Did the economic crisis affect income inequality and poverty in Germany? SOEP-based analyses, 2002-2009

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Did the Economic Crisis Affect Income Inequality and Poverty in Germany? SOEP-Based Analyses, 2002-2009

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Zusammenfassung*

Auf der Basis von Daten des Sozioökonomischen Panels (SOEP) werden Einkommensungleichheit und -armut in Deutschland von 2002 bis 2009, d. h. der Wohlstand verschiedener sozialer Gruppen vor und während der ökonomischen Krise in den Jahren 2008/09, untersucht. Konkret handelt es sich hierbei um die Verteilungsstrukturen in verschiedenen Einkommensbereichen, welche auf der Grundlage einer neuen Methode zur Messung von Ungleichheit und Armut ermittelt werden. Die Hauptelemente dieser neuen Methode sind a) Wohlstandsorientierungen an gruppenspezifischen Wohlstandsniveaus und b) die Nutzung variabler Äquivalenzskalen für die verschiedenen Einkommensbereiche.

Auf dieser Basis werden Ergebnisse von binären logistischen Regressionen präsentiert. Es wird getestet, ob eine Person zu einem bestimmten Einkommensbereich gehört oder nicht. Hierbei ist die Wahrscheinlichkeit für arbeitslose Personen, dem unteren Einkommensbereich anzugehören, zwischen 2008 und 2009 (schwach) gestiegen.

Solche mikroökonomischen Berechnungen werden mit makroökonomischen Variablen und deren zeitlichen Entwicklung konfrontiert. Die in diesem Kontext betrachteten makroökonomischen Variablen sind ökonomisches Wachstum, Inflation und allgemeine Arbeitslosigkeit.

Zusätzlich wird mit Hilfe von Übergangsmatrizen die Einkommensdynamik insbesondere während der Krise erfasst. Hierbei zeigt sich z. B., dass zwischen 2008 und 2009 der Anteil von Personen, welche im Armutsbereich verblieben sind, um fünf Prozentpunkte gestiegen ist – verglichen mit 2007/08.

Alles in allem erlauben die Ergebnisse des Diskussionspapiers wertvolle Einblicke in die Quer- und Längsschnitteffekte der Krise in Bezug auf Ungleichheit und Armut in Deutschland.

Summary*

Based on data from the German Socio-Economic Panel (SOEP), income inequality and poverty in Germany from 2002 to 2009, i. e. economic well-being of different social groups in front of and during the economic crisis in the years 2008/09, are considered. Concretely, changes of structures in different income areas of German income distribution are taken into account by a new method for measuring inequality and poverty. The key elements of this new method are a) well-being orientations on group-specific well-being levels and b) the usage of variable equivalence scales for the different income areas.

On this basis, results of binary logistical regressions are presented. It is tested whether a person belongs to a certain income area or not. In this context, the likelihood of unemployed persons for being located in the low-income area (weakly) increased between 2008 and 2009.

Such microeconomic calculations are contrasted with macroeconomic variables and their development over time. The macroeconomic variables considered in this context are economic growth, inflation, and general unemployment.

Additionally, income dynamics especially during crisis is captured via transition matrices. For instance, between 2008 and 2009 the share of persons, who stayed within the poverty area, grew by five percentage points, compared with 2007/2008.

All in all, the paper's findings produce valuable insights into cross-sectional and longitudinal effects of the crisis on inequality and poverty in Germany.

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Content

1. Introduction[1]

1.1 Paper's structure

This paper deals with the economic crisis which began in 2008 and reached its (preliminary?) peak in 2009 in the sense that its effects on income inequality and poverty in Germany are considered. For analysing aspects corresponding with this economic crisis the period of time between 2002 and 2009 (2010) seems to be especially relevant. The reasons for analysing this period are on one hand data restrictions and on the other hand the possibility of comparing the recessions in 2003 and 2009 with each other.

The macroeconomic framework during the mentioned period is sketched in Section 1.2. It follows the description of the methodical and data framework in Chapter 2, which includes the choice of inequality and poverty indicator as well as the choice of welfare variable, the issue of equivalence scales, and the description of the data base. In Chapter 3 corresponding empirical findings for Germany 2002-2009 are presented; and in Chapter 4 microsimulations of the German income inequality and poverty in front of and during the economic crisis are performed. Finally, concluding remarks are the topic of Chapter 5.

1.2 Macroeconomic background

The following presentation of the macroeconomic background between 2002 and 2010 in Germany refers to main macroeconomic indicators: inflation rate, growth rate, and unemployment rate.[2]

Figure 1 reveals with respect to the harmonised index of consumer prices in Germany that at first the inflation rate fluctuated between +1.0 % and +1.9 % in the time interval between 2002 and 2005 and that it then rose between 2006 and 2008 from +1.8 % in 2006 and +2.3 % in 2007 to +2.8 % in 2008. Then it dropped from 2008 to the peak of the crisis in 2009 from +2.8 % to +0.2 %; in 2010 the German inflation rate amounted to +1.1 %.

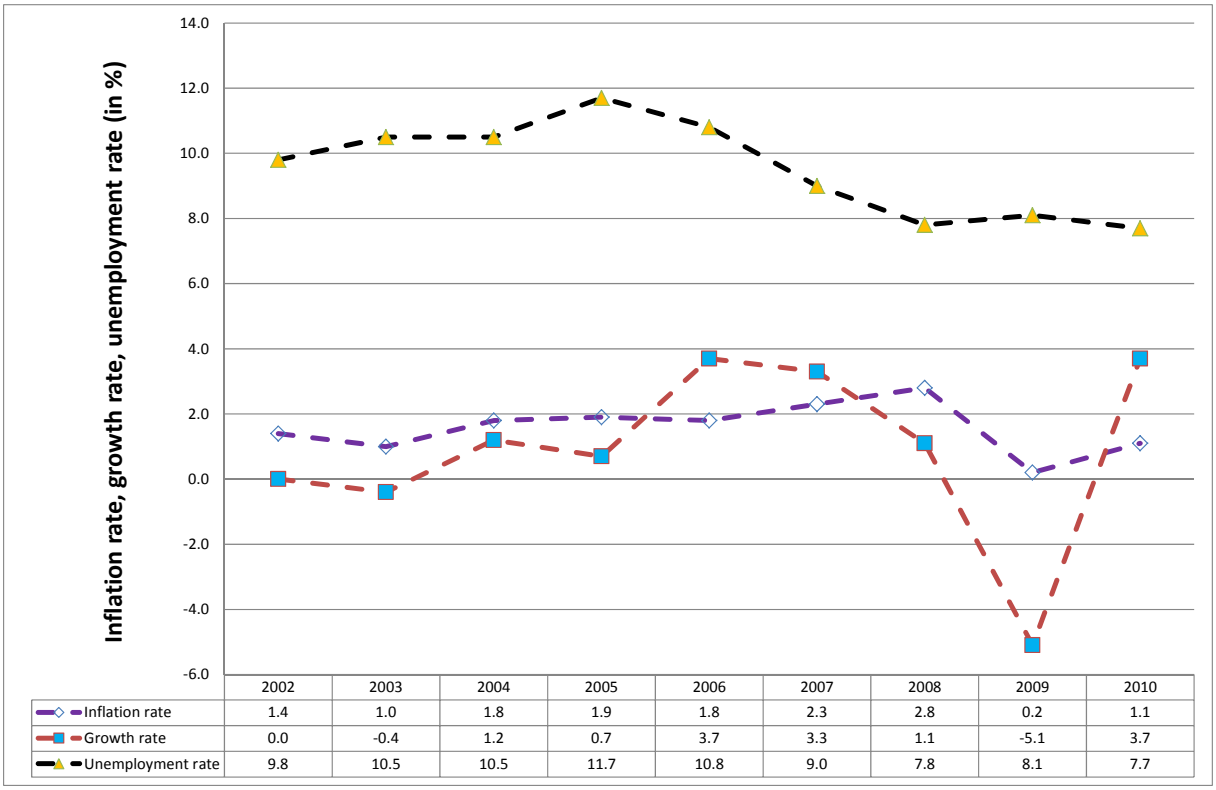
The decline in the macroeconomic price level between 2008 and 2009 was accompanied by a remarkable slump of the real gross domestic product (in prices of 2005): Between 2008 and 2009 there was a decreasing "growth" rate in the amount of -5.1 %. This negative value between 2008 and 2009 – indicating a strong recession – was much more pronounced compared with other recessions after Second World War in Germany, e. g. compared with -0.4 between 2002 and 2003. But already between 2009 and 2010 the German economy grew by +3.7 %.

