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Children's Opportunities in Germany – An Application Using Multidimensional Measures

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Discussion Paper

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Children's Opportunities in Germany - An Application Using Multidimensional Measures

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Abstract

Abstract. Single parents and unmarried couples are increasingly replacing the traditional nuclear family. This paper investigates if the greater variety in living arrangements contributes to increased resource disparities among children in Germany. Children in single parent families are disadvantaged in at least three dimensions decisive for their later achievements: material standard of living, parental education, and parental childcare time. We compute multidimensional inequality and poverty indices using SOEP data from 1991-2012. We distinguish between parental and publicly provided childcare, which is an increasingly important in-kind benefit in Germany. We find that both multidimensional inequality and poverty declined as expanded public childcare strongly reduces resource disparities among children.

JEL Classification: D30, D63, I32, J12, J13

Keywords: Multidimensional Inequality, Multidimensional Poverty, Inequality Indices, Demography

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1 Introduction

Single parents and non-marital cohabitations are increasingly replacing the traditional nuclear family in many industrialized countries.¹ The greater disparity in family environments most likely leads to greater disparity in children’s resources, which are major predictors of later life socio-economic success.

This paper analyses if changing family patterns in Germany create greater disparities in children’s endowments along three dimensions: (1) parental income; (2) parental education; (3) and care time; all crucial determinants of children’s later outcomes. Higher parental income translates into higher expected earnings for their children via investments in health and education, as argued by Becker and Tomes (1979, 1986).² Parental education reflects parental productivity in child-enhancing activities (Black and Devereux, 2011). There is broad evidence for strong correlations between parental education and income, on the one hand, with their children’s education and income later in life, on the other hand.³ Finally, time investment affects the development of children’s cognitive and social-emotional skills.⁴ We include both parental childcare time and publicly provided childcare and school time. In many industrialized countries, large welfare states play an important role in “leveling the playing field” for children both through financial redistribution via progressive taxes and monetary benefits as well as the provision of public services, such as public education, childcare, and other in-kind benefits. Verbist and Matsaganis (2014) suggest that the redistributive impact of in-kind benefits is as large as that of monetary benefits, with their relative importance in social spending seeming to increase in European countries. Since 2005, the German welfare state heavily expanded publicly provided childcare, which might have counteracted growing disparities among

¹See, e.g., McLanahan (2004)

²There was a rapidly growing theoretical literature on the relation of family behavior and the distribution of income and wealth in the 1970s and 1980s, among which Becker and Tomes (1979, 1986) are probably the best known contributions.

³The large literature on intergenerational mobility since the 1990s is summarized in Black and Devereux (2011) and Jenkins and Jäntti (2015).

⁴An extensive overview of empirical studies on the importance of certain early life conditions and the evidence on critical periods for shaping multiple life skills is provided by Heckman and Mosso (2014).

children.⁵

We apply Maasoumi’s index for multidimensional inequality (Maasoumi, 1986, 1999) and poverty (Lugo and Maasoumi, 2008), where resources are first aggregated for each individual and then aggregated across individuals to arrive at a single index.⁶ Maasoumi’s proposition to first aggregate dimensions for each individual carries the benefit that low levels of one dimension can be compensated with high levels of another dimension at the individual level. E.g., lower net incomes, lower parental education and less parental time, which applies to the average child in a single parent family, may be at least partly compensated by publicly provided childcare.

We contribute to the growing literature on multidimensional inequality and poverty measurement, which promotes a shift from the sole focus on income to a broader concept of ”well-being” by incorporating endowments along several dimensions into a single measure.⁷ Our study is also related to the literature on equality of opportunity, which separates the influence on outcomes into circumstances beyond individual control and individual effort.⁸ If people believe that inequality is caused by circumstances beyond individual control they are less willing to accept high inequality levels and support more redistribution (Fong, 2001; Corneo and Grüner, 2002). Niehues and Peichl (2014) find that a sizable share of total inequality in Germany and the US can be attributed to circumstances beyond individual control. We argue that our three dimensions are beyond the children’s control.

Our main results are as follows. Both multidimensional inequality and poverty among children decreased between 1991 and 2012, despite changing family patterns. The decline is driven by expanded publicly provided childcare that reduced inequality along this dimension and more than offsets rising income inequality among children. The finding is robust to different assumptions on inequality and poverty aversion and to the degree of substitutability between dimensions. However, increasing

⁵According to Schober and Stahl (2014), the use of publicly provided childcare has disproportionately grown among single mothers and highly educated mothers since 2006.

⁶Further applications of Maasoumi’s index include, e.g., Nilsson (2010); Justino (2012); Rohde and Guest (2013).

⁷Rawls (1971) and Sen (1985) first advocated a multidimensional perspective on the notion of well-being. See Aaberge and Brandolini (2015) for a summary and thorough discussion of the multidimensional approaches as well as the introduction of Decancq and Lugo (2013).

⁸The literature on equality of opportunity was pioneered by Roemer (1993, 1998).

the weight of income and decreasing the weight of publicly provided childcare takes away the declining trend in some cases.

The paper is organized as follows: In Section 2, we describe our data, sample and the measurement of (1) parental income; (2) parental education; as well as (3) parental and non-parental childcare time. Section 3 describes how these resources evolved over time by family type. The methodological approach deriving multidimensional inequality and poverty indices is described in Section 4. In Section 5, we present and discuss our results. Section 6 concludes.

2 Data

Our analysis is based on data from the Socio-Economic Panel (SOEP). The SOEP is an annual survey of German households that includes a variety of demographic and socio-economic characteristics for all years since 1984. East German households are included in the panel since 1990. By 2013, almost 11,000 households participated, which corresponds to approximately 20,000 individuals.⁹

Our sample includes East and West German children. Children are defined as individuals that are younger than 14 years and still live in the household of their parents.¹⁰ We further differentiate between children living with married, cohabiting and single parents. We start the analysis with the year 1991 in order to include East German children that entered the sample after reunification in 1990. In order to maximize the sample size and to minimize problems like panel attrition, we use the original and all refreshment samples (A-K) of the SOEP in an unbalanced panel design excluding the migration sample from 2013. Furthermore, our sample is restricted to children, where values of all four attributes are observed, by which we lose about 2,500 observations from a total of about 77,000 observations over the entire period. In 2013, the sample includes about 3,000 observations.¹¹

Children's resources are measured along three dimensions: (1) parental income;

⁹For further details see Wagner et al. (2007) and Gerstorff and Schupp (2015).

