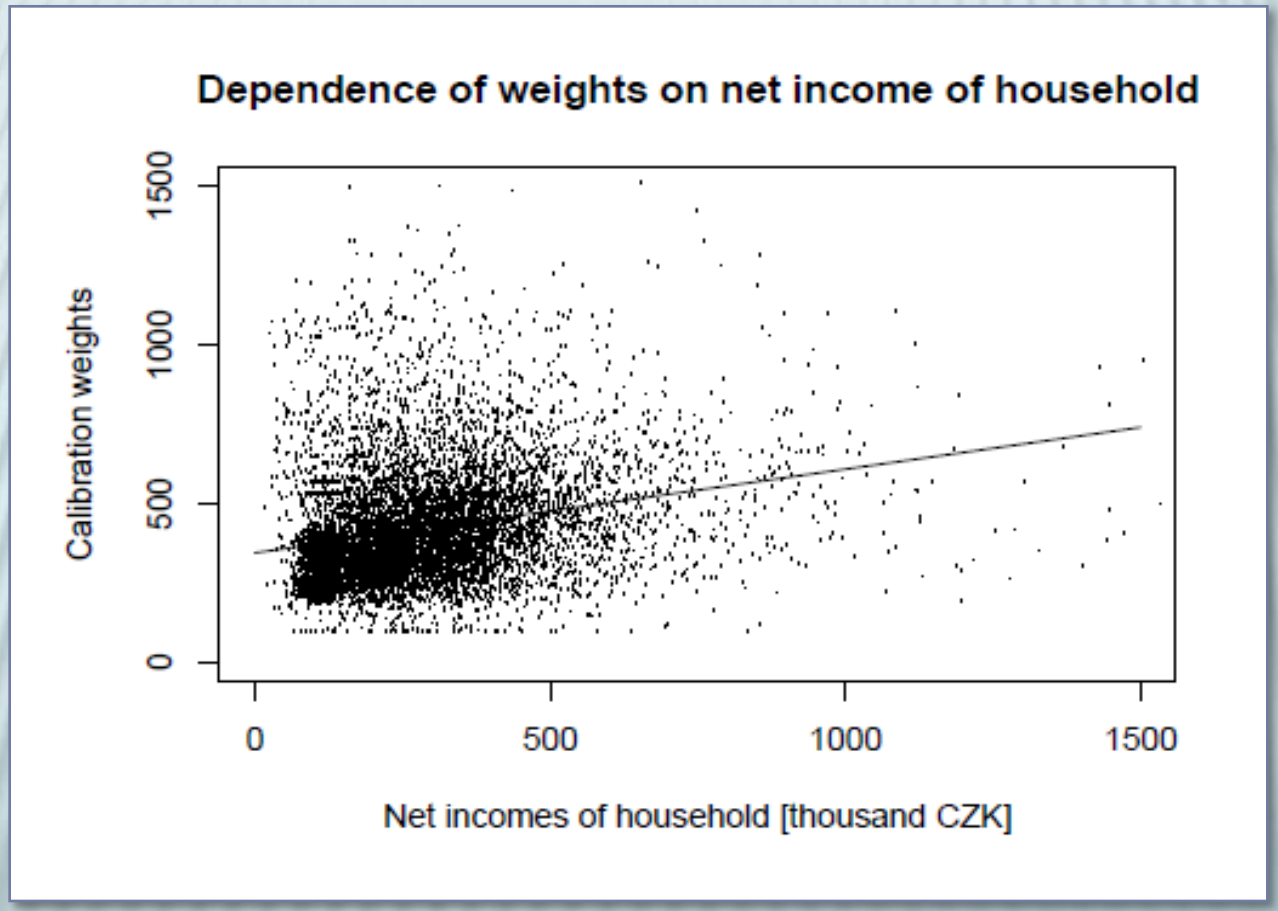
Fig. 1: Kernel density estimates of calibration weights distribution



Source: EU – SILC 2005 – 2007

DEPENDENCE OF CALIBRATION WEIGHTS ON INCOME OF HOUSEHOLDS

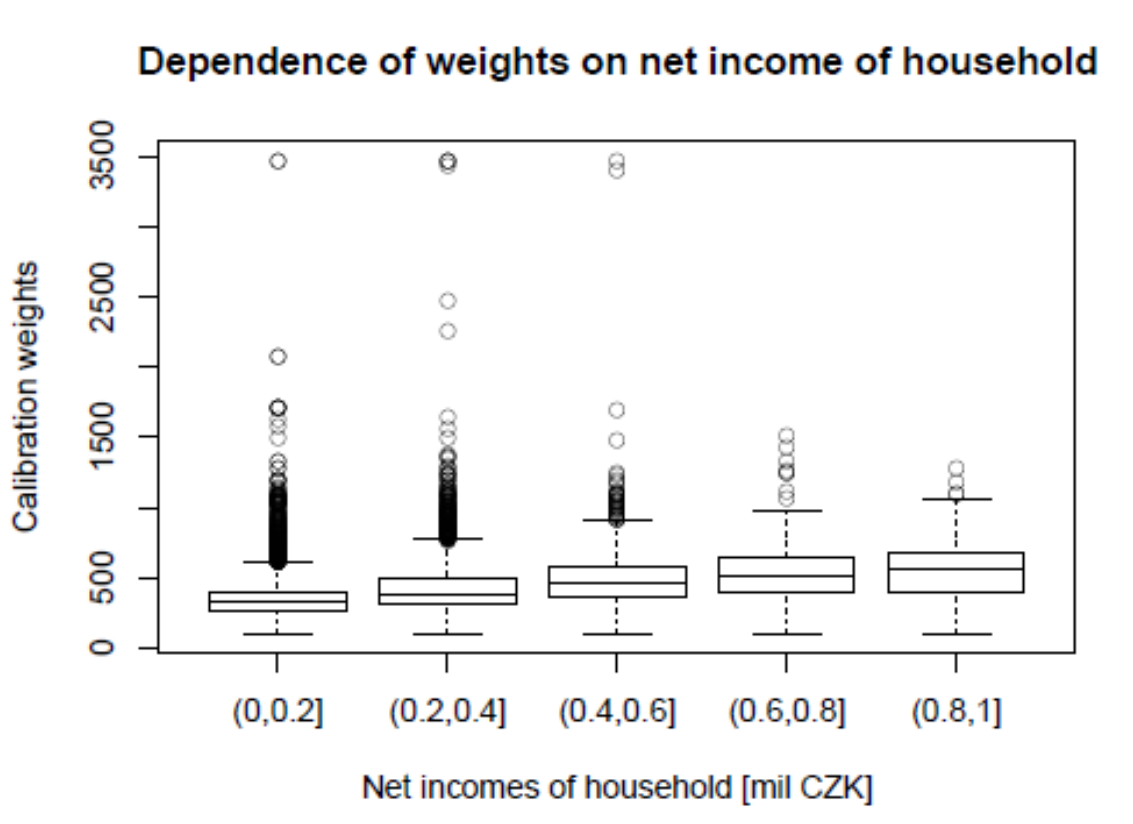
Fig. 2: Dependence of calibration weights on income of households



Source: EU - SILC 2007

DEPENDENCE OF CALIBRATION WEIGHTS ON NET OF INCOME

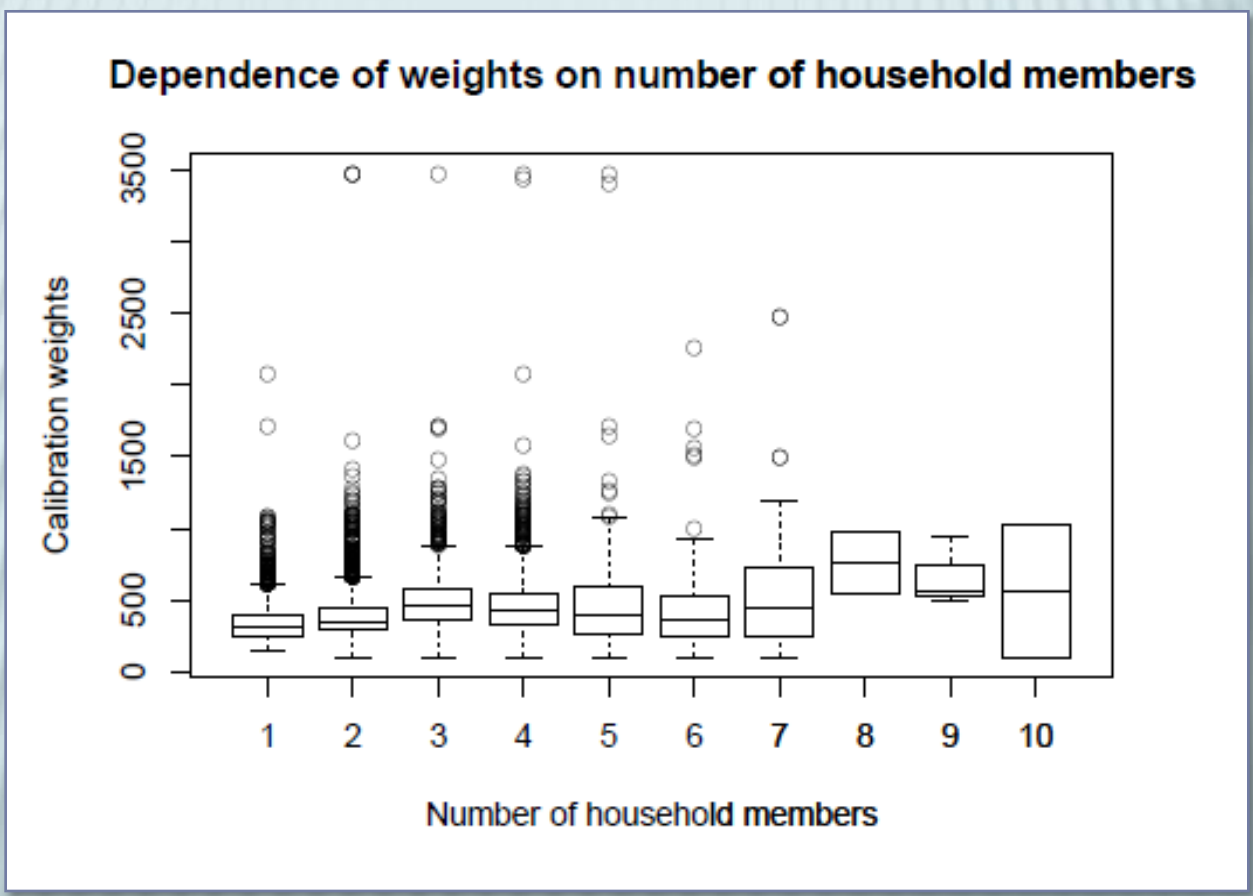
Fig. 3: Calibration weights of the households with different number of members