The latter development – revealing a relatively good performance of the German economy during the crisis (on a macroeconomic level) – was reflected in the development of the number of unemployed persons (in the definition of the German Labour Office, related to the number of civil gainfully employed persons) within the underlying period of time from 2002 on. Between 2002 and 2005 the unemployment rate grew by about two percentage points in Germany but from 2005 to 2008 it dropped by nearly four percentage points. Between 2008 and 2009 the unemployment rate only increased by 0.3 percentage points, and between 2009 and 2010 this rate again decreased by 0.4 percentage points. To some degree this development was the result of short-time working in Germany, as is sketched below.

[1] The data of this paper rest upon the German Socio-Economic Panel (SOEP) of the German Institute for Economic Research (DIW Berlin). As a reference for the SOEP data base see, e. g., Wagner, Frick, and Schupp 2007.

[2] The used data stem from http://www.destatis.de; i. e. from the website of the German Statistical Office, the *Statistisches Bundesamt*.

Figure 1: The development of inflation, growth, and unemployment rate in Germany 2002-2010



	2002	2003	2004	2005	2006	2007	2008	2009	2010
Inflation rate	1.4	1.0	1.8	1.9	1.8	2.3	2.8	0.2	1.1
Growth rate	0.0	-0.4	1.2	0.7	3.7	3.3	1.1	-5.1	3.7
Unemployment rate	9.8	10.5	10.5	11.7	10.8	9.0	7.8	8.1	7.7

Source: http://www-genesis.destatis.de

In absolute terms the number of unemployed persons in Germany increased between 2002 and 2005 but then it was continuously reduced until 2008 (see Table 1). Against the background of the important productivity losses between 2008 and 2009 sketched above, the number of unemployed persons rose during these years only in the amount of about 156,000 persons which was – at least to some degree – the result of an increase of short-time work. Table 1 reveals that short-time work increased in Germany between 2008 and 2009 by a factor of more than 10 from about 100.000 persons to more than 1,1 Mio persons. Between 2009 and 2010 the number of unemployed persons decreased from 3.4 Mio persons to 3.2 Mio persons which were accompanied by an approximately halving of the number of short-time workers. These results also confirm the relatively good performance of the German economy during the economic crisis between about 2007/2008 and 2010 (on a macroeconomic level).

Table 1: The development of unemployment and short-time work in Germany 2002-2010

Year	Number of unemployed persons	Absolute change of unemployed persons	Number of short-time workers	Absolute change of short-time workers
2002	4,061,345	.	206,767	.
2003	4,376,795	+315,450	195,371	-11,396
2004	4,381,281	+4,486	150,593	-44,778
2005	4,860,909	+479,628	125,505	-25,088
2006	4,487,305	-373,604	66,981	-58,524
2007	3,760,072	-727,233	68,317	+1,336
2008	3,258,451	-501,621	101,540	+33,223
2009	3,414,545	+156,094	1,147,094	+1,045,554
2010	3,238,421	-176,124	502,694	-644,400

Sources: http://www-genesis.destatis.de and present author's own calculations

2. Methodical and data framework

In this paper I will concentrate myself on income inequality since in my eyes income is a suitable predictor for other welfare categories. More specific, the following income considerations are based on equivalent household net incomes which are weighted by the number of persons in each household.

The income and the other data used in this paper are from the German Socio-Economic Panel (SOEP)[3] for the years 2002 to 2009; the most recent SOEP – conducted in 2010 – is not yet available for scientific purposes. The SOEP, which is collected since 1984 in yearly intervals, comprises approximately between 5,000 and 10,000 households and currently more than 30,000 persons. Since there has been a fundamental extension of the data base in 2002 by high-income receivers, which has caused some bias in the data base, the analyses in the following start with the year 2002.

The SOEP offers information on monthly household income of the current year and on annual household income of the previous year. I decided to primarily use the monthly, current household net income in my analyses below since the corresponding current income levels are "fresh" in memories of interviewees so that the information on monthly income appears more precise than that on yearly, retrospective income. Another rather practical reason is that the time series of annual incomes currently available for scientific purposes ends in 2008, i. e. one year in front of the peak of the crisis in Germany.

In order to "normalize" household net incomes because of different household sizes and compositions, it is necessary to divide household net incomes by equivalence scales. Typically, in this context overall equivalence scales are used which assign the same scale values to households in different income areas. In contrast, there are good reasons for basing distributional analyses on variable, income-dependent equivalence scales since it might be ar-

[3] See Wagner, Frick, and Schupp 2007.

gued, for example, that credit constraints for households in the bottom income range may shift the consumption bundles of these households towards lower expenditure shares of durables which are connected with relatively high economies of scale.[4]

I will apply this approach in the following since this allows, amongst others, a needs-related allocation of inequality developments to different income areas before and during crisis. In this context I will assume a bottom, a middle, and an upper income area. These income areas will be *separately* generated for each household type so that no *overall* equivalence scale must be specified. The latter means an orientation of welfare levels only on the behaviour of one's *own* group of households.[5]

According to the idea of variable equivalence scales, the income values in the low-income area are divided by higher scale values than the incomes in the middle and in the upper income area. According to empirical findings or settings in the literature[6] the following differentiations are made:

- *Poverty area:* for single persons poverty line at 50 percent of single-person households' mean net incomes, and for multi-person households[7] calculation of poverty lines on the basis of the (approximate) old OECD scale, i. e.: on the basis of θ = 0.8 (in the Buhmann et al. formula[8]);
- *Low-income area:* for single persons low-income line at 70 percent of single-person households' mean net incomes, and for multi-person households calculation of low-income lines on the basis of the (approximate) old OECD scale, i. e.: on the basis of θ = 0.8;
- *Middle-income area:* for single persons middle-income lines above 70 percent and below 200 percent of single-person households' mean net incomes, and for multi-person households calculation of middle-income lines on the basis of θ = 0.7;
- *High-income area:* for single persons high-income line at 200 percent of single-person households' mean net incomes, and for multi-person households calculation of low-income lines on the basis of the (approximate) new OECD scale, i. e.: on the basis of θ = 0.6.

For the measurement of inequality of the equivalent household net income, the normalized coefficient of variation (= half the square of the coefficient of variation) is primarily utilized as inequality indicator, and in the field of poverty measurement the headcount ratio – i. e.: the relation between the number of poor people and population's number – will be the main poverty indicator in the following.

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[4] See Koulovatianos, Schröder, and Schmidt 2005, p. 969. See also Faik 2010a, p. 23.

[5] For a more detailed consideration of this approach see Faik 2011c, pp. 8-12.

[6] See, e. g., Faik 2011a, Grabka et al. 2007, pp. 60-61, Becker and Hauser 2009, p. 223; see also Faik 2011b, pp. 5-10, and Faik 2011c, pp. 8-12.

[7] The calculations of the paper are restricted to single- to six-person households since the number of cases for household sizes with seven and more persons is too low for statistical reasons (see Faik 2011c, p. 24).