¹⁰Sensitivity tests show that our results are robust to restricting our sample to children younger than seven years.

¹¹The number of observed children by family type is provided in Appendix Table A.1.

(2) parental education; (3) and care time.

1. *Parental income*

Parental income is measured as real net equivalent household income. Net household income is the sum of households' labour earnings, asset flows, private retirement income, private transfers, public transfers, and social security pensions minus total household taxes including imputed rents from housing. Income is equivalized using the modified OECD scale to take into account different needs of adults and children in the household.

2. *Parental education*

Parental education is measured as years of education completed at the time of the survey. For married and cohabiting parents, we use the value of the parent with the highest number of years of education.

3. *Childcare time*

(a) *Parental childcare time*

In contrast to many other surveys, where parental time can only be measured as a residual term, we are able to directly observe total time devoted to childcare activities by each parent: Every household member aged sixteen or older is asked the number of hours spent on childcare on an average weekday. Parental childcare time is the sum of hourly childcare activities of household head and spouse for all children on an average weekday. Unfortunately, we do not observe the type of childcare such that we cannot distinguish between physical and non-physical childcare (e.g. nourishing vs. teaching) or direct and indirect childcare (e.g. reading vs. doing household tasks together). Consequently, we can only measure quantity of childcare time and not quality. Empirical evidence shows that quality of childcare time depends on parents' educational level.¹² Higher

¹²E.g., Doyle et al. (2009) find that children of low-educated mothers tend to have lower achievements in tests measuring cognitive, socio-emotional and behavioural skills than children from high-educated families.

quality of childcare time might thus be captured by considering parental education as a separate dimension.

Since parents' only state the total time spend with children, we have to adjust total time to the number of children in the household. We assume that parents' caring time is not proportionally increasing with the number of children and that there are economies of scale in parenting within families. Evidence for this hypothesis is given by time use studies. In particular, Kühhirt (2012) shows that West German married and cohabiting parents do not spend significantly more time on childcare activities if there is more than one child living in the same household. To construct comparable *one child equivalent families* we apply a generalized version of the square root scale¹³ on total parental childcare time, PT , of both parents ($i = 1, 2$) such that equivalent parental childcare time, PT_{eq} is defined as:

$$PT_{eq} = \frac{\sum_{i=1}^2 \text{Parental time}_i}{s^\theta}, \quad (1)$$

where s is the number of siblings living in a household and θ is an *equivalence elasticity* (Bönke and Schröder, 2012). $\theta = 0.5$ produces the well-known square root equivalence scale. Dividing total parental childcare time by the number of children (this would be equal to $\theta = 1$) would most likely underestimate parental time devoted to each child in the presence of economies of scale in parenting. On the other hand, assigning the total parental time to each child in the family (this would be equal to $\theta = 0$), would certainly overestimate parental time per child.¹⁴

(b) *Non-parental childcare time*

Non-parental childcare time includes total hours spent in crib, kindergarten, after school care club, with a child-minder or in school on an

¹³We use the square root scale to consider the number of siblings only, in contrast to the modified OECD scale used for income which also considers the number of adults in the household.

¹⁴Our results on trends in parental childcare inequality are robust to changes of θ . Inequality levels vary in θ , but differences are not significant. Results are available from the authors upon request.

average weekday depending on the age of the respective child. Since the bulk of this care time is provided by the state and presumably only a small portion is spent with a private child-minder, we also refer to this dimension as publicly provided childcare time.

We only observe if children spent half- or full-day in the above mentioned institutions on an average weekday. According to information on public childcare provision, we assign four hours for half-day care and eight hours for full-day care. Since 2009 exact hours are asked in the SOEP questionnaire, but for consistency reasons we stick to our half-day and full-day categories.

Time in school is based on information from publications of the Standing Conference of the Ministers of Education and Cultural Affairs of the German Länder (*Kultusministerkonferenz der Länder*), where school hours taught per week are provided by class type, class level and federal state (*Bundesland*) for the 1992-2012 period. We take 1992 values for 1991, where no information is available. We assign school hours taught in elementary school to every child aged between six and ten in the respective *Bundesland* and year. The average of actually taught school hours over all lower secondary school types is assigned to every child aged between eleven and thirteen in the respective *Bundesland* and year.¹⁵

There exist large differences within and across regions and between private and public childcare and schools (Camehl et al., 2015). SOEP data only includes questions on the quality of publicly provided childcare for children in preschool age. Information on the attended school and its respective quality is not observed. Therefore, we might underestimate disparities in non-parental childcare time.

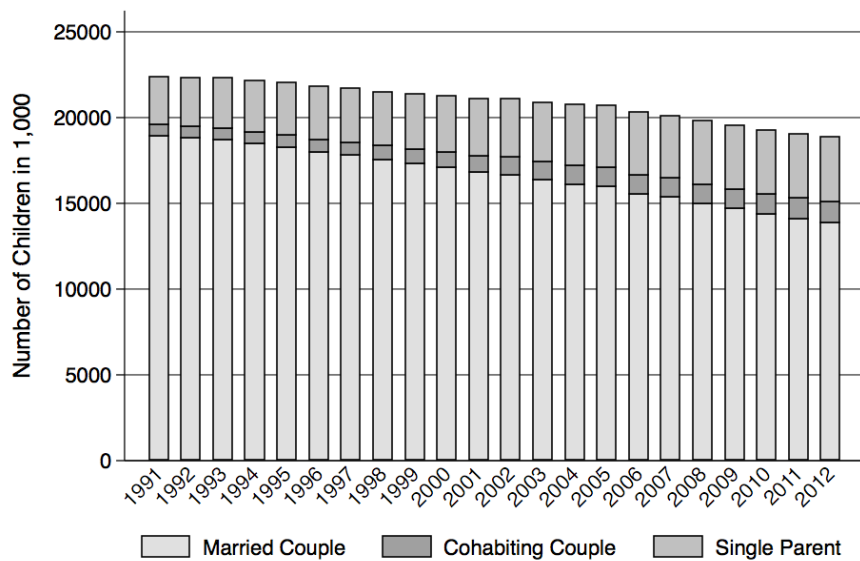
¹⁵We also incorporate the fact that primary school usually lasts until class level six in the federal states of Berlin and Brandenburg, in contrast to four years in the other federal states. We take averages over all lower secondary school types for each year because school types and hours taught in lower secondary schools vary heavily within and between *Bundesländer* over time. Secondary school types in Germany are *Hauptschule*, *Realschule*, *Gesamtschule*, *Schularten mit mehreren Bildungsgängen* and *Gymnasium*.