Source: EU - SILC 2007

DEPENDENCE OF CALIBRATION WEIGHTS ON THE HOUSEHOLD SIZE

- Fig. 3: Calibration weights of the households with different number of members



Source: EU - SILC 2007

DEPENDENCE OF THE CALIBRATION WEIGHTS ON THE SOCIAL GROUP AND MUNICIPALITY

Table 3: Sample sizes and means of calibration weights of different social groups

	Social group of the head of household							
	1	2	3	4	5	6	7	8
sample size	2385	802	2297	418	3423	258	110	9675
mean of weights	420.4	630.1	433.6	429.2	332.3	731.1	380.4	417.9

1 Lower employees

2 Self employed

3 Higher employees

4 Retired with EA members

5 Retired without EA members

6 Unemployed

7 Others

8 All households

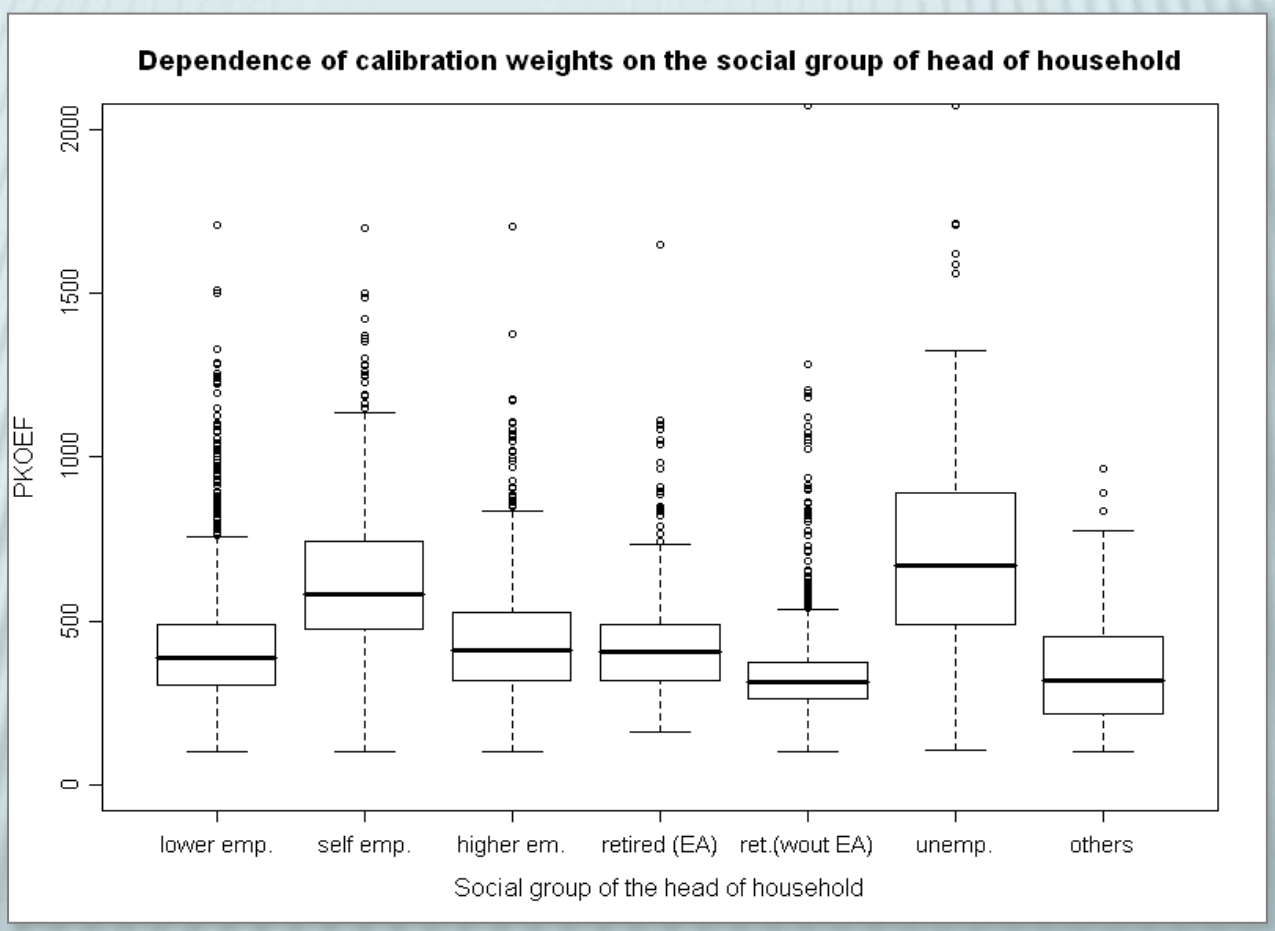
Source: EU - SILC 2007

Table 4: Sample sizes and means of calibration weights of different municipalities

	Type of municipality			
	capital town	county seat	urban villages	villages
sample size	864	1423	3952	3436
mean of weights	617.3	446.4	395.6	381.7

DEPENDENCE OF THE CALIBRATION WEIGHTS ON THE SOCIAL GROUP

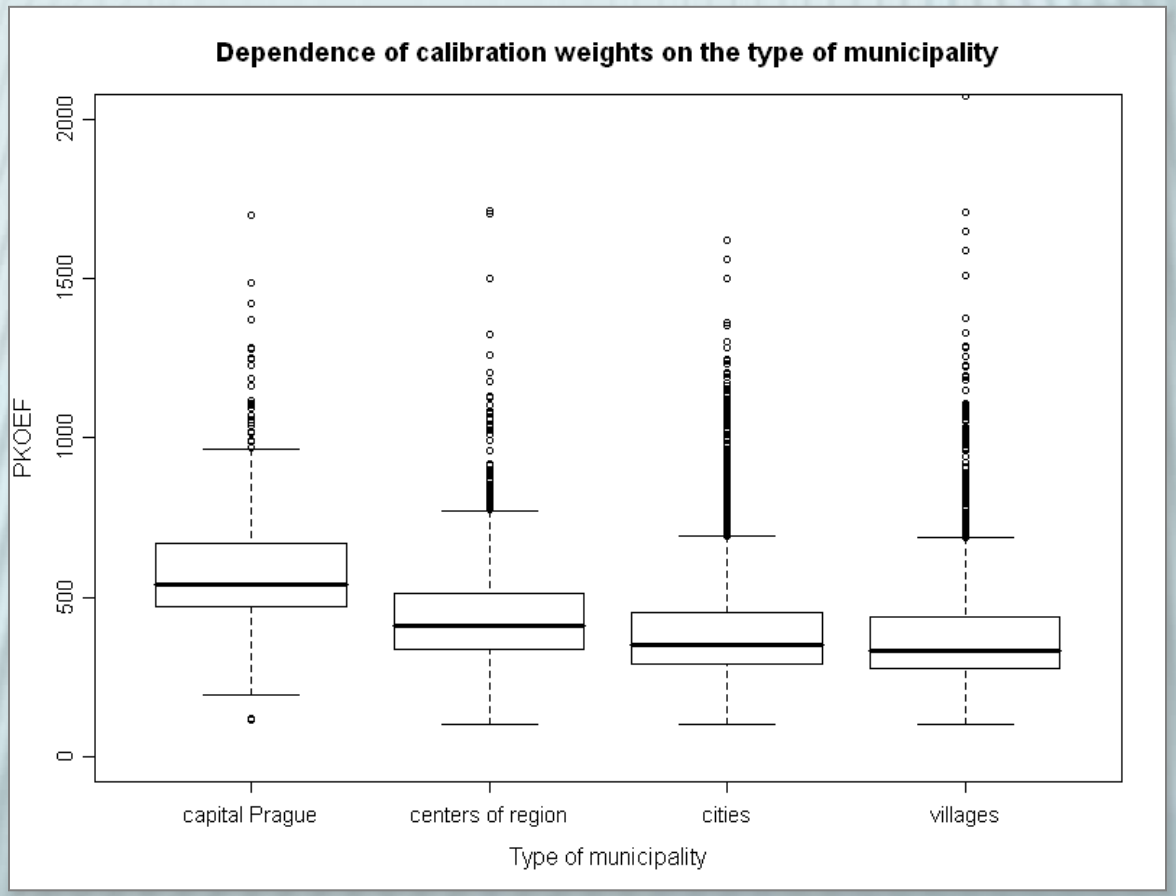
- Fig. 4: Calibration weights of the households from different social groups



Source: EU - SILC 2007

DEPENDENCE OF THE CALIBRATION WEIGHTS ON THE TYPE OF MUNICIPALITY

- Fig. 5: Calibration weights of the households from different types of municipalities



Source: EU - SILC 2007

INFLUENCE OF CALIBRATION WEIGHTS ON THE ESTIMATES OF INCOME CHARACTERISTICS

- Table 4: Income characteristics of the households from different social groups

Difference between weighted and unweighted characteristics	Social group of the head of household							
	1	2	3	4	5	6	7	8
mean (CZK)	10628	17486	10878	14424	2374	3243	1181	22131
median (CZK)	8727	14198	8658	14237	10128	9260	-1288	20582
standard deviation (CZK)	5294	19872	3135	9512	-143	2289	-4574	21380