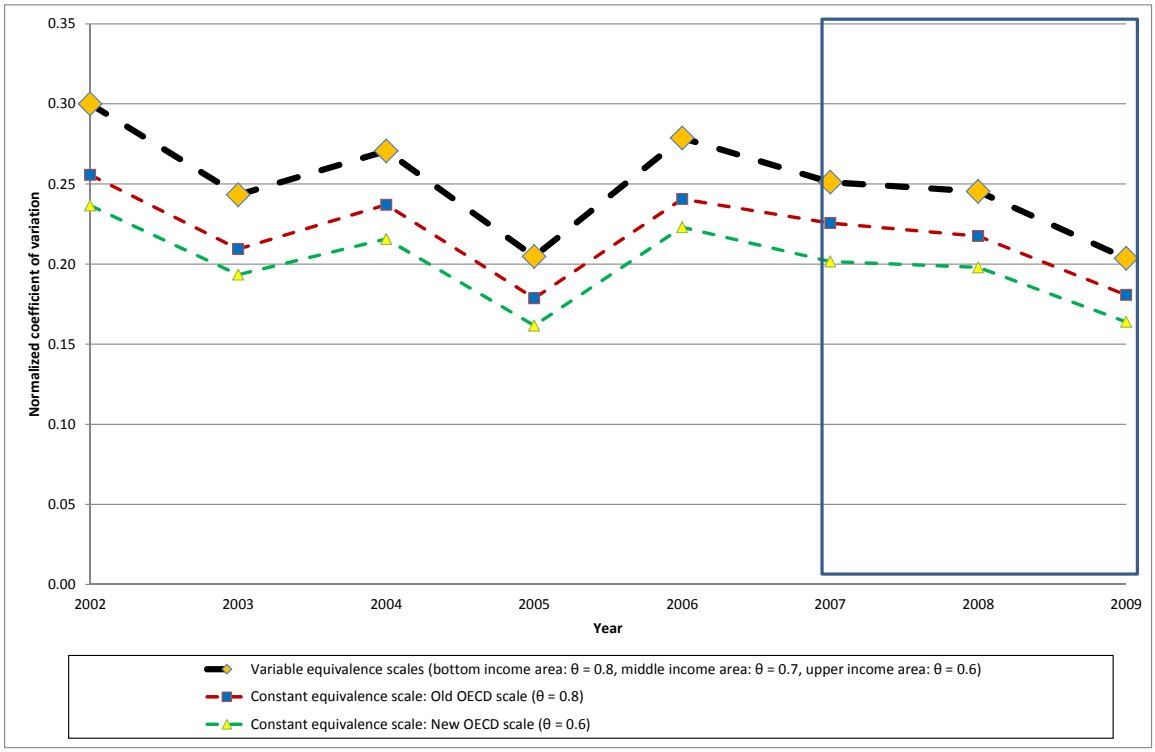
[8] Buhmann et al.'s equivalence scale formula is as follows: $m_h = S^{\theta} \quad (0 \le \theta \le 1)$; see Buhmann et al. 1988, p. 119 [m_h: equivalence scale value of household type h (with respect to the reference household type, in this case a single-person household), S: household size, θ: elasticity of the equivalence scale with regard to household size (and therefore it also reflects the degree of economies of scale)].

3. Inequality and poverty findings for Germany 2002-2009

3.1 Overall descriptive findings

The basic inequality results for Germany 2002-2009, arising from different equivalence scales, are shown in Figure 2. Especially from 2006 to 2009 a tendency towards decreasing income inequality occurred in Germany as a whole. Perhaps (at least partly and by tendency) this was a reflection of the diminished unemployment rates in Germany during this period (reported in the introduction of this paper). With respect to the economic crisis 2007-2009 (2010) this means equalizing effects in Germany in front of and during crisis. For the cases with constant equivalence scales, Figure 2 shows the same pattern of income inequality as in the case with variable equivalence scales but at lower inequality levels (which is plausible).[9]

Figure 2: Variable and constant equivalence scales in Germany as a whole 2002-2009
SOEP on the basis of the normalized coefficient of variation
(Buhmann et al. scale, monthly equivalent household net income)



Source: Present author's own calculations (see also Faik 2011c, p. 15)

[9] Compared with the largely high-income sensitive normalized coefficient of variation, the mean logarithmic deviation and Theil's measure of entropy – both not as sensitive to changes in high-income regions as the normalized coefficient of variation – reveal a rather smoothed "inequality curve" over time. In contrast, there are substantial inequality differences between the variant with current monthly incomes and the variant with annual incomes of the previous yea. While the concept of annual income indicates an increase of income inequality since the beginning of the new century, the reference on monthly incomes shows a tendency towards diminishing income inequality at least since 2006. Partly these divergences depend on methodical differences: E. g., in the case with monthly incomes socio-demographic characteristics belong to the same period of time as the variable "income", while in the other case both variables differ from each other by one year regarding chronological reference. Furthermore, the concept of monthly income does not include special payments like Christmas bonuses; this also contrasts to the concept of annual income. The opposite effect of increasing inequality of annual incomes seems not fully generated by the crisis since this increase already started in 2002, i. e. a long time before the beginning of the crisis; additionally and unfortunately, the available data for yearly incomes end in 2008, i. e. one year before the peak of the crisis (as was already mentioned above).The corresponding sensitivity calculations can be obtained from present author on request (see also Faik 2011c, pp. 17-18).

The strengthening of the population shares of the middle class and – to some degree – of the upper income classes tends to increase inequality between 2006 and 2009 since these classes have a higher degree of within-group inequality (see Table 2). In the opposite direction the development of relative income positions acts: That means a leveling at least between 2006 and 2008.[10] Concerning group-specific normalized coefficients of variation the values within the low-income and within the middle-income area remained approximately constant during the period 2006-2009 while the normalized coefficient of variation within the high-income area decreased by tendency. Thus, all in all, within-group inequality dropped between the periods of time mentioned. The same happened with respect to between-group inequality (as a consequence of the leveling effects of relative income positions which seem to over-compensate the opposite effects of population shares) so that overall inequality of monthly incomes also declined. Summarizing and roughly speaking, concerning monthly equivalent household net incomes, the diminishment of overall inequality is primarily caused by leveling effects of relative income positions and of normalized coefficients of variations within the high-income area.

Table 2: Decomposition of income inequality in Germany 2002-2009 by income areas

	Population shares			Relative income positions			Normalized coefficients of variations			Normalized coefficients of variations			Between-group inequality in %
Year	Low	Middle	High	Low	Middle	High	Low	Middle	High	Within	Between	Overall	
2002	0.449	0.507	0.044	0.572	1.185	3.231	0.004	0.020	0.117	0.141	0.160	0.301	53.1
2003	0.422	0.529	0.049	0.555	1.171	2.986	0.004	0.021	0.074	0.099	0.146	0.245	59.7
2004	0.423	0.529	0.048	0.557	1.168	3.030	0.004	0.021	0.099	0.124	0.149	0.273	54.6
2005	0.447	0.507	0.046	0.564	1.203	3.015	0.004	0.022	0.035	0.061	0.146	0.207	70.6
2006	0.445	0.506	0.049	0.550	1.187	3.134	0.004	0.022	0.088	0.114	0.166	0.280	59.3
2007	0.429	0.519	0.052	0.546	1.175	2.993	0.004	0.021	0.072	0.097	0.156	0.253	61.7
2008	0.415	0.530	0.055	0.542	1.161	2.902	0.004	0.020	0.074	0.097	0.150	0.247	60.7
2009	0.413	0.537	0.050	0.543	1.173	2.932	0.004	0.022	0.036	0.061	0.144	0.205	70.2

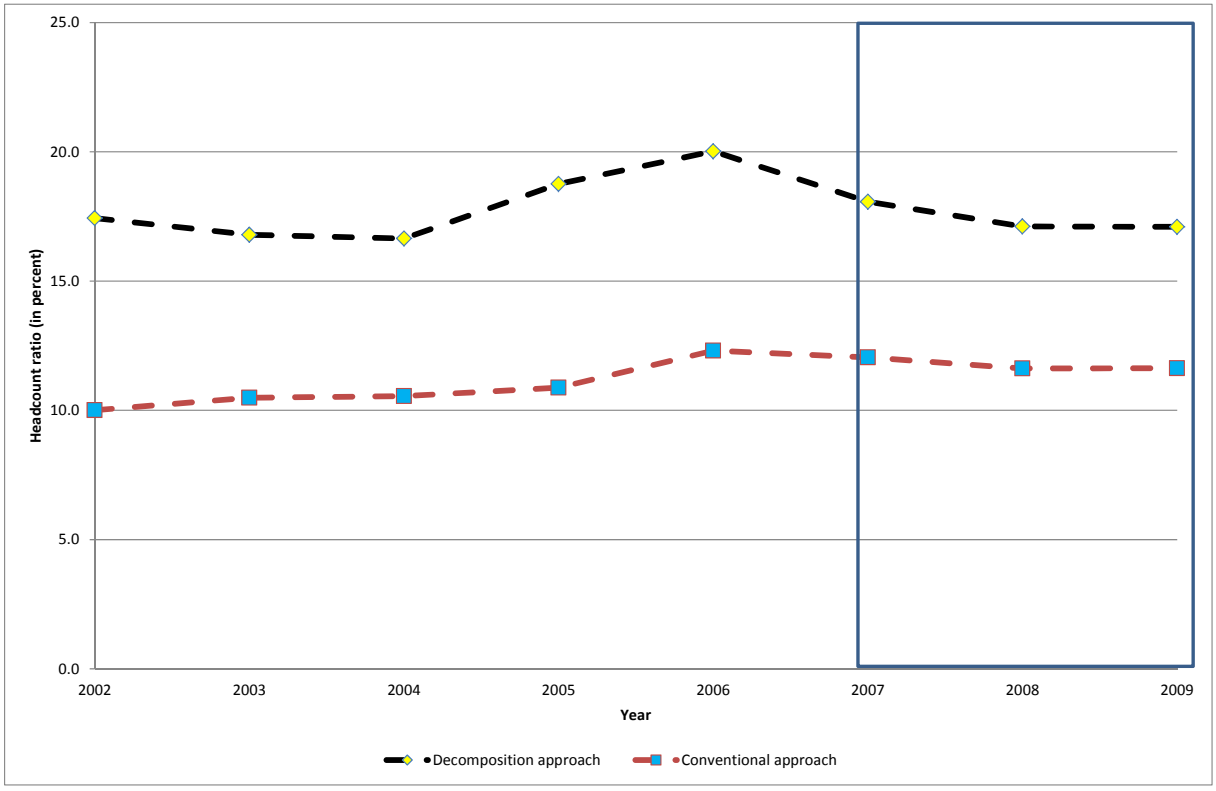
Source: Present author's own calculations