3 Trends in Family Resources in Germany

Since the mid-1960s, the traditional nuclear family consisting of a married couple and their respective children is on retreat. An increasing number of children grows up in comparably disadvantaged families with only one parent.¹⁶

As Figure 1 shows, the total number of children in Germany decreased from approximately 22 million in 1991 to 19 million in 2012. Over this period, the share of children living in traditional nuclear families decreased from 84.5 percent to 73.6 percent. At the same time, the share of children living in cohabiting couple families more than doubled increasing from 2.9 percent to 6.5 and the share of children in single parent families increased from 12.6 percent to 19.9 percent. In particular, the number of female-headed single parent households has risen sharply. In contrast, the number of children per family remained fairly constant.¹⁷

Figure 1: Trends in the number of children by family type



Source: Federal Statistical Office (2013, Table 6.5), own calculations.
 Note: Values for the years 1991-1995 are not available and thus imputed using a linear trend.

Figure 2 depicts the average trends in Germany in each dimension by family

¹⁶A wide sociological and demographical literature examines the general trends and causes of the so-called second demographic transition for Western countries, e.g., Peuckert (2012), Lesthaeghe (2010), and McLanahan and Percheski (2008).

¹⁷The share of families with one child increased from 31.4 percent in 1991 to 33.4 percent in 2012, whereas the share of families with two (three or more) children declined from 46.2 (22.4) percent to 45 (21.6) percent.

type from 1991 to 2012. Graph 2a shows that children's average equivalent net income increased from 17,832 Euro to 21,223 Euro (+19 percent). Children living in traditional married couple families experienced both a higher level and a higher income growth rate than their counterparts in single parent families.¹⁸ Consequently, the absolute income gap between children from married and cohabiting couple families on the one hand and children from single parent families on the other hand has widened.

Similarly, married and cohabiting couples exhibit, on average, more years of education than single parents, as can be taken from Graph 2b. However, although years of education increased for all family types, the education gap did not.

Parental childcare time depicted in Graph 2c replicates the pattern observed for parental income and education. Children in single parent families receive less care time from their parents. Of course, this gap is mostly explained by the total number of parents present in the family.¹⁹ Equivalizing childcare time reduces the level of childcare time per child across all family types, as depicted in Graph 2d, but more so for children living in traditional married couple families due to the larger number of children living in this type of family. Average (equivalent) parental childcare time increased slightly from 8.0 (5.8) hours in 1991 to 8.6 (6.3) hours in 2012.²⁰

Finally, Figure 2e shows that, in contrast to the other dimensions, the average child in a single parent family receives more non-parental childcare time than an average child living with married or cohabiting couple families. Average non-parental childcare time increased from 3.6 to 5 hours per day. A number of legislative changes expanded public childcare provision in Germany, particularly since 2005.²¹ In some municipalities, special consideration is given to single parents. The observed trend

¹⁸Single parent families lack a second potential earner. Moreover, most single parents are females who have lower hourly wages and lower working hours than males.

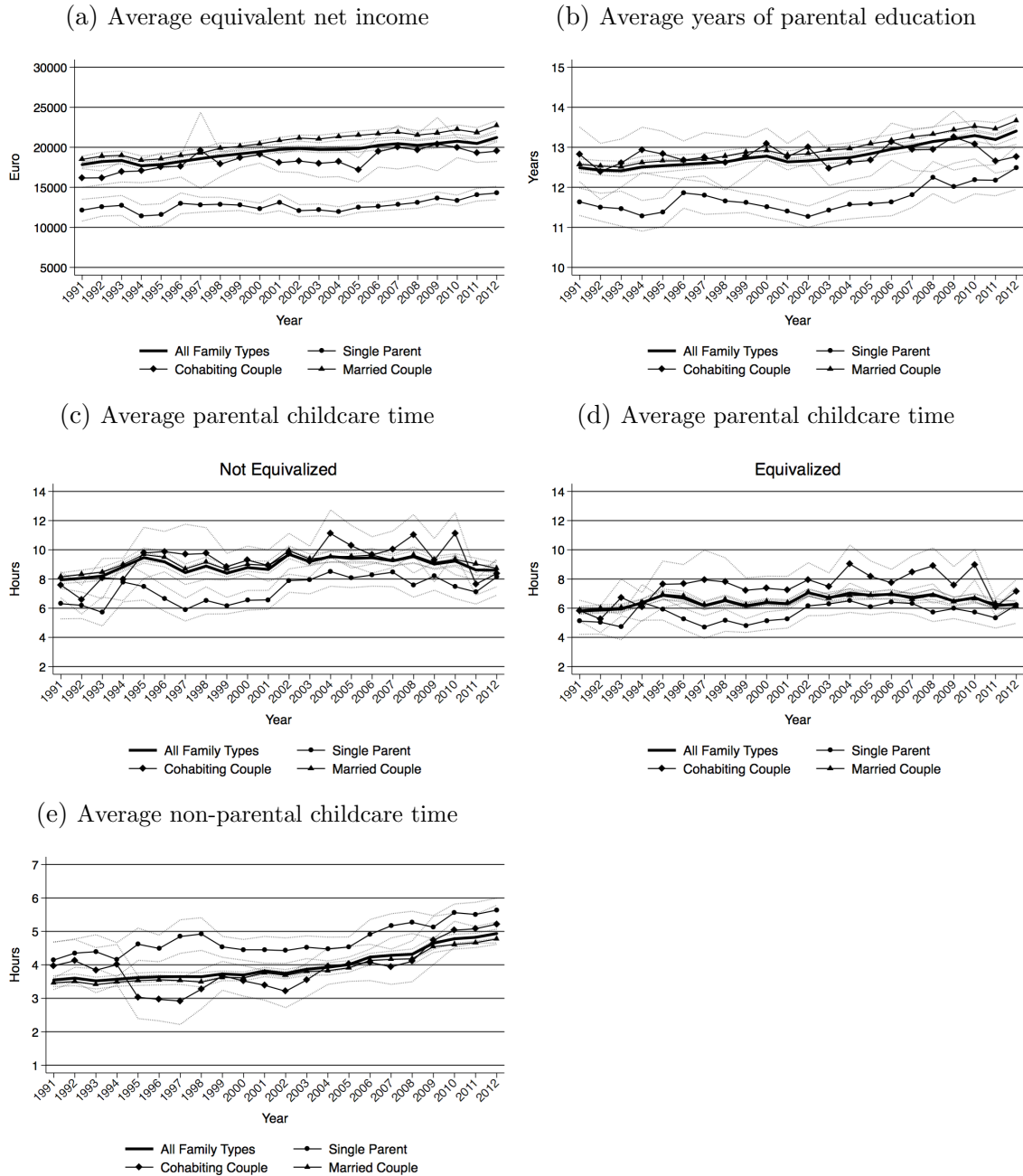
¹⁹Single parents spend less time on childcare since they are not able to share housework with a partner and cannot reduce their working time being the only "breadwinner."