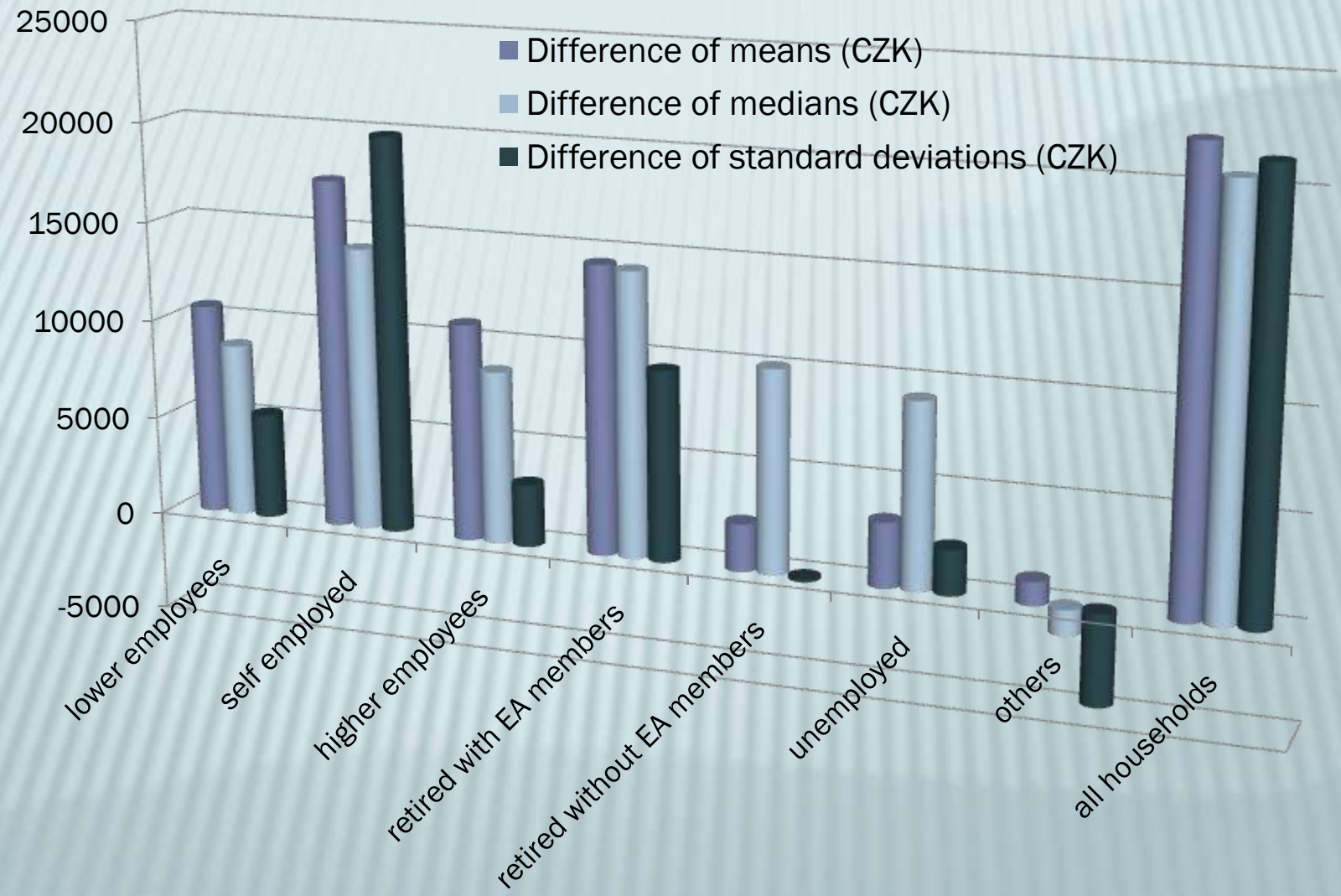
1 – lower employees, 2 – self employed, 3 – higher employees, 4 – retired with economically active members, 5 – retired without economically active members, 6 – unemployed, 7 – others, 8 – all households

- Table 5: Income characteristics of the households from different municipalities

Difference between weighted and unweighted characteristics	Type of municipality			
	capital town	county seat	urban villages	villages
mean (CZK)	17387	20973	18278	21102
median (CZK)	26499	21500	16152	18862
standard deviation (CZK)	13035	9799	23437	20544

Source: EU - SILC 2007

DIFFERENCE BETWEEN WEIGHTED AND UNWEIGHTED CHARACTERISTICS



DEFINITIONS OF THE CONSUMING UNIT

H – total income per household

$$H = 1 + 0 \cdot ch + 0 \cdot op$$

SJ – equivalent scale of OECD

$$SJ = 1 + 0.5 \cdot ch + 0.7 \cdot op$$

EJ – equivalent scale of EU

$$EJ = 1 + 0.3 \cdot ch + 0.5 \cdot op$$

R – income per representative

$$R = 1 + 1 \cdot ch + 1 \cdot op$$

- *ch* – number of children between 0 and 13
- *op* – number of other children and members (except „head“ of household)

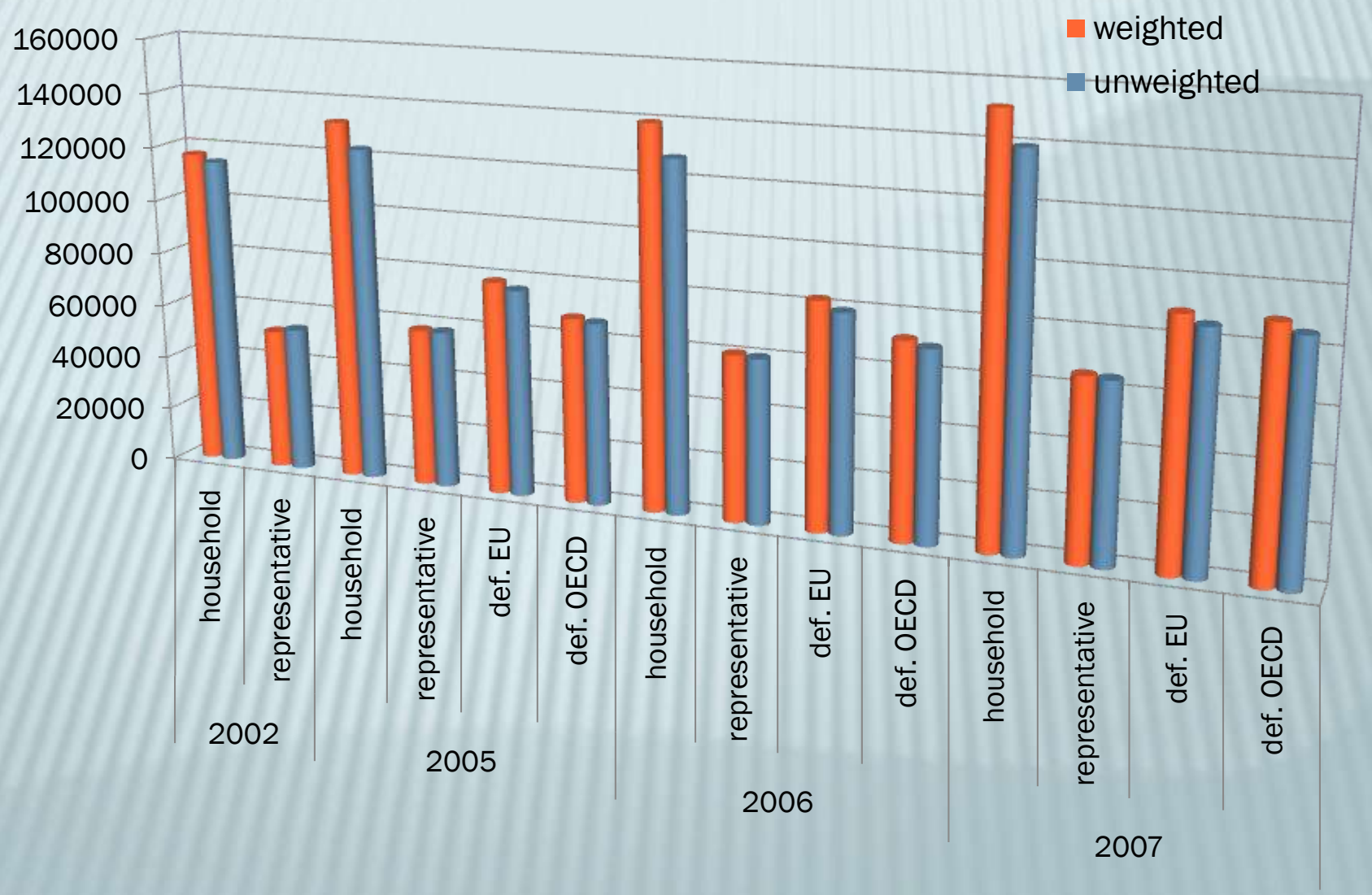
THRESHOLD OF MONETARY POVERTY FOR DIFFERENT TYPES OF CONSUMING UNITS

- Table 6: Influence of calibration weights on the threshold of monetary poverty for different types of consuming units

Year	Type of the consuming unit	Threshold of monetary poverty (CZK)		
		weighted estimate	unweighted estimate	Difference between weighted and unweighted
2002	household	116909	114554	2355
	representative	52000	53522	-1522
2005	household	132549	123246	9303
	representative	58200	58230	-30
	def. EU	78786	76500	2286
	def. OECD	68223	67199	1024
2006	household	139743	128088	11655
	representative	60912	60384	528
	def. EU	83052	79568	3484
	def. OECD	72000	69926	2074
2007	household	152069	139718	12351
	representative	65850	65246	604
	def. EU	89611	86129	3482
	def. OECD	89611	86129	3482