In the field of (relative) poverty Figure 3 shows higher headcount ratios in the framework of the decomposition approach (i. e.: different poverty lines for different household types) compared to the conventional approach (i. e.: an overall – equivalent – poverty line). The pattern of headcount ratios over time is nearly the same in both cases: Since 2006 a tendency towards diminishing poverty has occurred. This latter tendency was much more pronounced by the decomposition than by the conventional approach. Interestingly, this means a tendency towards diminishing poverty – according to the headcount ratio as a poverty index – in Germany in front of and during crisis.[11]

[10] From 2008 to 2009 there was a small inequality increasing effect.

[11] Similar to the headcount ratio, due to alternative poverty indicators (poverty gap ratio, Foster, Greer, and Thorbecke's indicator) the measured poverty has been decreased (slightly) since 2006/2007. Comparing two different income definitions (monthly income versus annual income of the previous year), both "poverty curves" proceed nearly parallel to each other which indicates that in the context of

Figure 3: Headcount ratios in Germany 2002-2009 SOEP based on the decomposition and on the conventional approach (Buhmann et al. scale with θ = 0.8, poverty lines: 50 percent of mean (equivalent or single-person households') net income)



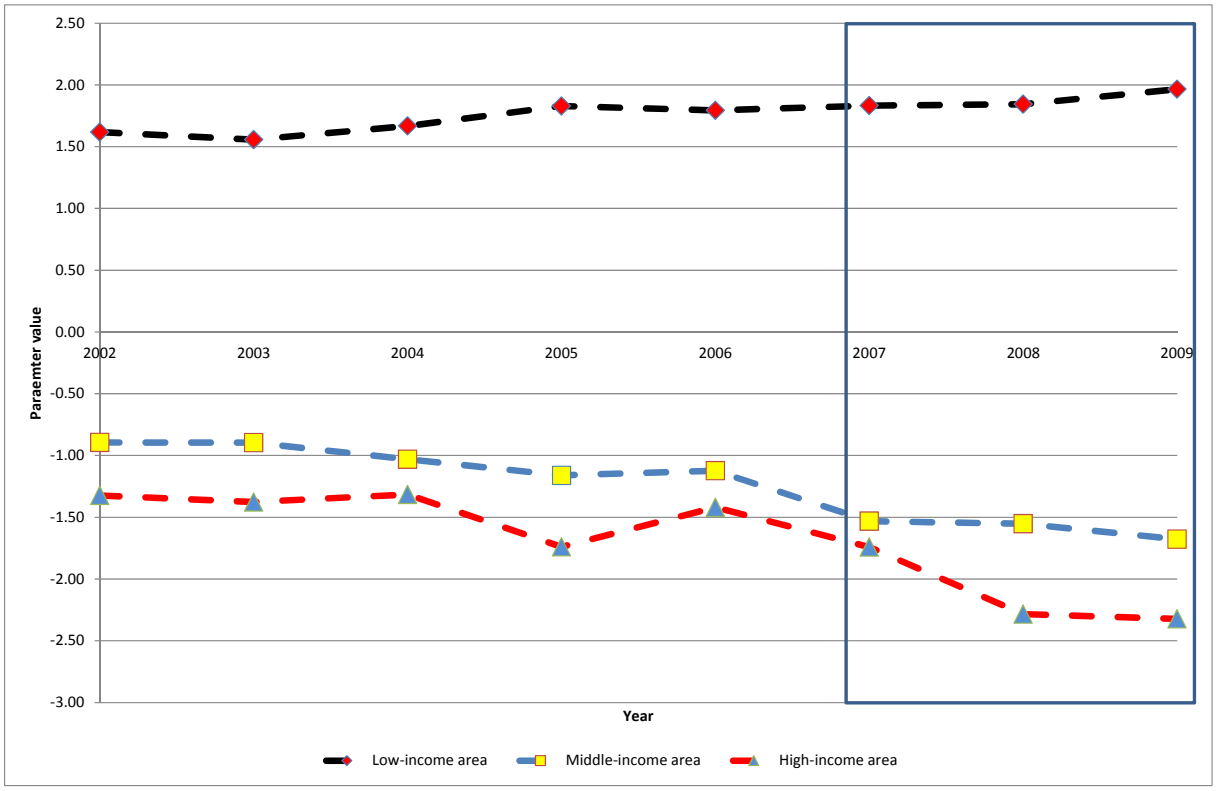
Source: Present author's own calculations (see also Faik 2011b, p. 12)

3.2 Binary logistical regressions

The results of a small binary logistical regression's model are presented in Table 3. They especially reveal that for the variable "unemployed" the parameter is strongly positive in the low-income area and strongly negative in the middle- and in the high-income area. On average, this indicates a relatively low well-being level for unemployed persons in Germany 2002-2009. In front of and during the economic crisis – here i. e.: between 2005 and 2009 – the parameter of unemployed persons for belonging to the low-income area increased slightly, and their parameters for belonging to the middle- and the high-income area decreased by tendency. To some degree, we can conclude that the well-being position of unemployed persons in Germany was reduced directly before and during the economic crisis (see Figure 4).

poverty methodical differences between both income concepts seem to play no important role. These sensitivity calculations can also be obtained from present author on request (see also Faik 2011b, p. 13 and p. 17).

Figure 4: Odd-ratios for unemployed persons within different income areas in Germany 2002-2009



Source: Present author's own calculations based on Table 3

Table 3: Binary logistical regression's parameters due to different income areas in Germany 2002-2009 (SOEP) based on variable equivalence scales

Covariates (0/1 dummies) and statistical information	Low-income area (dependent variable: "being a member of this income area", 0/1 dummy)							
	2002	2003	2004	2005	2006	2007	2008	2009
Absolute term	+0.145***	+0.136**	+0.349***	+0.574***	+0.467***	+1.467***	+1.149***	+1.276***
Living in western Germany	-0.572***	-0.580***	-0.590***	-0.651***	-0.584***	-0.632***	-0.619***	-0.606***
Male household member	-0.106***	-0.130***	-0.085***	-0.130***	-0.112***	-0.084***	-0.092***	-0.125***
German household member	-0.681***	-0.707***	-0.815***	-0.821***	-0.813***	-1.029***	-1.303***	-1.115***
Person living in a small household (not more than two persons)	-0.676***	-0.558***	-0.672***	-0.717***	-0.630***	-0.742***	-0.616***	-0.647***
Until 29 years	+0.643***	+0.698***	+0.652***	+0.610***	+0.631***	+0.435***	+0.398***	+0.426***
60 years and older	+0.320***	+0.238***	+0.208***	+0.189***	+0.195***	+0.209***	+0.234***	+0.239***
Unemployed household member[1)]	+1.617***	+1.557***	+1.668***	+1.829****	+1.794***	+1.832***	+1.843***	+1.965***
Married person	+0.526***	+0.497***	+0.411***	+0.364***	+0.398***	-0.028	-0.098***	-0.067*
Non-qualified person[2)]	+0.763***	+0.985***	+0.952***	+0.919***	+0.938***	+0.891***	+1.091***	+1.090***
Very qualified person[3)]	-1.424***	-1.439***	-1.387***	-1.333***	-1.354***	-1.495***	-1.389***	-1.409***
Number of observations (dependent dummy = 1)	11,329 persons	10,523 persons	10,214 persons	10,354 persons	11,097 persons	9,996 persons	8,887 persons	9,649 persons
Nagelkerke's coefficient of determination	0.148	0.150	0.164	0.174	0.163	0.196	0.178	0.187

(Table 3 continued:)