²⁰See Section 2 for care time equalization.

²¹A new law in 2004 introduced a legal claim for children under three years of age for a place in a day care center if certain conditions are met. Another law in 2008 redefined this claim for children older than one. Consequently, the share of children under three in day care centers increased from 8 to 24 percent in West Germany between 1991 and 2013, while remaining at roughly 50 percent in East Germany where the use of publicly provided childcare has a stronger tradition (Schober and Stahl, 2014).

indicates that expanded public supply may at least partly offset single parent children's disadvantage in parental care time.

Figure 2: Average trends by dimension



Source: SOEP (v30), own calculations.

Note: Incomes are in prices of 2010 and equivalized using the modified OECD scale. Education is measured as years of highest educated parent. Parental childcare time is the sum of household head's and spouse's stated childcare time on an average week day. Non-parental time is categorically coded (0,4, or 8). Significance at the five percent level is calculated using bootstrap standard errors with 100 replications. Higher volatility of the series for children in cohabiting couples is due to small sample sizes and relatively large variation of the respective sample size over time (see A.1).

4 Method

In this section, we explain and discuss how we measure inequality and poverty in a multidimensional setting.

First, we have to normalize the observed values x_{itd} for every child i , $i = 1, \dots, N$, and dimension d , $d = 1, \dots, D$, because of the dimensions' different measurement units, which are daily hours for childcare and schooltime, Euro for income and years for education. We transform observed values x_{itd} to values between zero and one for all observation years t , where the dimension-specific maximum and minimum over all years t serve as so-called *goalposts* (see, e.g., United Nations Development Programme, 2014).²² Transformed values \tilde{x}_{itd} are obtained by the following formula:

$$\tilde{x}_{itd} = \frac{x_{itd} - \min x_d}{\max x_d - \min x_d}. \quad (2)$$

After normalization, we replace all zero observations with 0.001, since GE measures of inequality are not defined for zero values.²³

Most importantly, an aggregation rule that transforms the dimensions' distributions into a single real value has to be decided upon.²⁴ One approach is to first aggregate across children for each single dimension and second aggregate the dimension-specific indicators. This approach is easily applicable if only aggregates are available by dimension and, thus, forms the basis for the UN's Human Development Index (HDI). If individual data are available for each dimension, the joint distribution can be taken into account and potentially compensating effects between dimensions can be considered for each child. Then, as suggested by Maasoumi (1986, 1999), dimensions are first aggregated for each individual using a utility-like function

²²The goalpost approach is a linear transformation that is used, for instance, to construct the Human Development Index. Of course, the transformation affects the inequality measured in each dimension, but, so far, standardization offers the best solution how to overcome different measurement units. See Decancq and Lugo (2013) for details on standardization procedures.

²³Sensitivity tests show that our results are robust to choosing values closer to zero. Results are available from the authors upon request.

²⁴The problem of choosing an appropriate well-being index including the selection of dimensions, substitution rates between each pair of dimensions, dimension weights etc., is also known as Rawl's index problem (Rawls, 1971, p. 80).

and then a univariate inequality measure is employed to aggregate the utility-like values across individuals. Maasoumi's index is an "ad-hoc" measure as compared to an axiomatic approach. The "ad-hoc" chosen parameter values make value judgments, e.g., the degree of substitutability between the dimensions and the weight of each dimension, explicit and transparent.²⁵

In the first step, every child's observed endowments \tilde{x}_{id} – suppressing time index t – are aggregated using aggregation function S_i , which can be interpreted as some utility-like function used to rank alternative distributions according to their social desirability (see Weymark, 2006). In our context, it measures a child's opportunities incorporating disposable income, parents' educational background and care time into a single measure. According to Maasoumi (1986) the optimal aggregation function S_i minimizes the distance between the joint distribution of the resources and the distribution of the index under the condition $\sum_{i=1}^N S_i = 1$ such that:

$$S_i = \left(\sum_{d=1}^D w_d \tilde{x}_{id}^\beta \right)^{1/\beta}, \beta \neq 0, \quad (3)$$

$$S_i = \left(\prod_{d=1}^D \tilde{x}_{id}^{w_d} \right), \beta = 0. \quad (4)$$

In the second step, the utility-like function S_i to which we will refer to as opportunity indicator is aggregated to arrive at a measure of multidimensional inequality (Section 4.1) and of multidimensional poverty (Section 4.3).

4.1 Multidimensional Inequality

Maasoumi (1986, 1999) proposes a measure from the General Entropy (GE) family for the inequality of the distribution of $S = (S_1, \dots, S_N)$. We can derive the following GE specifications to get a measure of multidimensional inequality I_α , where $\bar{S} =$

²⁵Maasoumi's index satisfies the desirable properties for measuring multidimensional inequality: monotonicity, continuity, normalization, anonymity, homotheticity, subgroup decomposability, weak uniform majorization as well as individualism. See, e.g., Tsui (1999), Lugo (2007) or Weymark (2006) for a comprehensive discussion on desirable distributional and non-distributional properties of multidimensional inequality measures.