Source: Mikrocensus 2002, EU-SILC 2005 – 2007

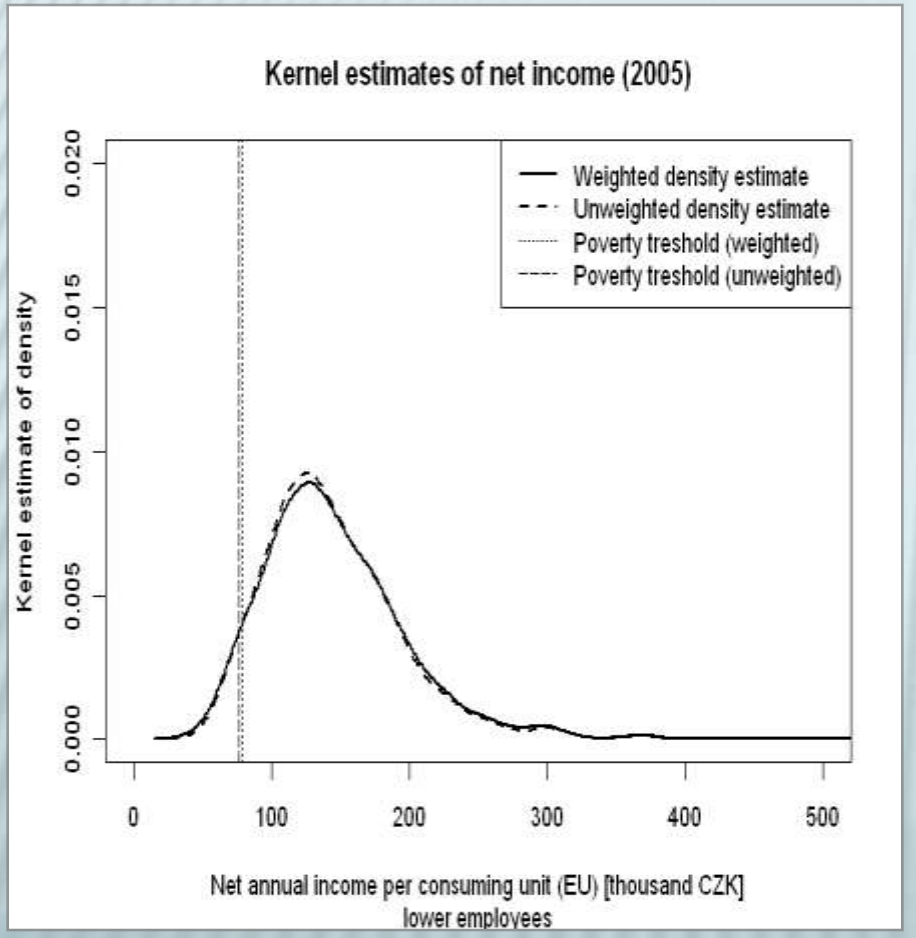
THRESHOLD OF MONETARY POVERTY FOR DIFFERENT TYPES OF CONSUMING UNITS

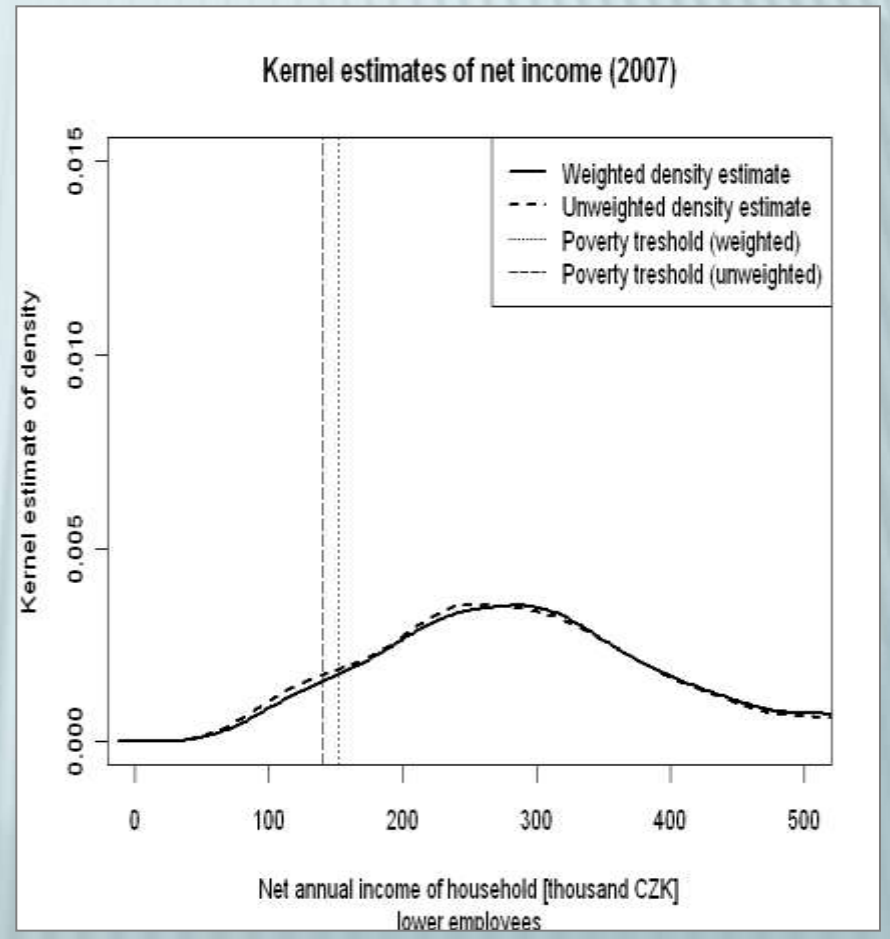


INFLUENCE OF CALIBRATION WEIGHTS ON THE INCOME DISTRIBUTION AND POVERTY THRESHOLD

Income per consuming unit (EU)

Lower employees

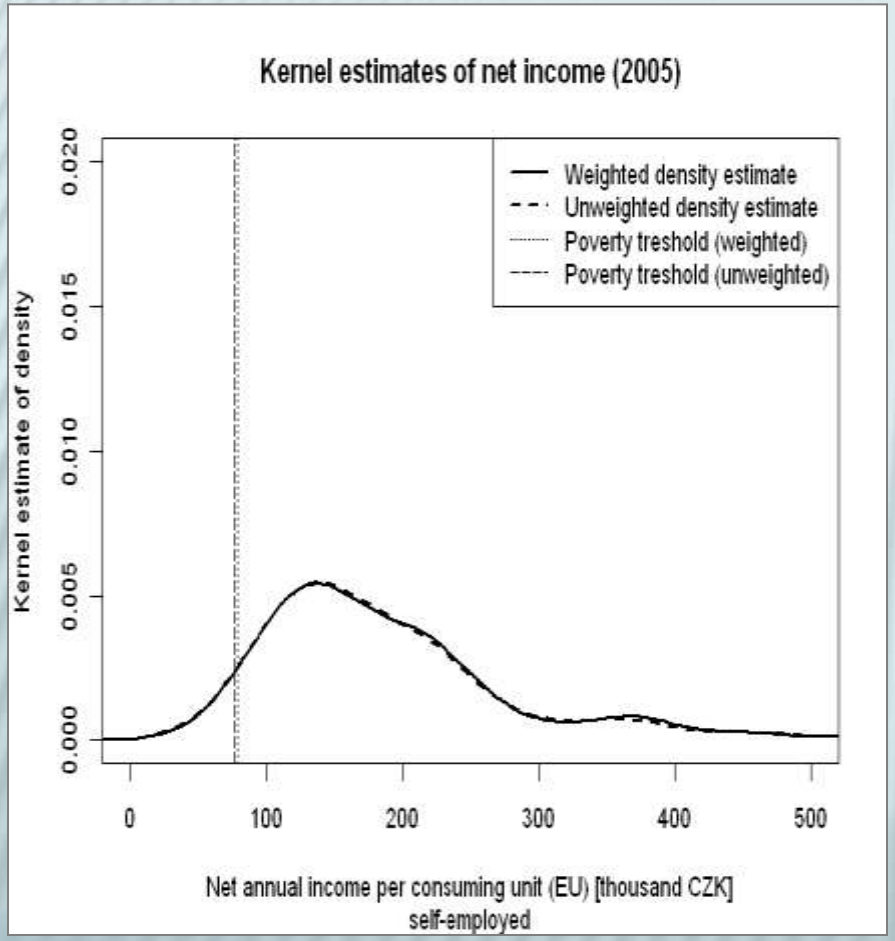


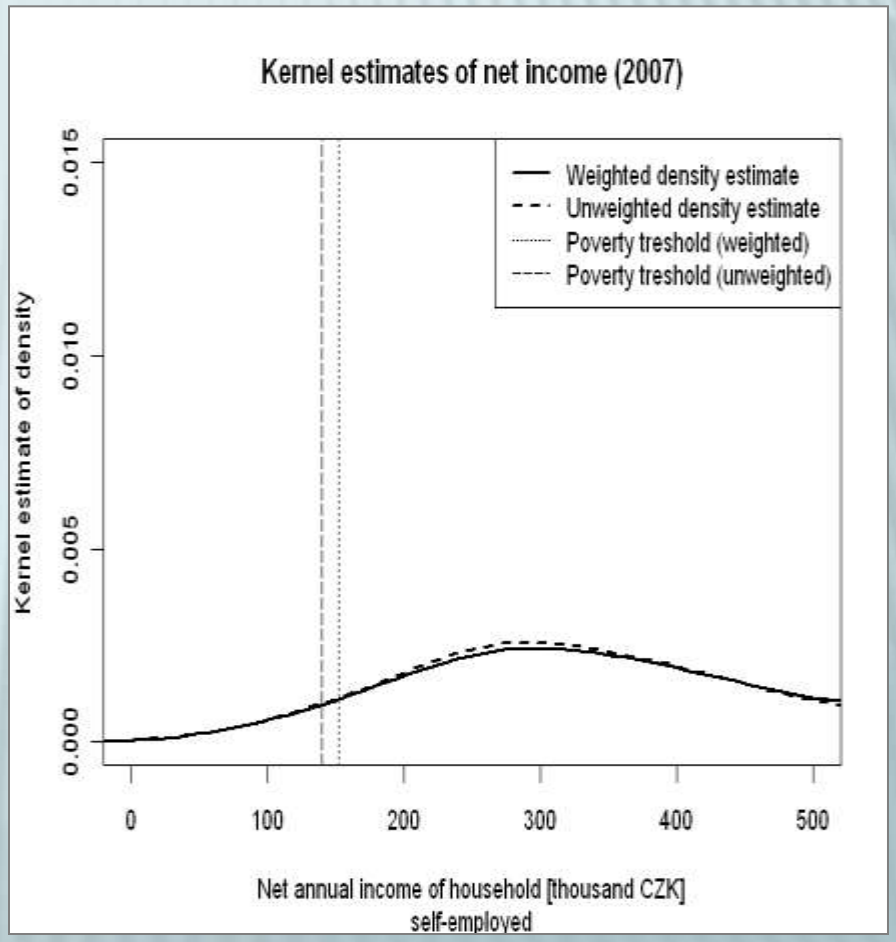


INFLUENCE OF CALIBRATION WEIGHTS ON THE INCOME DISTRIBUTION AND POVERTY THRESHOLD

Income per consuming unit (EU)