Covariates (0/1 dummies) and statistical information	Middle-income area (dependent variable: "being a member of this income area", 0/1 dummy)							
	2002	2003	2004	2005	2006	2007	2008	2009
Absolute term	-1.367***	-1.279***	-1.264***	-1.476***	-1.547***	-0.809***	-0.721***	-0.859***
Living in western Germany	+0.109***	+0.080***	+0.094***	+0.186***	+0.171***	+0.278***	+0.256***	+0.274***
Male household member	+0.027	+0.040**	+0.035	+0.057**	+0.037	+0.060**	+0.049*	+0.026***
German household member	+0.768***	+0.750***	+0.839***	+0.838***	+0.891***	+0.823***	+0.849***	+0.950***
Person living in a small household (not more than two persons)	+0.355***	+0.347***	+0.381***	+0.397***	+0.391***	+0.386***	+0.278***	+0.311***
Until 29 years	+0.067**	+0.003	-0.090***	-0.042	-0.077**	-0.437***	-0.387***	-0.438***
60 years and older	+0.002	+0.075**	+0.038	-0.003	+0.011	-0.088**	-0.106***	-0.107***
Unemployed household member[1)]	-0.895***	-0.896***	-1.031***	-1.161***	-1.123***	-1.532***	-1.553***	-1.677***
Married person	+0.518***	+0.516***	+0.427***	+0.510****	+0.460***	-0.024	+0.033	-0.004
Non-qualified person[2)]	-0.184*	-0.498***	-0.532***	-0.510***	-0.428***	-0.729***	-0.916***	-0.927***
Very qualified person[3)]	+0.556***	+0.584***	+0.438***	+0.550***	+0.590***	+0.376***	+0.288***	+0.352***
Number of observations (dependent dummy = 1)	16,261 persons	15,509 persons	15,048 persons	14,017 persons	14,702 persons	14,132 persons	13,679 persons	14,339 persons
Nagelkerke's coefficient of determination	0.070	0.080	0.078	0.089	0.089	0.085	0.073	0.085

(Table 3 continued:)

Covariates (0/1 dummies) and statistical information	High-income area (dependent variable: "being a member of this income area", 0/1 dummy)							
	2002	2003	2004	2005	2006	2007	2008	2009
Absolute term	-6.015***	-6.240***	-6.031***	-6.459***	-6.106***	-5.591***	-5.590***	-5.715***
Living in western Germany	+1.455***	+1.501***	+1.565***	+1.537***	+1.501***	+1.399***	+1.510***	+1.453***
Male household member	+0.046	+0.012	-0.021	-0.060	-0.020	-0.017	+0.055	+0.056
German household member	+0.880***	+0.939***	+0.699***	+1.084***	+0.692***	+0.727***	+0.568***	+0.509***
Person living in a small household (not more than two persons)	+1.169***	+1.133***	+1.042***	+1.152***	+1.039***	+1.031***	+1.040***	+1.120***
Until 29 years	-0.013	+0.018	+0.060	-0.073	+0.058	-0.083	-0.208***	-0.120
60 years and older	0.426***	-0.336***	-0.227***	-0.256***	-0.300***	-0.302***	-0.317***	-0.361***
Unemployed household member[1)]	-1.324***	-1.377***	-1.315***	-1.740***	-1.420***	-1.742***	-2.284***	-2.323***
Married person	+0.540***	+0.463***	+0.491***	+0.440***	+0.594***	+0.297***	+0.284***	+0.364***
Non-qualified person[2)]	-1.957***	-0.933**	-0.824**	-0.843**	-1.439***	-0.959**	-1.036**	-1.049**
Very qualified person[3)]	+1.729***	+1.827***	+1.925***	+1.892***	+1.838***	+1.732***	+1.750***	+1.798***
Number of observations (dependent dummy = 1)	2,131 persons	1,755 persons	1,802 persons	1,600 persons	1,716 persons	1,744 persons	1,615 persons	1,571 persons
Nagelkerke's coefficient of determination	0.194	0.192	0.202	0.207	0.192	0.184	0.196	0.198

*: significant at 10-percent level; **: significant at 5-percent level; ***: significant at 1-percent level

[1)] unemployed and non-working, [2)] no school-leaving qualification achieved, [3)] university degree (or the like) achieved

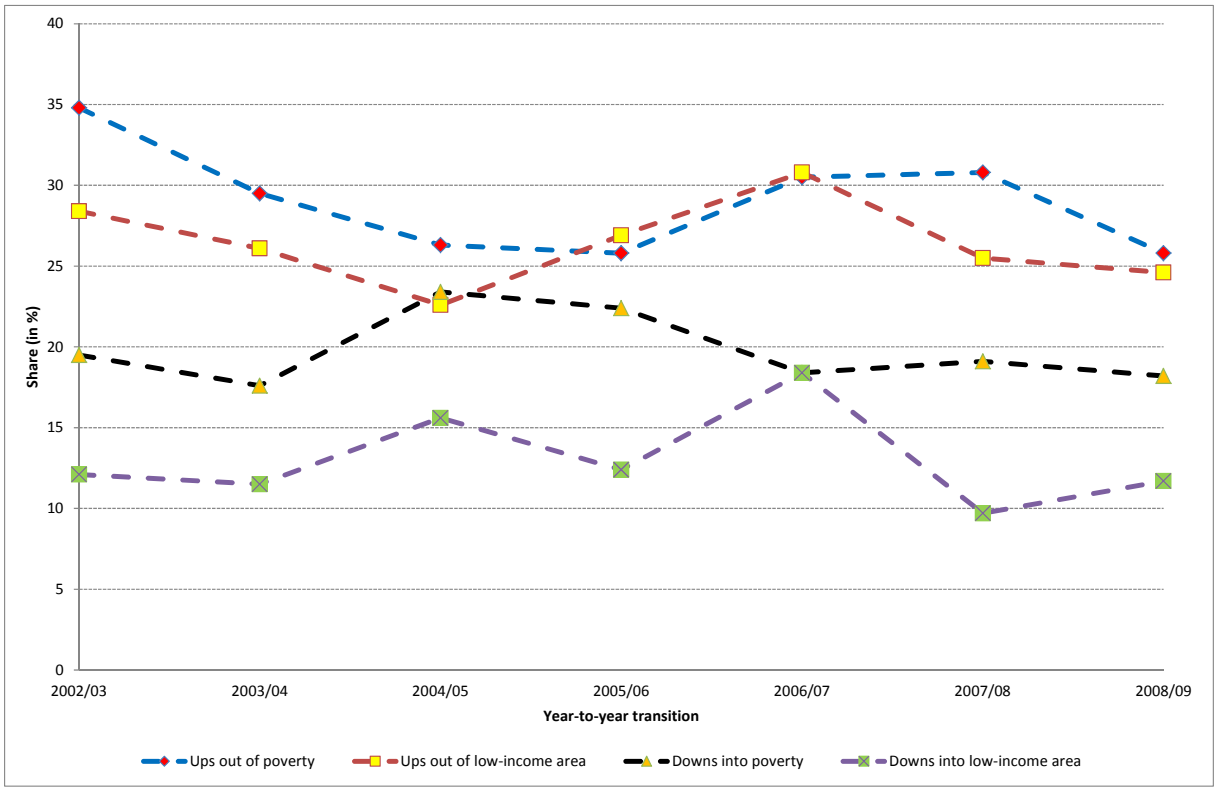
Source: Present author's own calculations

3.3 Transition matrices

In order to consider temporal transitions between different income areas, year-to-year transitions between 2002 and 2009 were calculated.[12]

Especially the ups and downs out of and into the lower income areas appear of interest in our context. In this sense, Figure 5 contains the corresponding ups and downs.

Figure 5: Ups out of and downs into poverty and low-income area in Germany 2002/03-2008/09



Source: Present author's own calculations (partly) on the basis of Faik 2011c, p. 22

In our context the ups and downs between 2007 and 2009 are particularly important. Concerning the ups, during this period of time decreases of shares occurred, and concerning the downs into the poverty area a diminishment and with respect to the downs into the low-income area a (contrasting) increase were observed. Thus, we can (only) conclude that during crisis an upwards movement of the members of the low-income classes was difficult.

Another interesting finding is the increasing share of stayers in the poverty area (by five percentage points) comparing the transitions 2007/08 and 2008/09 with each other.[13] This indicates a kind of "hardening" within the poverty area during crisis.

[12] See Faik 2011c, p. 22.
[13] See once more Faik 2011c, p. 22.

4. Micro-simulations of German income inequality and poverty 2002-2009

The micro-simulations presented in the following are performed as static shift-share calculations. Concretely, they rest on constant population shares, constant mean incomes within the differentiated (age) groups, and constant income deviations within the several (age) groups of a base year.