$\sum_{i=1}^N S_i/N$ is the average of the aggregated well-being indicator for N children:

| | | GE inequality measure I_α | | |
|-------|------------------------|----------------------------------|--|-----|
| GE | ($\alpha \neq 0, 1$) | = | $\frac{1}{\alpha(1-\alpha)} \frac{1}{N} \sum_{i=1}^N \left[1 - \left(\frac{S_i}{\bar{S}} \right)^\alpha \right]$ | (5) |
| MLD | ($\alpha = 0$) | = | $\frac{1}{N} \sum_{i=1}^N \ln \left(\frac{\bar{S}}{S_i} \right)$ | (6) |
| Theil | ($\alpha = 1$) | = | $\frac{1}{N} \sum_{i=1}^N \left[\frac{S_i}{\bar{S}} \ln \left(\frac{S_i}{\bar{S}} \right) \right]$ | (7) |
| HSCV | ($\alpha = 2$) | = | $-\frac{1}{2N} \sum_{i=1}^N \left[1 - \left(\frac{S_i}{\bar{S}} \right)^2 \right]$ | (8) |

The magnitude of multidimensional inequality measured crucially depends on the chosen weighting structure w (1), the substitutability between dimensions β (2), and the inequality aversion parameter α (3). We elaborate on the weighting structure in Section 4.4.

The parameter β determines the degree of substitution between all pairs of dimensions. If $\beta = 1$, then all dimensions are perfect substitutes, i.e., low levels of one dimension can be perfectly compensated by high levels of another. The smaller β , the smaller is the substitutability between the dimensions, i.e., the loss of one unit in one dimension can only be compensated by ever more extra units in another dimension to keep the level of well-being constant. If β converges to minus infinity, then dimensions are treated as perfect complements and the opportunity indicator depends on the dimension where the child is worst off regardless of the chosen weighting structure.

The parameter α determines the degree of concavity of the inequality measure and indicates to what extent a society values the well-being of some individuals in the distribution different from others. The lower α , the more weight is put on individuals at the bottom of the distribution and, thus, the more sensitive is the inequality measure to changes in the lower part of the distribution. The Mean Logarithmic Deviation (MLD), where $\alpha = 0$, is thus more sensitive to changes at the bottom than the Theil, where $\alpha = 1$, or the Half Squared Coefficient of Variation (HSCV), where $\alpha = 2$.

4.2 Decomposition of Multidimensional Inequality

To further investigate the relationship between changing family patterns and our measure for children's opportunity, we decompose the intertemporal change in multidimensional inequality by family type. Using inequality measures from the GE family in the second step of our multidimensional framework, we can additively decompose the changes in multidimensional inequality into a within group and a between group component (see Shorrocks, 1980; Maasoumi, 1986). In particular, we can decompose the MLD denoted as I_0 , which is the only path independent inequality measure of that class (see Foster and Shneyerov, 2000), as follows:

$$I_0 = \underbrace{\sum_{f=1}^F v_f I_{0f}}_{\text{within}} + \underbrace{\sum_{f=1}^F v_f \ln\left(\frac{1}{\lambda_f}\right)}_{\text{between}}. \quad (9)$$

F is the number of family types, $v_f = n_f/n$ is the population share of family type f , I_{0f} is the family type specific level of multidimensional inequality measured by MLD, and $\lambda_f = \bar{S}_f/\bar{S}$ reflects family type f 's average opportunities relative to the overall opportunity average. Since we are particularly interested in the impact of changing family patterns on the change in multidimensional inequality over time, we decompose the inequality change $\Delta I = I_{t+1} - I_t$, suppressing the GE index α , according to Mookherjee and Shorrocks (1982) as follows:

$$\Delta I = \sum_{f=1}^F v_{f,t+1} I_{f,t+1} - \sum_{f=1}^F v_{f,t} I_{f,t} - \sum_{f=1}^F v_{f,t+1} \ln(\lambda_{f,t+1}) + \sum_{f=1}^F v_{f,t} \ln(\lambda_{f,t}). \quad (10)$$

Extending both sides by $\sum_{f=1}^F v_{f,t} I_{f,t+1}$ and $\sum_{f=1}^F v_{f,t} \ln(\lambda_{f,t+1})$, rearranging and denoting differences between $t+1$ and t by Δ gives:

$$\Delta I = \sum_{f=1}^F v_{f,t} \Delta I_f + \sum_{f=1}^F \Delta v_f I_{f,t+1} - \sum_{f=1}^F \Delta v_f \ln(\lambda_{f,t+1}) - \sum_{f=1}^F v_{f,t} \Delta \ln(\lambda_f). \quad (11)$$

$v_{f,t}$, $I_{f,t+1}$ and $\ln(\lambda_{f,t+1})$ are replaced by their mean values (e.g., $\bar{v}_f = \frac{1}{2}[v_{f,t} + v_{f,t+1}]$) in order to avoid aggregating weights from different points in time which gives:

$$\Delta I = \sum_{f=1}^F \bar{v}_f \Delta I_f + \sum_{f=1}^F \bar{I}_f \Delta v_f - \sum_{f=1}^F \overline{\ln(\lambda_f)} \Delta v_f - \sum_{f=1}^F \bar{v}_f \Delta \ln(\lambda_f). \quad (12)$$

The first term gives the impact of the change in within family type inequality ΔI_f on the overall inequality change. However, the change in relative importance of family types Δv_f affects not only the two middle terms but also the last term through $\lambda_f = \bar{S}_f / \bar{S}$ because of $\bar{S} = \sum_{f=1}^F v_f \bar{S}_f$. Since we want to exactly identify the effect of Δv_f on the overall inequality change, we rearrange the last term in Equation (12) and then approximate the decomposition according to Mookherjee and Shorrocks (1982) as:

$$\Delta I \approx \underbrace{\sum_{f=1}^F \bar{v}_f \Delta I_f}_{(1)} + \underbrace{\sum_{f=1}^F \bar{I}_f \Delta v_f}_{(2)} + \underbrace{\sum_{f=1}^F \left[\bar{\lambda}_f - \overline{\ln(\lambda_f)} \right] \Delta v_f}_{(3)} + \underbrace{\sum_{f=1}^F (\bar{\theta}_f - \bar{v}_f) \Delta \ln(\bar{S}_f)}_{(4)}, \quad (13)$$

where $\theta_f = v_f \bar{S}_f / \bar{S}$ is the family type's share of total population's well-being. We can now clearly distinguish between the impact of changes in (1) within family inequality and (4) between family inequality, as well as the impact of changing relative importance of family types on the (2) within and (3) between family type inequality.