Self-employed

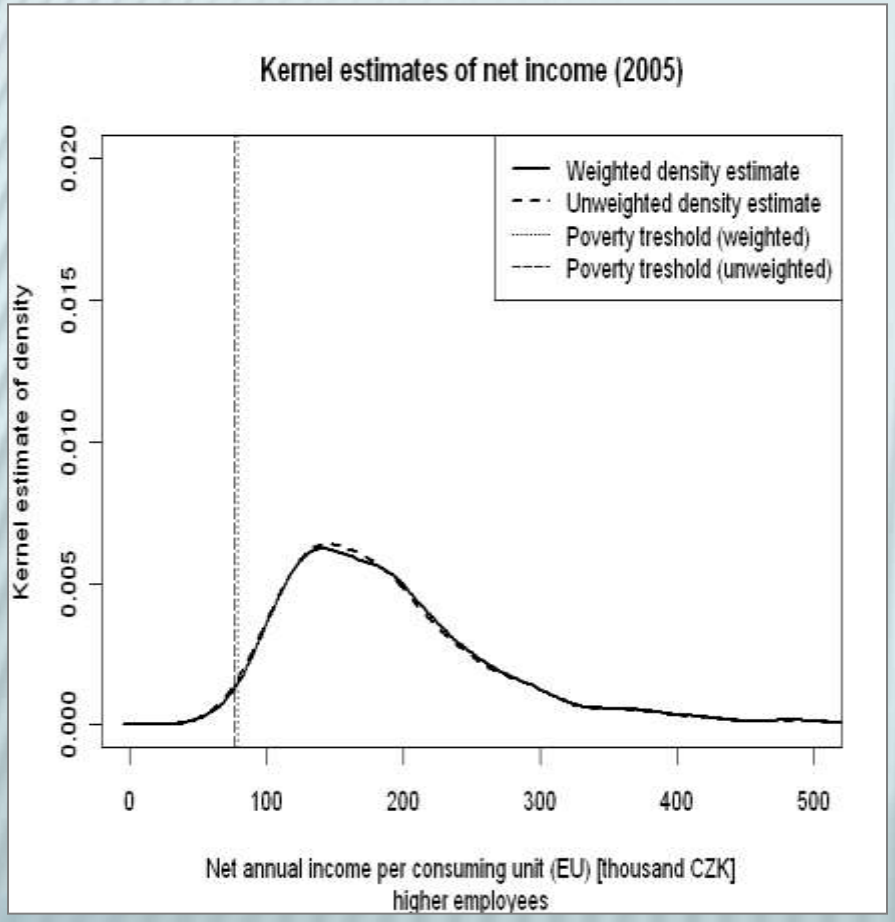


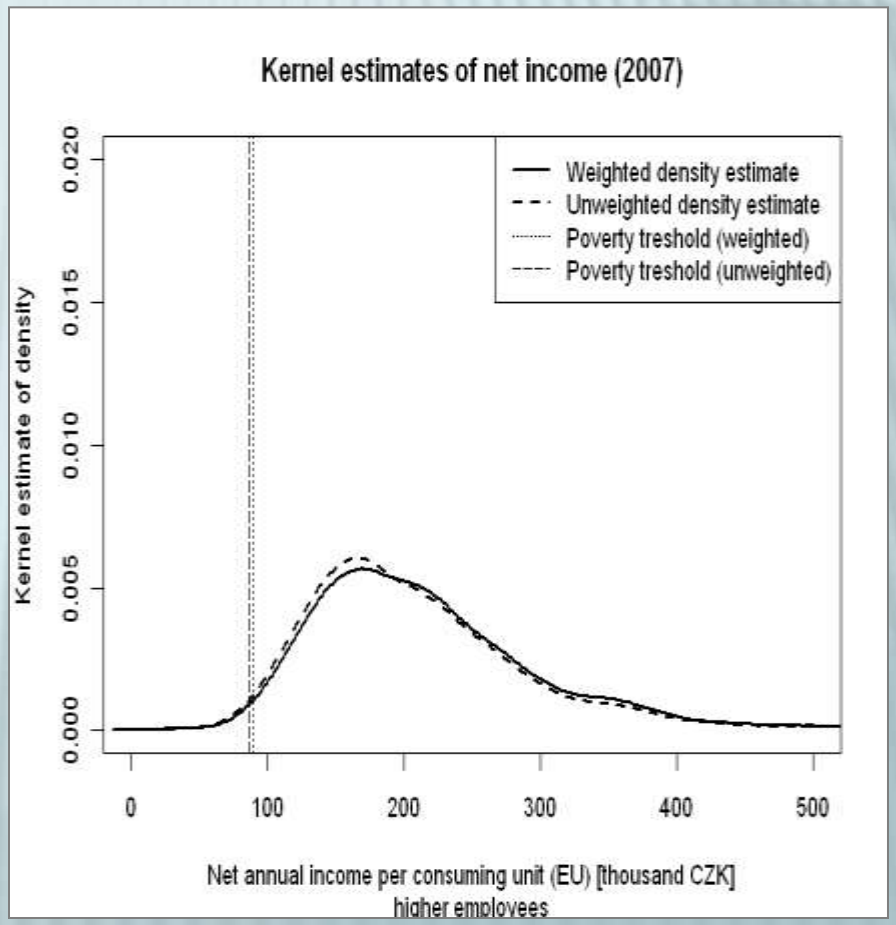


INFLUENCE OF CALIBRATION WEIGHTS ON THE INCOME DISTRIBUTION AND POVERTY THRESHOLD

Income per consuming unit (EU)

Higher employees

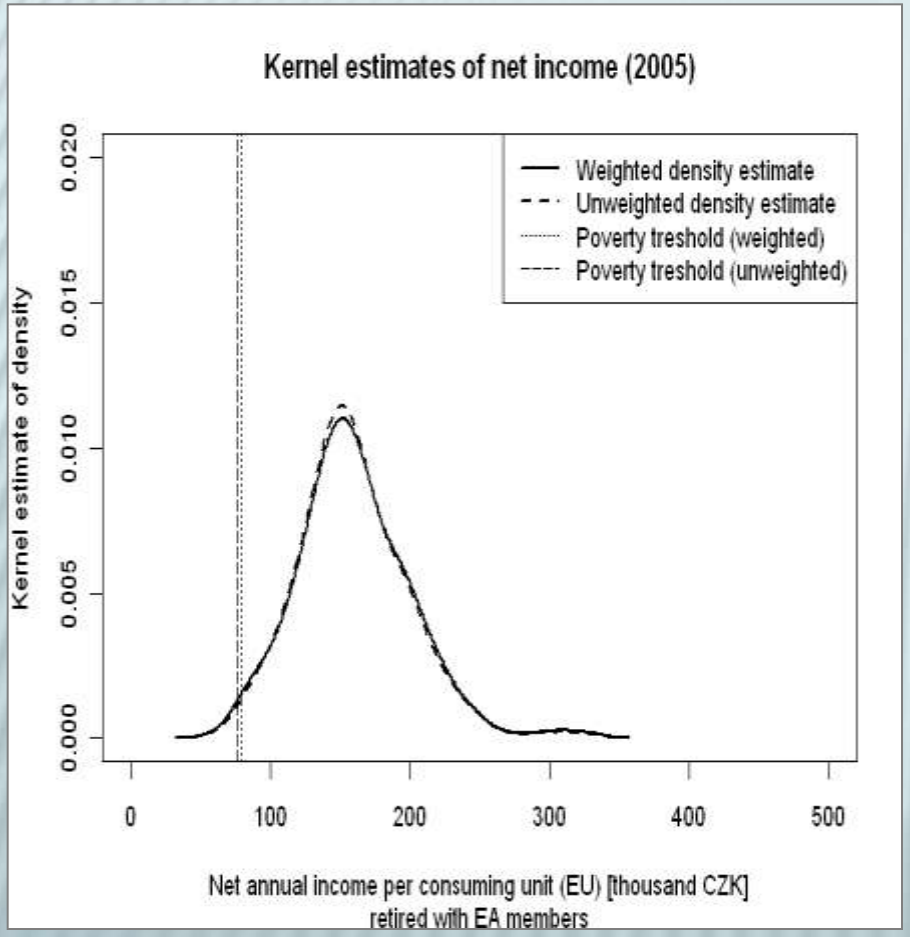


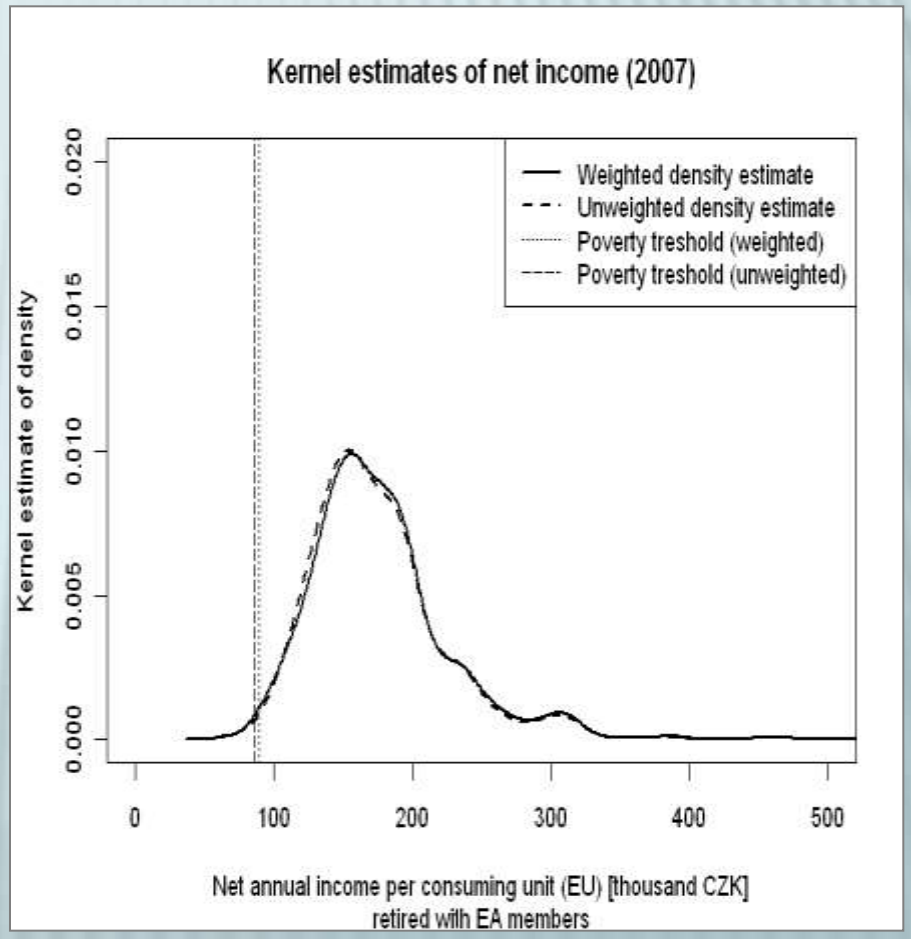


INFLUENCE OF CALIBRATION WEIGHTS ON THE INCOME DISTRIBUTION AND POVERTY THRESHOLD

Income per consuming unit (EU)