4.1 Preliminary remarks

Table 4 gives an overview about the fundamental data concerning population shares, mean incomes, income deviations, and group-specific poverty within the several age groups for Germany 2002-2009.

Table 4: Fundamental inequality and poverty elements in Germany 2002-2009

Year	Age group								
	Until 9 years	10-19 years	20-29 years	30-39 years	40-49 years	50-59 years	60-69 years	70-79 years	80 years and older
Population shares:									
2002	0.085	0.108	0.107	0.157	0.149	0.123	0.135	0.097	0.038
2003	0.086	0.105	0.108	0.150	0.156	0.121	0.138	0.094	0.042
2004	0.084	0.108	0.110	0.140	0.158	0.123	0.141	0.093	0.043
2005	0.082	0.108	0.116	0.138	0.165	0.128	0.130	0.090	0.043
2006	0.083	0.102	0.121	0.131	0.168	0.134	0.127	0.091	0.044
2007	0.080	0.101	0.121	0.129	0.167	0.135	0.129	0.094	0.044
2008	0.079	0.098	0.119	0.128	0.169	0.138	0.126	0.097	0.045
2009	0.078	0.097	0.122	0.124	0.167	0.140	0.125	0.100	0.046
Relative income positions:[a)]									
2002	0.750	0.827	0.929	0.964	1.065	1.234	1.087	1.014	1.042
2003	0.749	0.832	0.912	0.973	1.042	1.233	1.111	1.031	0.992
2004	0.764	0.806	0.930	0.971	1.049	1.214	1.111	1.016	1.033
2005	0.755	0.792	0.928	0.989	1.036	1.214	1.122	1.026	1.016
2006	0.744	0.814	0.918	0.968	1.046	1.217	1.107	1.021	1.046
2007	0.761	0.821	0.921	0.997	1.037	1.191	1.106	0.994	1.049
2008	0.776	0.807	0.915	1.009	1.043	1.181	1.094	0.989	1.054
2009	0.779	0.823	0.924	1.028	1.072	1.139	1.080	0.984	1.010
Group-specific normalized coefficients of variation:									
2002	0.223	0.414	0.238	0.215	0.277	0.331	0.324	0.293	0.225
2003	0.173	0.308	0.218	0.155	0.220	0.300	0.279	0.193	0.108
2004	0.183	0.234	0.180	0.163	0.360	0.341	0.296	0.165	0.182
2005	0.193	0.180	0.156	0.170	0.204	0.212	0.248	0.175	0.097
2006	0.196	0.217	0.255	0.180	0.283	0.305	0.391	0.207	0.139
2007	0.177	0.255	0.184	0.178	0.370	0.245	0.199	0.251	0.199
2008	0.188	0.215	0.157	0.176	0.233	0.325	0.309	0.155	0.228
2009	0.170	0.194	0.185	0.156	0.224	0.232	0.187	0.150	0.253

(Table 4 continued:)

Relevance of within-group inequality:[b)]									
2002	0.168	0.342	0.221	0.207	0.287	0.408	0.352	0.297	0.234
2003	0.130	0.256	0.199	0.151	0.230	0.370	0.310	0.199	0.107
2004	0.140	0.188	0.168	0.158	0.377	0.413	0.329	0.168	0.188
2005	0.146	0.143	0.145	0.168	0.211	0.257	0.278	0.180	0.099
2006	0.146	0.176	0.235	0.174	0.296	0.371	0.432	0.211	0.145
2007	0.135	0.209	0.170	0.177	0.383	0.291	0.220	0.250	0.209
2008	0.146	0.173	0.144	0.178	0.243	0.384	0.339	0.154	0.240
2009	0.132	0.160	0.171	0.160	0.240	0.264	0.202	0.148	0.255
Group-specific headcount ratios:									
2002	0.321	0.287	0.212	0.180	0.151	0.114	0.107	0.108	0.093
2003	0.311	0.259	0.247	0.166	0.150	0.107	0.094	0.091	0.107
2004	0.301	0.274	0.213	0.172	0.154	0.114	0.089	0.103	0.088
2005	0.339	0.309	0.241	0.187	0.175	0.127	0.096	0.118	0.106
2006	0.376	0.297	0.264	0.228	0.181	0.137	0.109	0.118	0.088
2007	0.326	0.295	0.226	0.189	0.167	0.130	0.097	0.115	0.098
2008	0.313	0.282	0.220	0.176	0.157	0.129	0.092	0.105	0.081
2009	0.299	0.280	0.242	0.154	0.146	0.137	0.104	0.102	0.108

a) Group-specific mean equivalent household net income divided by overall mean equivalent household net income; b) Product of relative income positions and group-specific normalized coefficients of variations

Source: Present author's own calculations

As base years the first year of the observations' period, 2002, and 2005, quasi in the middle of the observations' period, are alternatively used.

On this basis the shift-share decompositions are as follows:

(1) Constant population shares:

$$HSCV_t = \sum_{g=1}^{G} v_{g,t}^2 \cdot w_{g,BASE}^{-1} \cdot HSCV_{g,t} + \frac{1}{2} \cdot \left\{ \left[\sum_{g=1}^{G} w_{g,BASE} \cdot \left(\frac{\mu_{g,t}}{\mu_t} \right)^2 \right] - 1 \right\}$$

$$H_t = \sum_{g=1}^{G} w_{g,BASE} \cdot H_{g,t}$$

(2) Constant relative income positions:

$$HSCV_t = \sum_{g=1}^{G} v_{g,BASE}^2 \cdot w_{g,t}^{-1} \cdot HSCV_{g,t} + \frac{1}{2} \cdot \left\{ \left[\sum_{g=1}^{G} w_{g,t} \cdot \left(\frac{\mu_{g,BASE}}{\mu_{BASE}} \right)^2 \right] - 1 \right\}$$

(3) Constant group-specific normalized coefficients of variation:

$$HSCV_t = \sum_{g=1}^{G} v_{g,t}^2 \cdot w_{g,t}^{-1} \cdot HSCV_{g,BASE} + \frac{1}{2} \cdot \left\{ \left[\sum_{g=1}^{G} w_{g,t} \cdot \left(\frac{\mu_{g,t}}{\mu_t} \right)^2 \right] - 1 \right\}$$

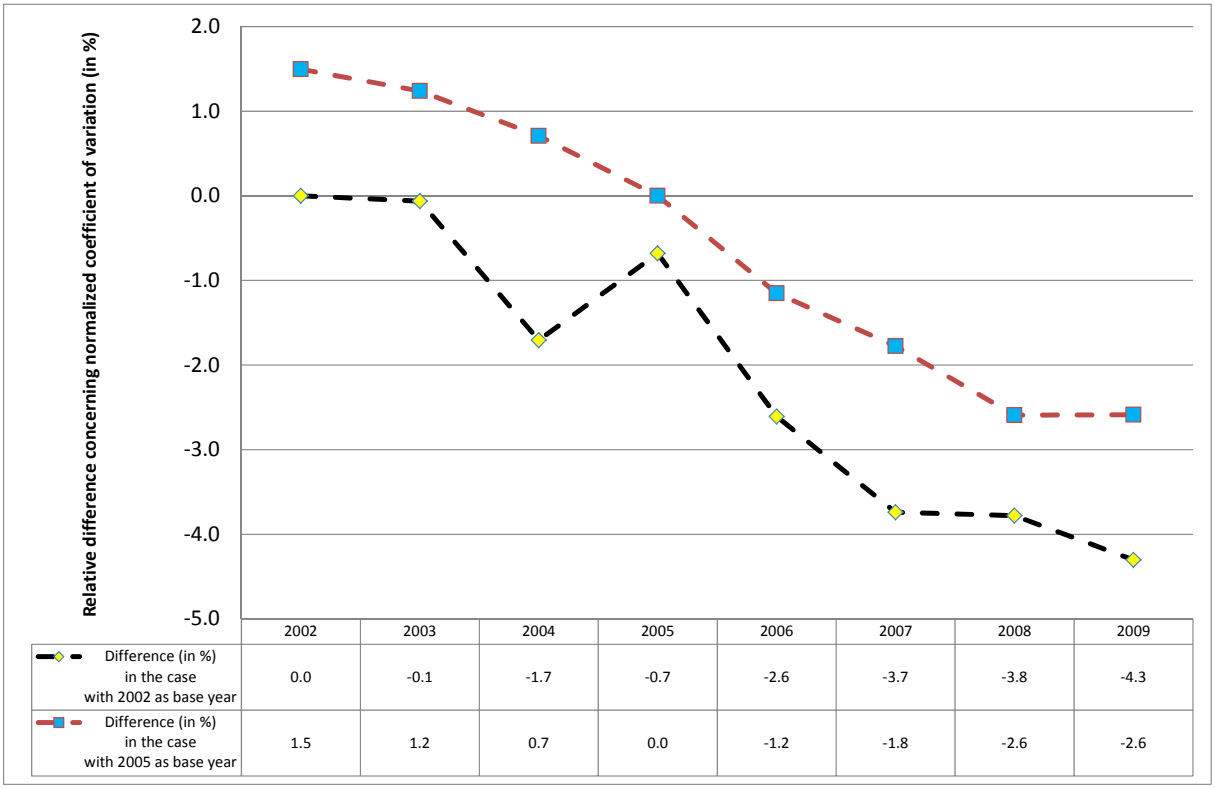
[HSCV: normalized coefficient of variation, t: period of time (2002, 2003, …, 2009), g: age group g (until 9 years, 10-19 years, 20-29 years, 30-39 years, 40-49 years, 50-59 years, 60-69 years, 70-79 years, 80 years and older), v: relative income position, w: population share, μ: mean equivalent household net income, BASE: base year (2002 or 2005), H: headcount ratio]