4.3 Multidimensional Poverty

In the view of policy implications, we might be particularly interested in the lower part of the distribution. Therefore, we also compute measures of multidimensional poverty. To stay as close as possible to our methodological framework for inequality presented above, we focus on a multidimensional poverty measure based on infor-

mation theory introduced by Lugo and Maasoumi (2008).²⁶

As for multidimensional inequality, we start with each child's utility-like function S_i (see equations (3) and (4)) covering the endowments in all dimensions. But to identify the children with poor opportunities we must decide on a poverty line.

One can either use dimension-specific poverty thresholds before aggregation (*component poverty line approach*) or an aggregate poverty line derived from dimension-specific poverty lines (*aggregate poverty line approach (APL)*). Since we aggregate dimensions in the first step, we construct an APL, which we denote S_z , from dimension-specific poverty lines z_d . The dimension-specific poverty lines z_d are defined as 60 percent of the median value in each dimension. E.g., children are identified as income poor if they have 60 percent of the median real equivalent net income or less. To obtain S_z we simply replace the \tilde{x}_{id} in (3) and (4) with the dimension-specific poverty lines z_d :

$$S_z = \left(\sum_{d=1}^D w_d z_d^\beta \right)^{1/\beta}, \quad \beta \neq 0, \quad (14)$$

$$S_z = \prod_{d=1}^D z_d^{w_d}, \quad \beta = 0. \quad (15)$$

Children with an opportunity indicator S_i below the aggregate poverty line S_z are identified as poor in opportunities.²⁷

Then, we aggregate the level of well-being of children identified as poor with the following function

²⁶See, e.g., Bourguignon and Chakravarty (2003) or Alkire and Foster (2011) for a detailed discussion of counting and multidimensional poverty measures including differences in identifying the poor (union, intersection or dual cutoff methods).

²⁷According to the union approach, an individual is already identified as multidimensional poor if she is deprived at least in one dimension. The intersection approach identifies an individual as multidimensional poor if it is deprived in all dimensions at the same time (see, e.g., Alkire and Foster, 2011). In contrast, we apply an intermediate approach that allows for some substitution between dimensions such that disadvantages in one or more dimensions can be compensated by advantages in other dimensions in which an individual is not deprived (Lugo and Maasoumi, 2008). However, the poverty function collapses to the union approach if β is infinitely small such that only the worst dimension is considered in S_i .

$$P(S; z) = \frac{1}{N} \sum_{i=1}^N p_i^\phi = \frac{1}{N} \sum_{i=1}^N \left[\max \left\{ \frac{S_z - S_i}{S_z}; 0 \right\} \right]^\phi, \quad (16)$$

where p_i is the multi-attribute poverty function for each child i . Our poverty measure is directly related to the Foster-Greer-Thorbecke (FGT) poverty measures and satisfies the same distributional and non-distributional properties. A general formulation that allows for some substitution between dimensions above and below the poverty thresholds can be written as

$$P(APL) = \frac{1}{N} \sum_{i=1}^N \left[\max \left\{ \frac{S_z^{1/\beta} - S_i^{1/\beta}}{S_z^{1/\beta}}; 0 \right\} \right]^\phi, \quad \beta \neq 0. \quad (17)$$

The magnitude of poverty measured crucially depends on the choice of the parameters w , β and ϕ . Note that a higher ϕ in FGT poverty measures indicates higher poverty aversion putting more weight on the children identified as poor.

4.4 Weights

The weighting structure w determines the trade-off between any pair of dimensions and reflects value judgments on which factors are viewed as more important than others for children's later achievements. We apply three methods to check the robustness of our findings to the chosen weights.²⁸

First, we assign equal weights to all dimensions following an agnostic approach. Equal weighting is widely used in empirical works on multidimensional inequality and poverty, e.g., in the Human Development Index.

Second, we employ a data-driven approach and calculate frequency-based weights following Cheli and Lemmi (1995). The weights w_d are defined as

²⁸Deutsch and Silber (2005) describe various methods to set weights in a multidimensional framework. Decancq and Lugo (2013) comprehensively discuss the issue of weight setting in a multidimensional framework and compare the advantages and disadvantages of three existing approaches: (1) data-driven; (2) normative; and (3) hybrid. Overall, there is no unifying theoretical framework that argues in favor of one specific weighting scheme. Both studies rather conclude to rely on reasonable trade-offs between dimensions and to perform a series of robustness checks and sensitivity analyses to control for the impact of different weighting schemes on the respective results.

$$w_d = \ln\left(\frac{1}{P_d}\right) / \sum_{d=1}^D \ln\left(\frac{1}{P_d}\right),$$

where P_d is the dimension-specific headcount ratio. Accordingly, the weights w_d are an inverse function of the average degree of deprivation; the lower the share of deprived children in one dimension, the greater the weight of the respective dimension.

Third, we gradually increase the weight of income from 1/4 to 9/10 and proportionally reduce the weight of the other dimensions checking if level and trends in multidimensional inequality and poverty change.

5 Results

We first present results how inequality of each dimension evolved between 1991 and 2012. Then we present and discuss the results from our multidimensional analysis.