Retired with EA members

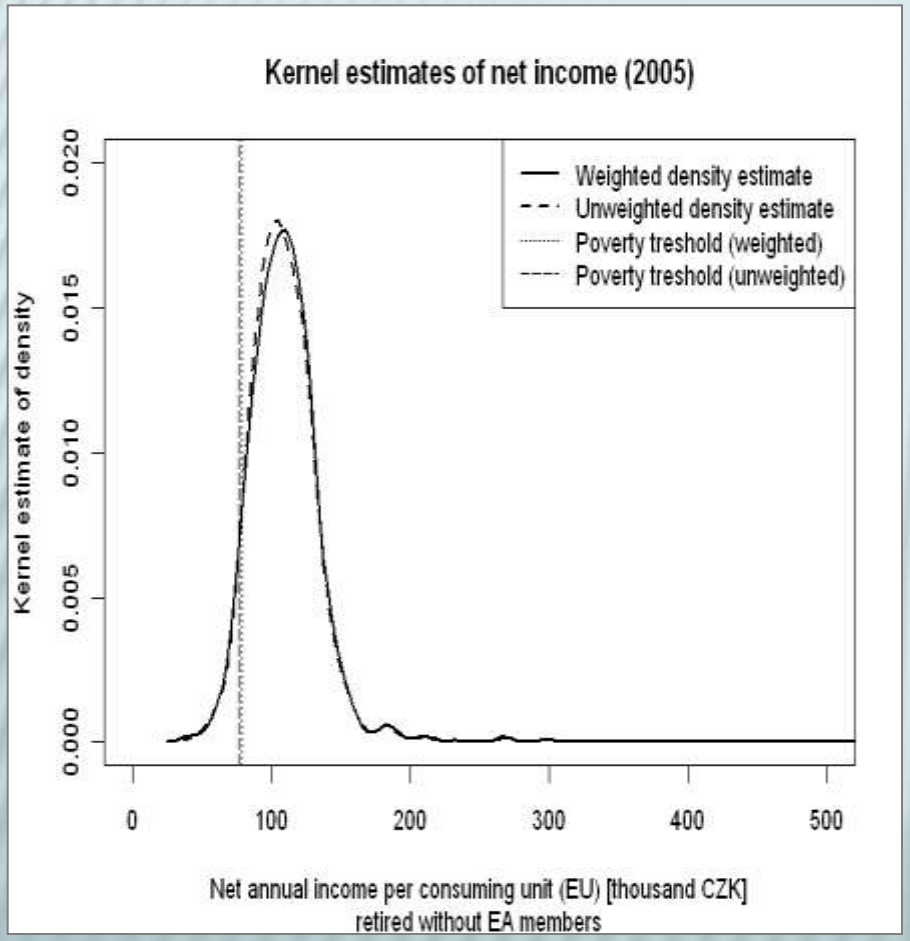


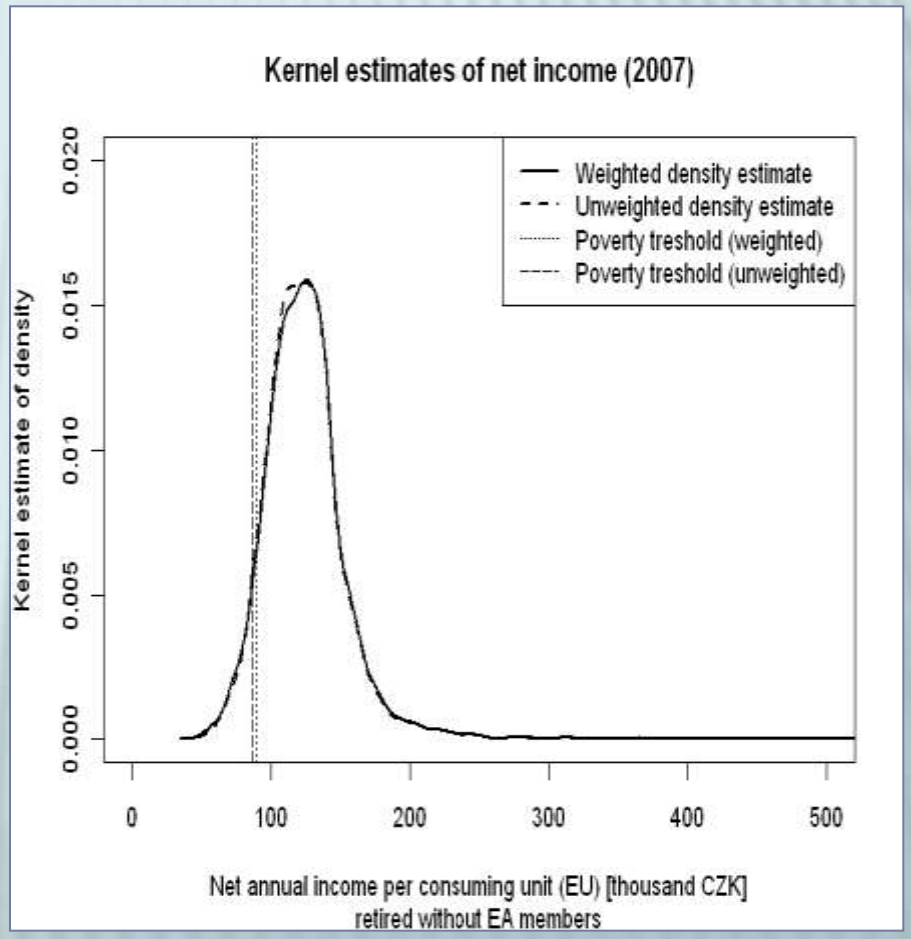


INFLUENCE OF CALIBRATION WEIGHTS ON THE INCOME DISTRIBUTION AND POVERTY THRESHOLD

Income per consuming unit (EU)