4.2 Population shares

Figure 6 reveals lower fictive inequality values – measured by the normalized coefficient of variation – during the crisis 2008/09 if the population structure would not have changed compared to the alternative base years 2002 and 2005. In other words: The changes concerning population structure from 2002 or 2005 to 2008/09 led ceteris paribus to higher inequality levels than otherwise. This is caused by decreasing population weights of younger persons which, by tendency, have a more regular within-group distribution of individual incomes (at least when weighted by group-specific relative income positions, as can be seen by Table 4, category "Relevance of within-group inequality").[14]

Since even overall income inequality has decreased during crisis, thus, the sketched effect of population shares was over-compensated by other effects which will be discussed in the following two sections.

Figure 6: Relative inequality differences in Germany 2002-2009 caused by changing population shares



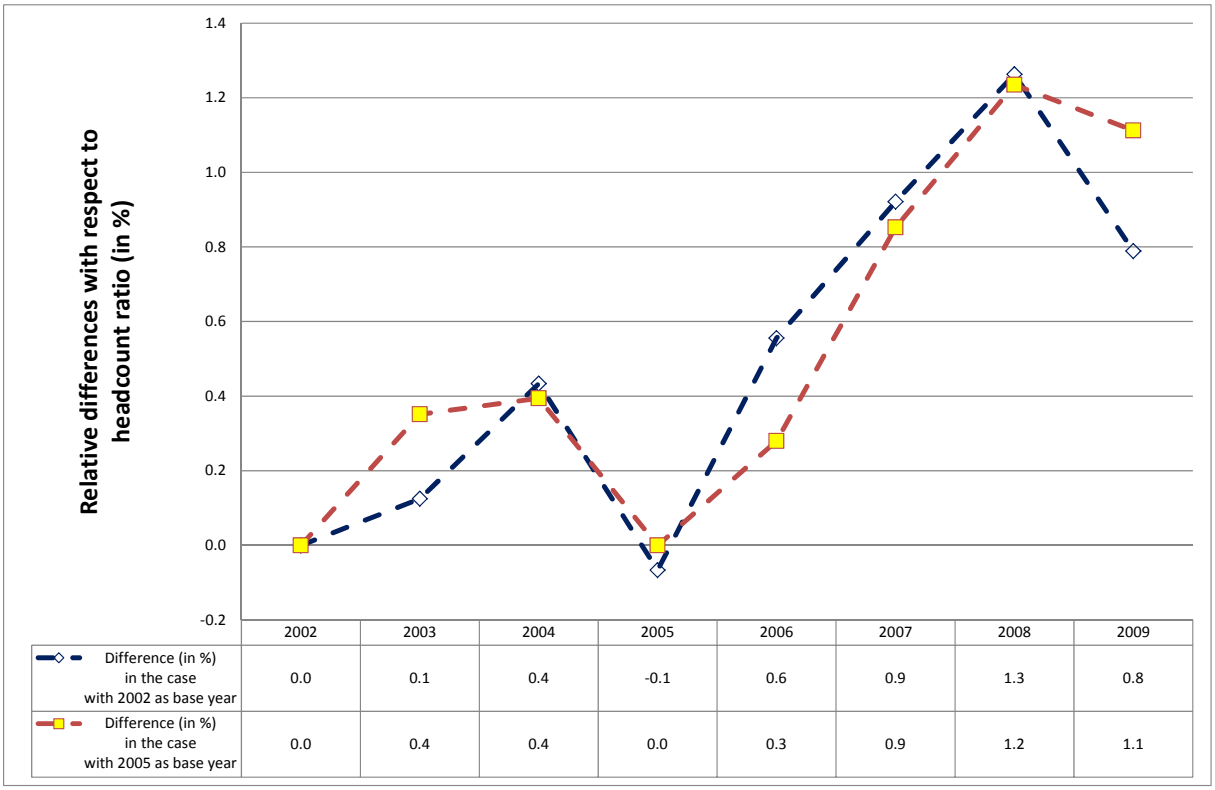
	2002	2003	2004	2005	2006	2007	2008	2009
Difference (in %) in the case with 2002 as base year	0.0	-0.1	-1.7	-0.7	-2.6	-3.7	-3.8	-4.3
Difference (in %) in the case with 2005 as base year	1.5	1.2	0.7	0.0	-1.2	-1.8	-2.6	-2.6

Source: Present author's own calculations

[14] In this context, it must be mentioned that within-group inequality dominates between-group inequality by far (with respect to age groups), as present author's own calculations have shown which can be obtained from present author on request.

In contrast to inequality – measured by the normalized coefficient of variation –, the altered population structure in Germany between 2002 and 2009 has decreased the actual values of the headcount ratio, as can be seen by Figure 7. The reason for this is that during crisis older population's groups with lower headcount ratios have raised their population shares and, therefore, their importance in the field of poverty measurement compared to younger groups with higher headcount ratios (see, once more, Table 4).

Figure 7: Relative poverty differences in Germany 2002-2009
caused by changing population shares



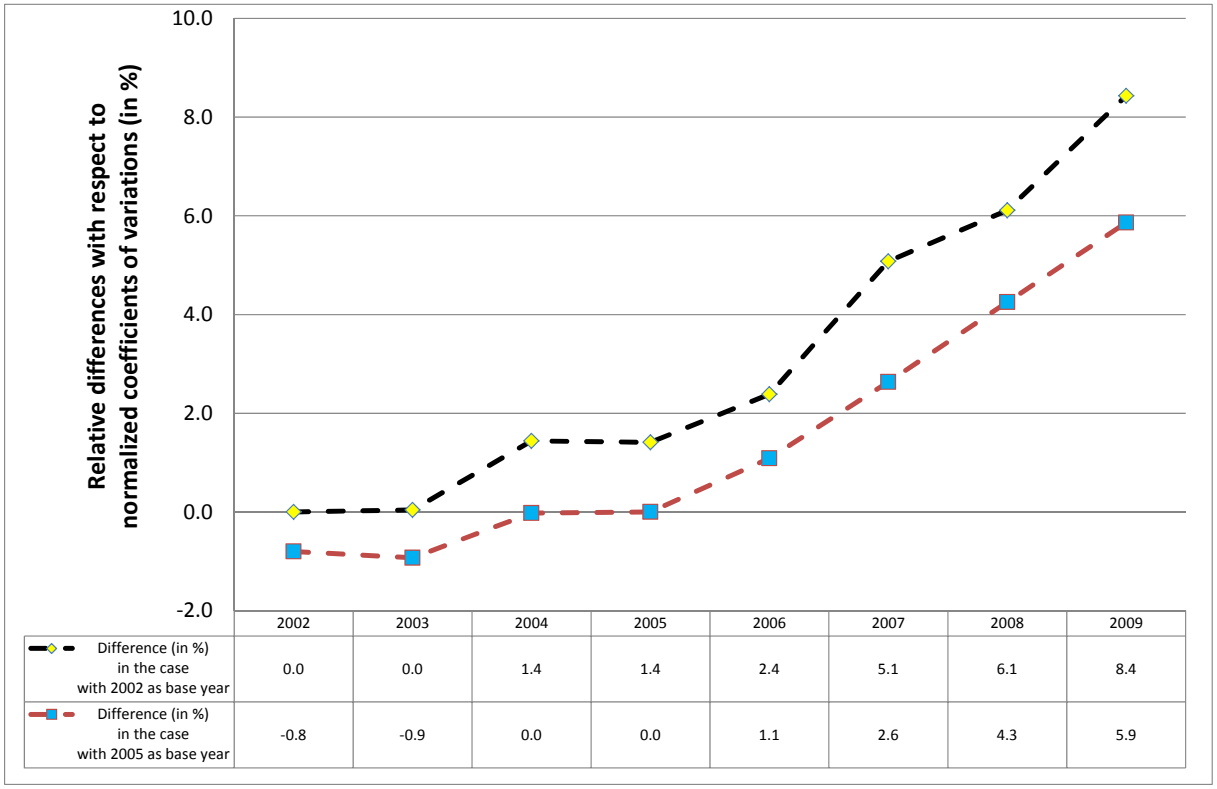
	2002	2003	2004	2005	2006	2007	2008	2009
Difference (in %) in the case with 2002 as base year	0.0	0.1	0.4	-0.1	0.6	0.9	1.3	0.8
Difference (in %) in the case with 2005 as base year	0.0	0.4	0.4	0.0	0.3	0.9	1.2	1.1