5.1 Univariate Inequality and Poverty

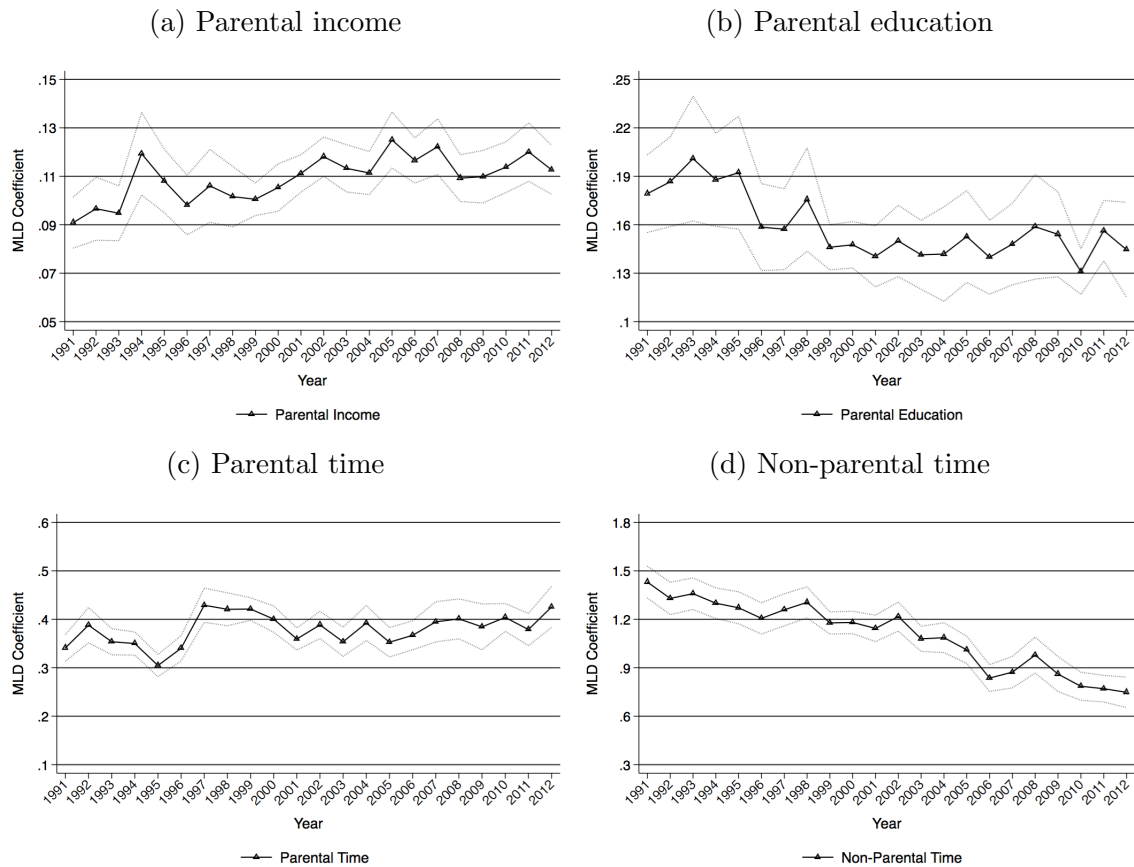
Univariate inequality in each dimension measured by the MLD is given in Figure 3. Income and parental time inequality significantly increased between 1991 and 2012 (Figures 3a and 3c).²⁹ In contrast, inequality of parental education did not change significantly (Figure 3b), while publicly provided childcare time decreased significantly (Figure 3d). However, differences in inequality levels across dimensions depend on the inequality measure: Inequality of non-parental time is by far the highest when measured by the MLD.³⁰ Non-parental time inequality decreases in the 2000s when several policy initiatives were enforced to increase the provision of

²⁹Prior research shows that changing family structures have actually led to an increase in family income inequality. E.g., Danziger and Gottschalk (1993) find that 13 percent of the increase in U.S. family income inequality among the white population between 1969 and 1987 was due to changing family structures, the rise in female-headed single parent families in particular. Peichl et al. (2012) show that decreasing average household size in Germany between 1991 and 2007 is associated with increasing income inequality.

³⁰Appendix Figure A.1 shows that inequality of non-parental time is similarly unequal as parental time when measured by the Gini. The share of children receiving zero non-parental childcare time declined from more than 30 percent in 1991 to less than 15 percent in 2012 which is more reflected by the MLD than by the Gini.

public childcare in Germany, especially for children under the age of three.

Figure 3: Inequality by dimension

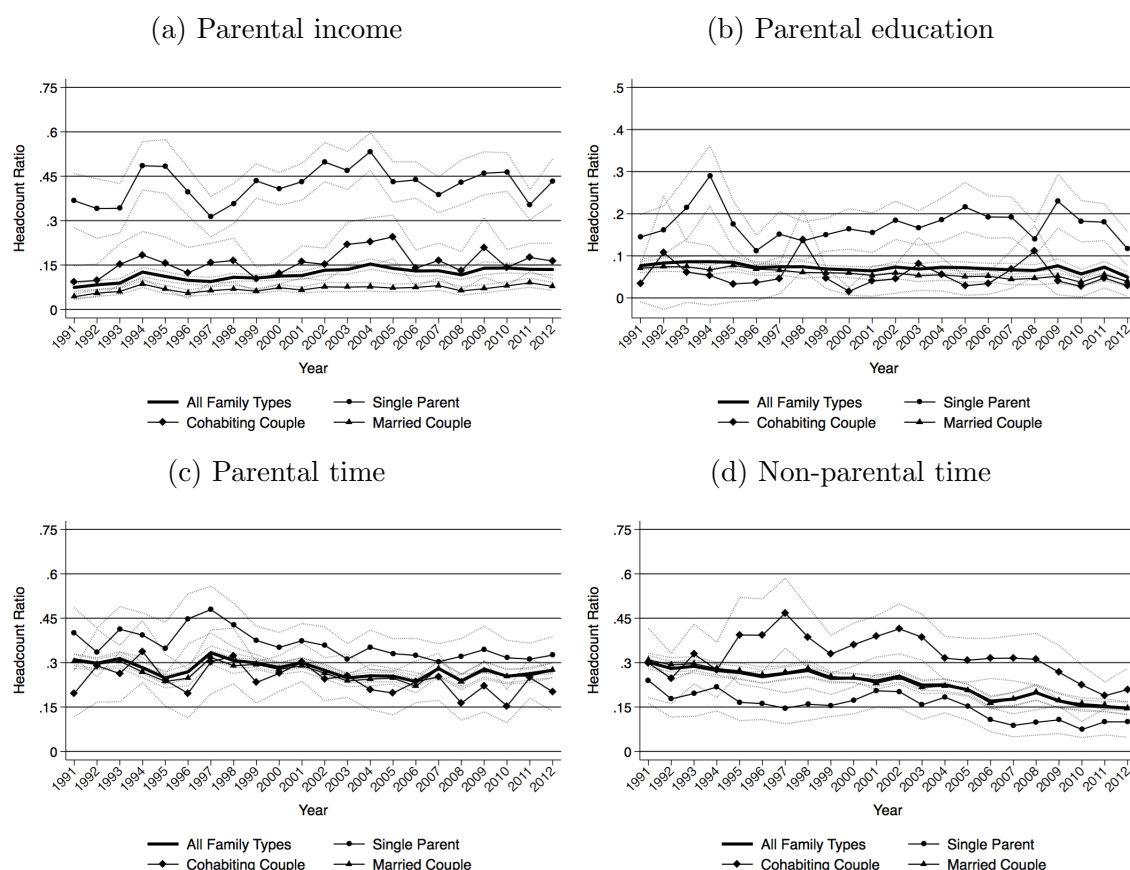


Source: SOEP (v30), own calculations.