Retired without EA members

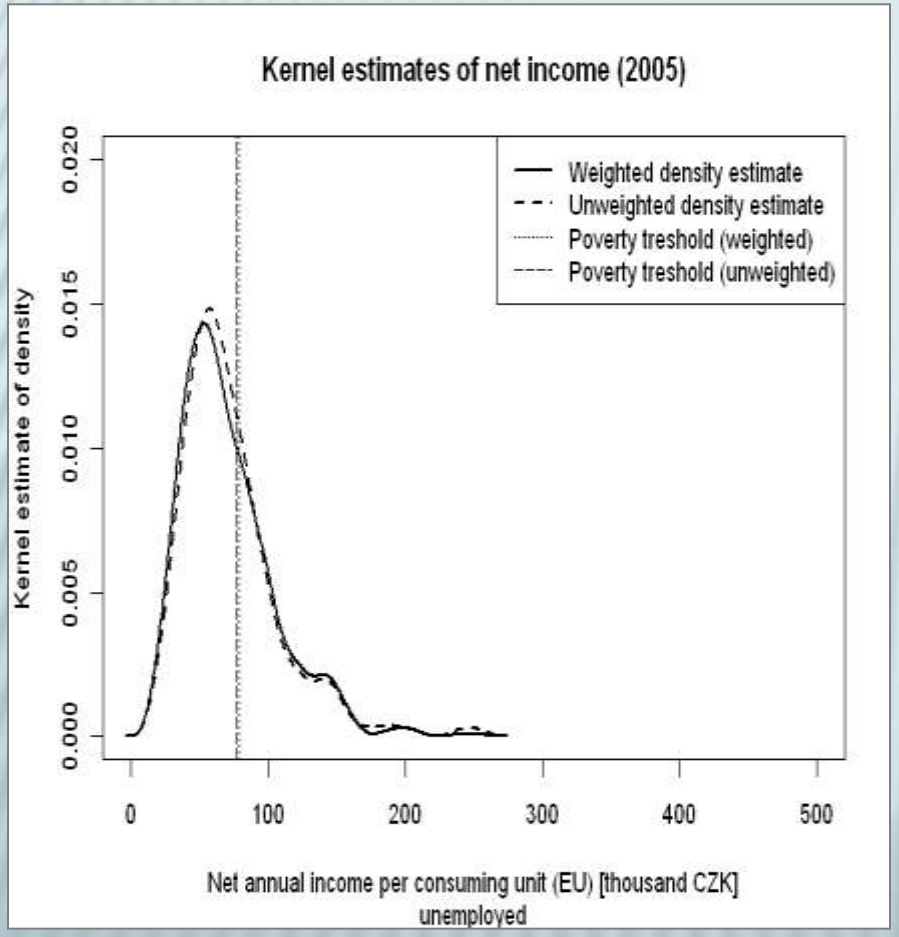


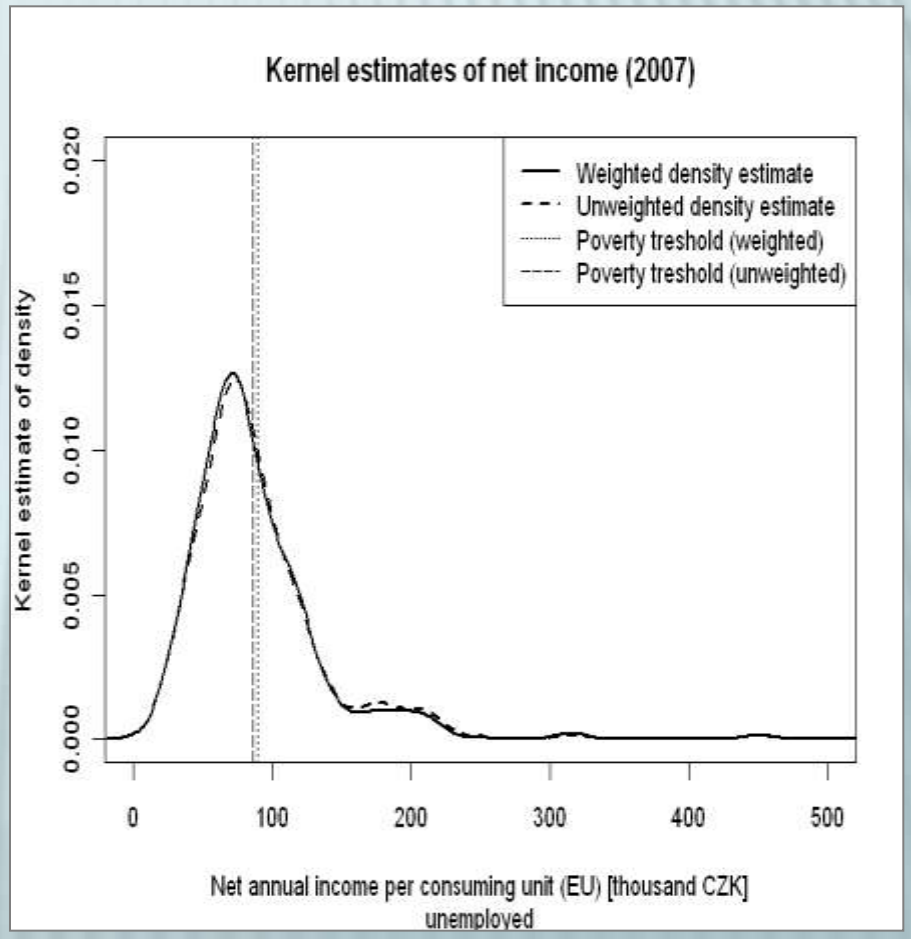


INFLUENCE OF CALIBRATION WEIGHTS ON THE INCOME DISTRIBUTION AND POVERTY THRESHOLD

Income per consuming unit (EU)

Unemployed

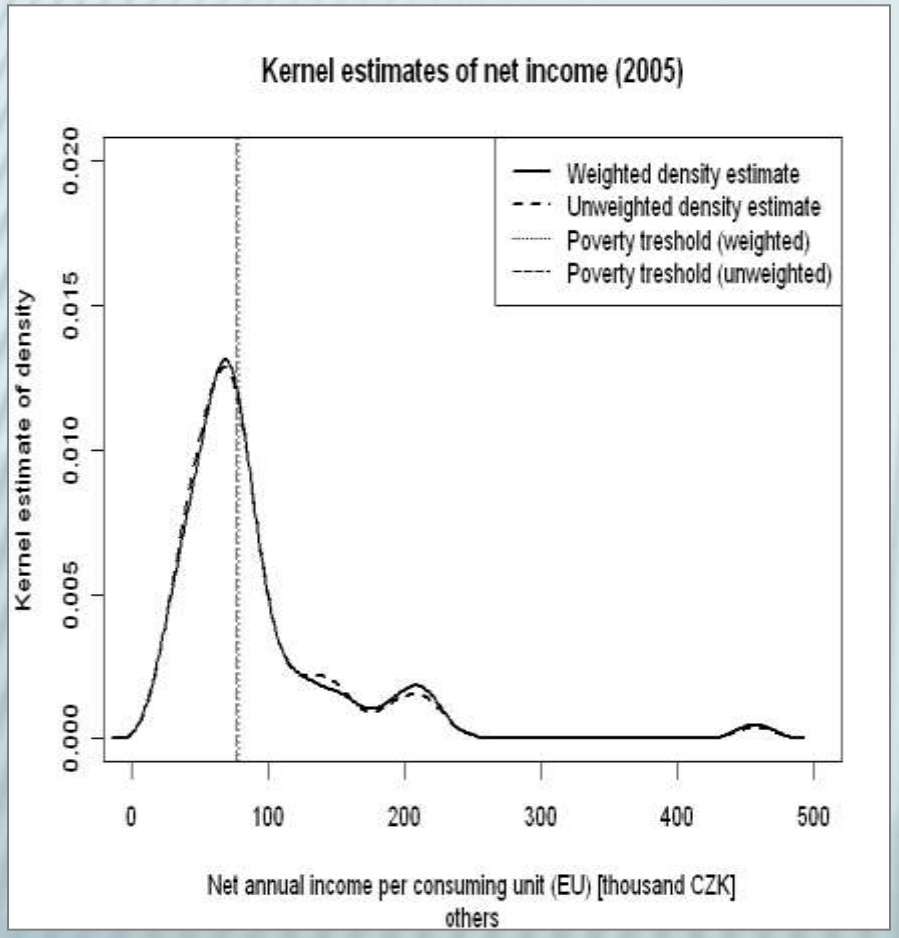


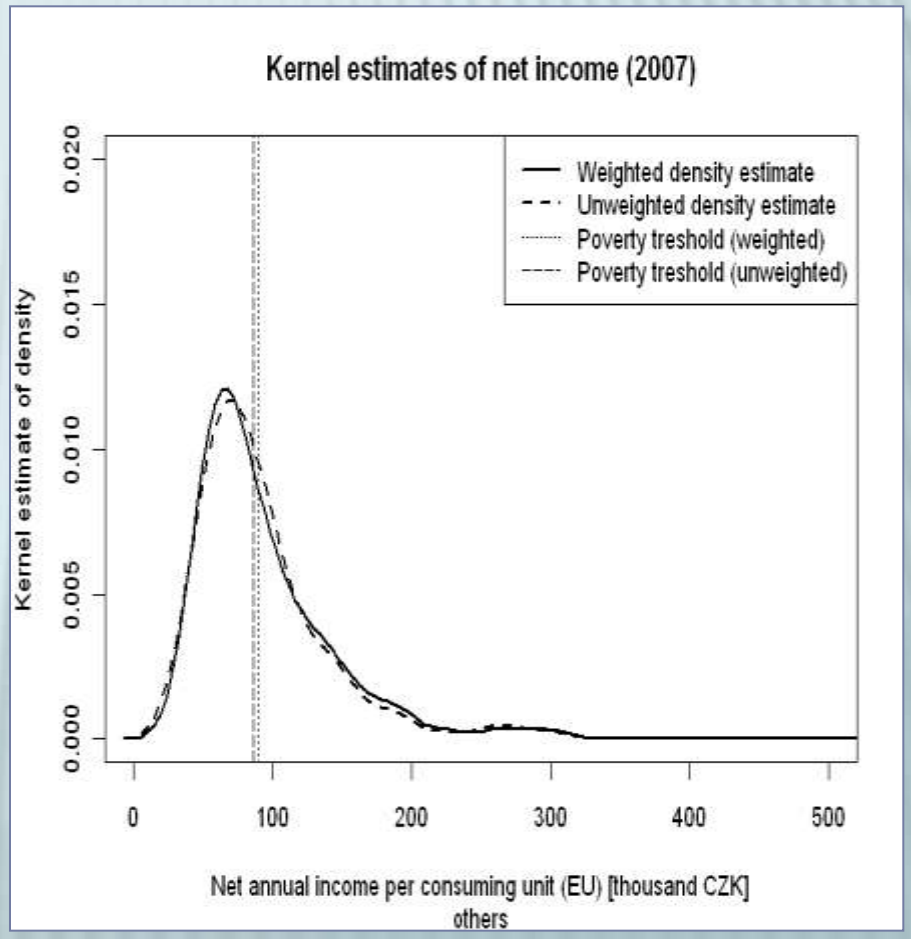


INFLUENCE OF CALIBRATION WEIGHTS ON THE INCOME DISTRIBUTION AND POVERTY THRESHOLD

Income per consuming unit (EU)