Source: Present author's own calculations

4.3 Mean incomes

Keeping group-specific relative income positions constant (at the level of 2002 or 2005), generates higher inequality values during crisis (2008/09) than before. Because of that, the changes of group-specific relative income positions over time tend to reduce income inequality in the sense of leveling effects between the relative income positions of the several age groups, even during the economic crisis. Obviously, between 2007 (2008) and the peak of crisis in 2009 income inequality – ceteris paribus – has decreased by effects resulting from group-specific relative income positions (see Figure 8).

Figure 8: Relative inequality differences in Germany 2002-2009
caused by changing relative income positions



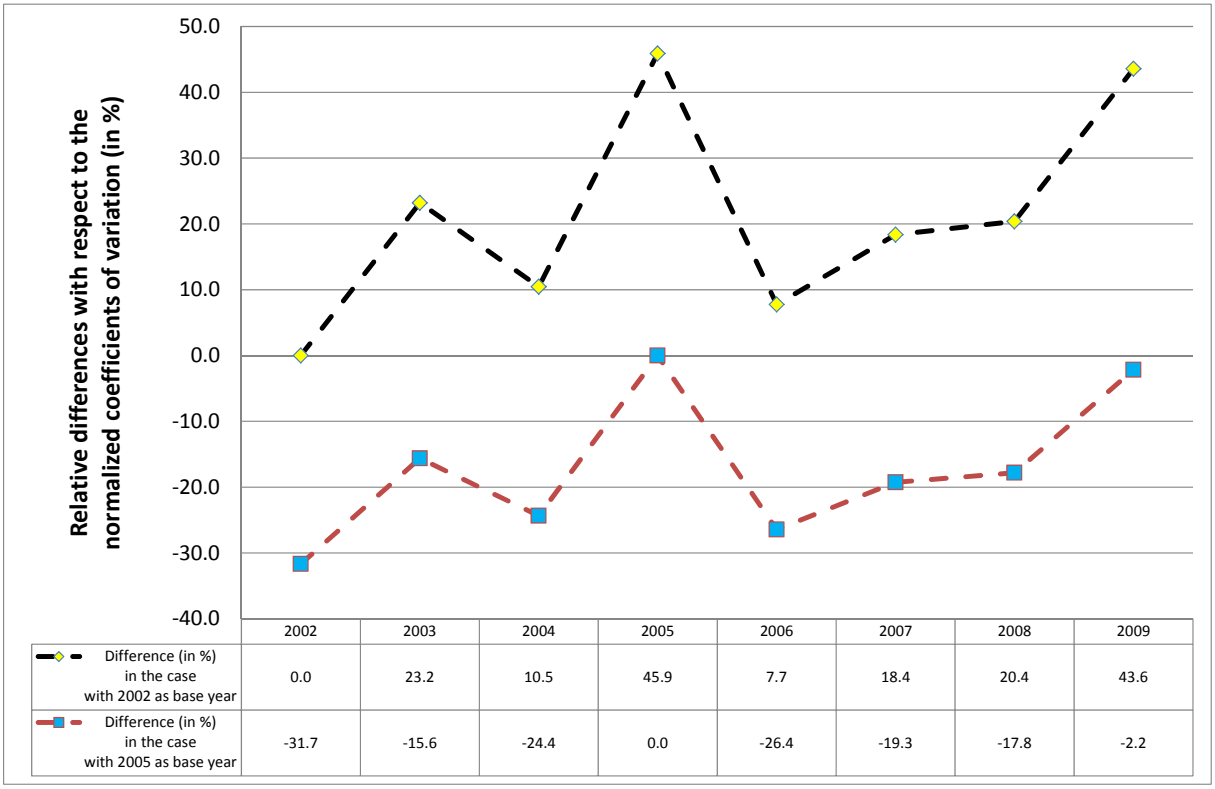
	2002	2003	2004	2005	2006	2007	2008	2009
Difference (in %) in the case with 2002 as base year	0.0	0.0	1.4	1.4	2.4	5.1	6.1	8.4
Difference (in %) in the case with 2005 as base year	-0.8	-0.9	0.0	0.0	1.1	2.6	4.3	5.9

Source: Present author's own calculations

4.4 Income deviations

As is shown by Figure 9, constant group-specific normalized coefficients of variation on the basis of 2002 lead to higher income inequality during crisis while constant group-specific inequality on the basis of 2005 has the opposite effect. This contrary result is due to some cyclical movements of the time series of within-group inequality (see Table 4).

Figure 9: Relative inequality differences in Germany 2002-2009
caused by changing group-specific inequality



	2002	2003	2004	2005	2006	2007	2008	2009
Difference (in %) in the case with 2002 as base year	0.0	23.2	10.5	45.9	7.7	18.4	20.4	43.6
Difference (in %) in the case with 2005 as base year	-31.7	-15.6	-24.4	0.0	-26.4	-19.3	-17.8	-2.2

Source: Present author's own calculations

5. Concluding remarks

The findings of the paper revealed – in a methodological sense – the sensitivity of distributional results due to different methodical settings. My empirical findings showed, e. g., higher inequality and poverty levels in the context of the decomposition approach compared with the conventional approaches of inequality and poverty measurement. In this context, there are good reasons for the usage of variable equivalence scales. Such welfare elements should be applied in distributional studies, as was done in this paper.[15]

Macroeconomic indicators showed that the German economy has handled the economic crisis at the end of the first decade of the 21st century relatively well. E. g., there was only a weak increase in the number of unemployed persons in Germany between 2008 and 2009 (despite a notable reduction of the real German gross domestic product).

[15] With respect to a rather cursory application see Faik 2010b.

Microeconomic considerations also confirmed – in detail – that the mentioned crisis had only slight economic effects in Germany: Inequality of (monthly) incomes decreased as well as income poverty did.[16]

I only found a few indications for distributional effects of the crisis: The well-being position of unemployed persons became worsened, the relative number of upwards movements out of lower income areas into higher well-being classes decreased, and the number of stayers within the poverty area increased by five percentage points between 2008 and 2009 compared with 2007/2008.

All in all, for Germany I have not found a large and notable influence of the economic crisis at the end of the first decade of the 21st century on important macroeconomic variables like the general number of unemployed persons as well as on microeconomic, distributional variables in the fields of inequality and poverty measurement (at least with respect to monthly income).

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[16] By the way, additional calculations for (income-dependent) mean life satisfactions (Germany 2002-2009) revealed that life satisfaction was highest in the high-income area and lowest in the low-income area in all observed years. In the low-income area the means ranged – on a 11-points scale – between 6.30 points (2004) and 6.59 (2002). In the middle-income area a range of values between 6.78 points (2004) and 7.07 points (2008) resulted, and in the high-income area the limits of values were 7.28 points (2004) and 7.60 points (2008). It is interesting that the maximum of the low-income area was below the minimum of the middle-income area; the same holds for the relationship between middle- and high-income areas. For all areas the minimum value was measured in 2004 so that the overall minimum was also observed in this year (with 6.66 points). The highest mean for the entire population was measured in 2002 (with 6.90). Since the end of the boom in the IT and in the communication line of business in 2001, in Germany a recession was observed until 2004. Thus, the reported minimum and maximum values of mean life satisfaction may have – at least to some degree – resulted from business cycle effects. Moreover, the calculations showed almost constant means between 2005 and 2009, indicating that the economic crisis at the end of the first decade of the 21st century had no (significant) effect on (mean) life satisfaction in Germany. The corresponding calculations can be obtained in detail from present author on request.

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