Other households

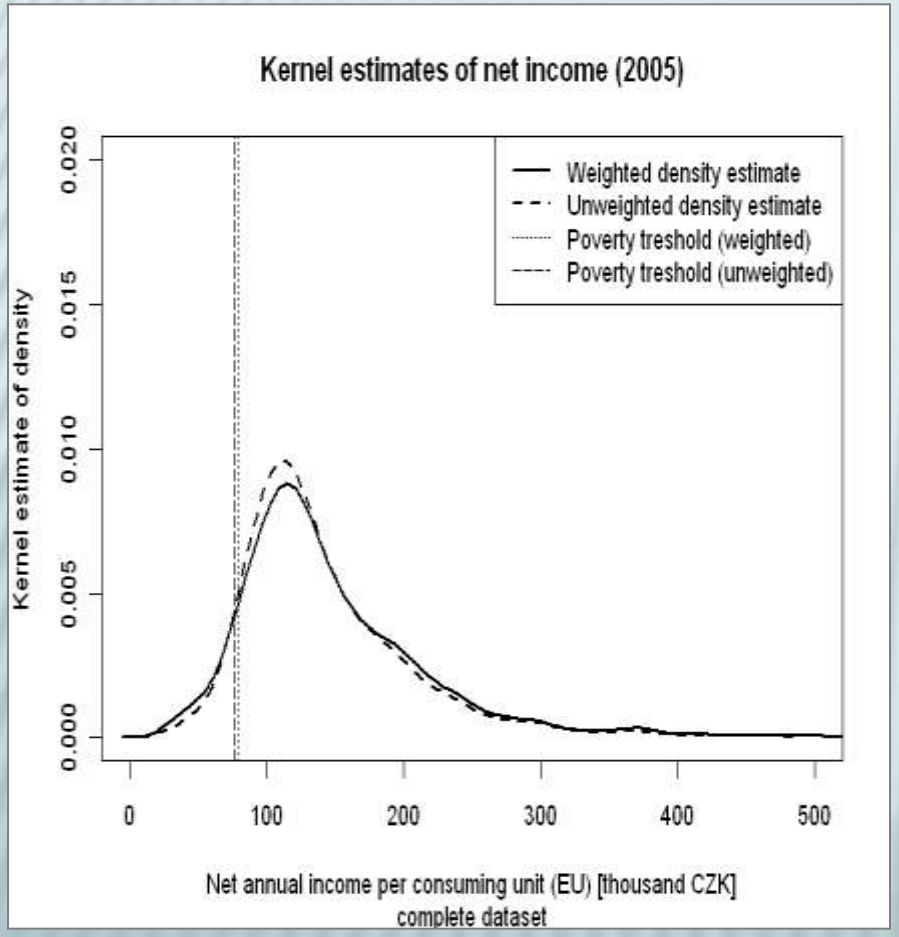


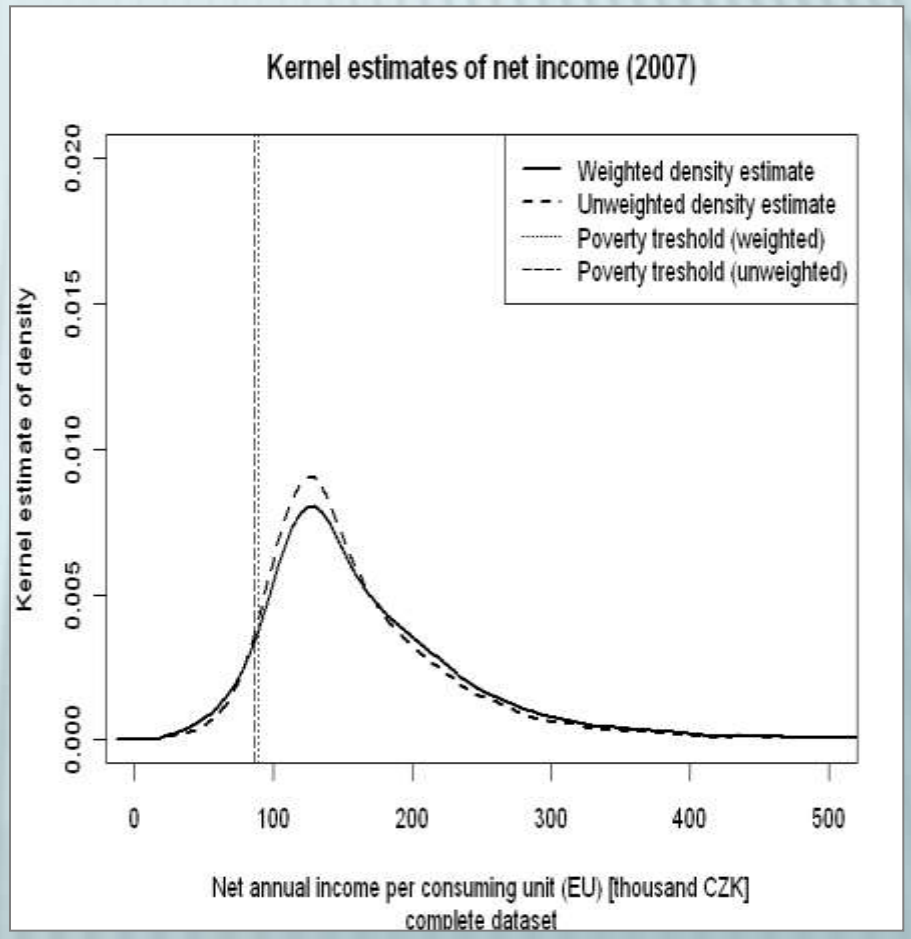


INFLUENCE OF CALIBRATION WEIGHTS ON THE INCOME DISTRIBUTION AND POVERTY THRESHOLD

Income per consuming unit (EU)

All households





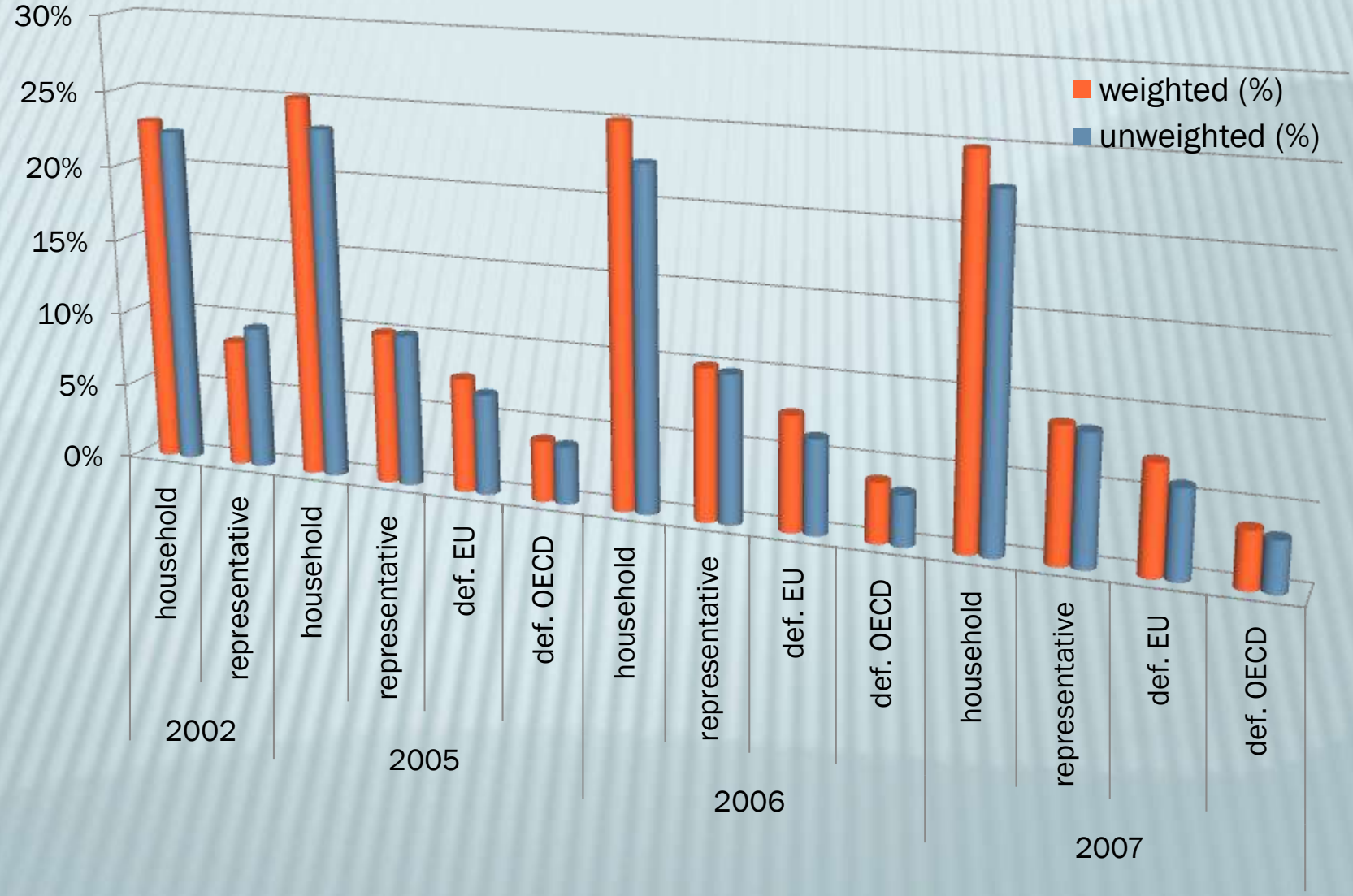
RATE OF HOUSEHOLDS UNDER THE THRESHOLD FOR DIFFERENT TYPES OF CONSUMING UNITS

- Table 7: Influence of calibration weights on the rate of households under the threshold of monetary poverty

Year	Type of the consuming unit	Freq. under risk-of-poverty threshold				Pearson in. test	
		weighted estimate		unweighted estimate		statistics X^2	p-value
		absolute	relative	absolute	relative		
2002	household	1833	22.99 %	1782	22.35 %	0.894304	0.344314
	representative	672	8.43 %	757	9.49 %	5.423770	0.019864
2005	household	1095	25.17 %	1012	23.26 %	4.210827	0.040167
	representative	439	10.09 %	439	10.09 %	0.001267	0.971608
	def. EU	331	7.61 %	291	6.69 %	2.633580	0.104626
	def. OECD	176	4.05 %	167	3.84 %	0.194245	0.6594065
2006	household	1878	25.10 %	1691	22.60 %	12.729007	0.000360
	representative	753	10.06 %	733	9.80 %	0.269714	0.603523
	def. EU	570	7.62 %	469	6.27 %	10.342669	0.001300
	def. OECD	297	3.97 %	253	3.38 %	3.490078	0.061738
2007	household	2409	24.90 %	2193	22.67 %	13.178869	0.000283
	representative	858	8.87 %	832	8.60 %	0.4052132	0.524409
	def. EU	697	7.20 %	566	5.85 %	14.315212	0.000155
	def. OECD	363	3.75 %	324	3.35 %	2.179265	0.139881

Source: Mikrocensus 2002, EU-SILC 2005 – 2007

RATE OF HOUSEHOLDS UNDER THE THRESHOLD FOR DIFFERENT TYPES OF CONSUMING UNITS



CONCLUSIONS

Sample survey Mikrocensus and Czech EU-SILC survey provides an information about incomes and other social and demographic characteristics of Czech households. The data files contain calibration weights that can significantly influence the results of realized analyses. It appears that the role of calibration changes with number of household members, grows with the growing incomes, etc.

The paper focuses on the strength of influence of the calibration weight on the risk of monetary poverty in the Czech Republic. We had shown that the bias of results occurred in all cases (usually higher values) and in more than half of cases this change was statistically significant (on the 5% level). Thus, the unweighted results are slightly distorted; only in half of cases the bias is statistically significant.

In order to create a complex insight on the problem of biasing the results of measuring the relative poverty by calibration weights, our analyses were based on the study of different definitions of consuming unit which handles the monetary poverty from different perspectives. We shown that the choice of scale can suppress or emphasize the influence of calibration weights.

An important outcome is the influence of consuming unit definition on the risk of poverty of Czech households. And therefore the suitable definition of consuming unit plays the key role in identifying of relative poverty in society.

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ACKNOWLEDGEMENT

The paper was supported by **Czech Science Foundation**:
Project GAČR 402/09/0515

„Analysis and Modelling of Financial Power
of Czech and Slovak Households“

Thank you for your attention and wish a nice day!

Happy to answer your questions in writing at:

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