Note: Parental time is equalized according to the number of children in the family. Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

The headcount ratio presented in Figure 4 shows the share of children by family type counted as poor in one dimension, i.e. their resource level is lower than 60 percent of the median. As we see for average numbers in Section 3, children living in single parent households are disadvantaged in parental income (Figure 4a), parental education (Figure 4b), and parental time (4c), but are better off with respect to non-parental childcare time (Figure 4d). About 40 percent of single parents' children is considered as income poor, contrasting to an overall income poverty risk between 7 and 14 percent in 1991 and 2012. The overall share of children with publicly provided time lower than 60 percent of the median sharply decreased over time. Interestingly, children living with cohabiting couples seem the least likely to spend much time in publicly provided childcare.

Figure 4: Poverty risk by dimension



Source: SOEP (v30), own calculations.

Note: Parental time is equalized according to the number of children in the family. Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

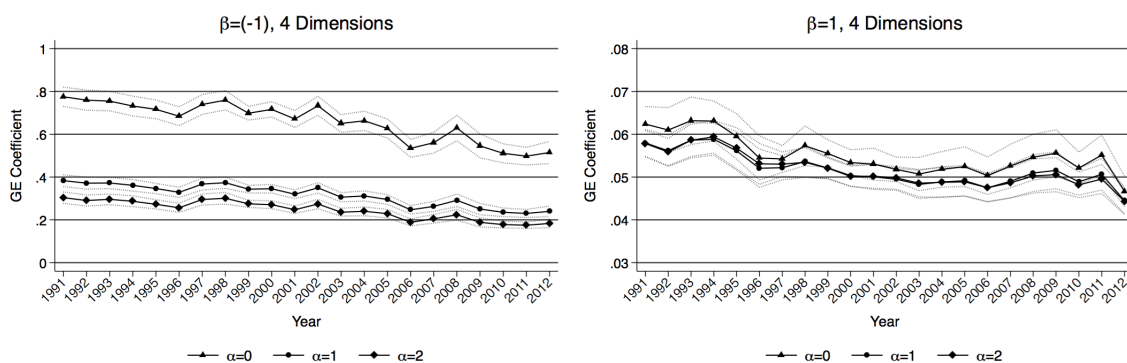
5.2 Multidimensional Inequality

Our results in Section 3 and 5.1 suggest that children living in single parent families are disadvantaged in parental income, parental education and parental time, but single parents make more use of publicly provided childcare time. The analysis of multidimensional inequality allows us to draw conclusions if disadvantages in one dimension are compensated by advantages in another at the individual level. Growing univariate inequality might be less of a concern if these dimensions indeed compensate each other and multidimensional inequality does not increase. In our baseline scenario, we consider parental care time and publicly provided care time as separate dimensions since it can hardly be argued that they should be added up and, hence, treated as perfect substitutes.³¹

³¹Instead, it seems to depend on the perceived quality of parental childcare time, whether one type of care should be preferred over the other.

All in all, multidimensional inequality significantly declines between 1991 and 2012, which is largely driven by the expansion of publicly provided childcare. In the following, we vary each of the "ad-hoc" chosen parameters of the Maasoumi index and check the robustness of the declining trend in the view of reasonable parameter values. Figure 5 shows that the decline is robust to degrees of inequality aversion between 0 and 2, which is the interval empirically agreed on.³² This applies to assuming dimensions to be complements (left-hand graph) or perfect substitutes (right-hand graph).

Figure 5: Multidimensional inequality with varying degrees of inequality aversion



Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

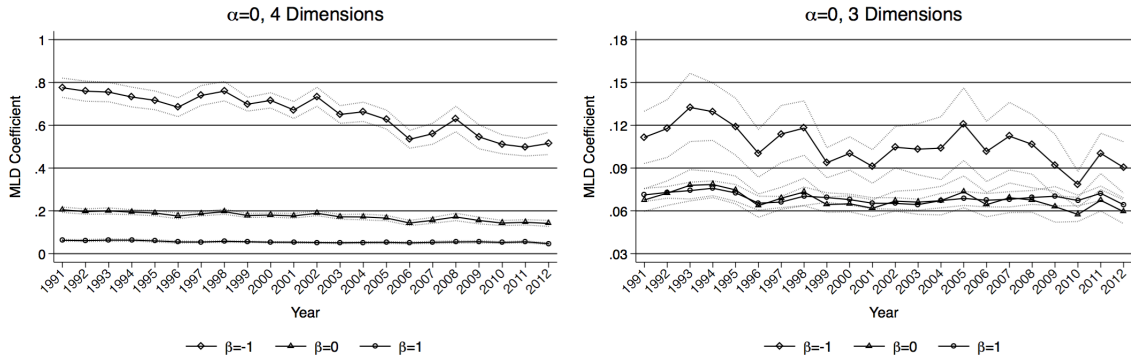
The declining trend persists for different degrees of substitutability between our four dimensions as shown by the left-hand graph in Figure 6. Even if we assume that all dimensions are perfectly substitutable, the declining trend remains but is smaller in size. However, the assumption of perfect substitutability seems rather far-fetched: One unit less parental time is most likely not perfectly compensated by one unit more income.³³ In contrast, one could argue that among our dimensions parental time and non-parental time are closest to being perfect substitutes. The right-hand graph of Figure 6 shows multidimensional inequality if we collapse both childcare time measure into one dimension and, consequently, end up with three dimensions in total. The declining trend is robust to different degrees of substitutability between

³²See Aaberge and Brandolini (2015) or Lambert et al. (2003) for an overview on studies that either estimate α , e.g., through the elasticity of marginal social utility of income, or use parameter ranges that seem theoretically plausible. Values vary between zero and three.

³³For $\beta < 1$, the utility-like function is a concave function and reflects a preference for a more equal vector of (transformed) achievements (Decancq and Lugo, 2013).

the three dimensions, but changes are no longer significant for all years. With equal weighting, income now receives a weight of 1/3 and non-parental childcare a weight of 1/6 such that the equalizing effect of non-parental time is deemphasized.

Figure 6: Multidimensional inequality with varying degrees of substitution



Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

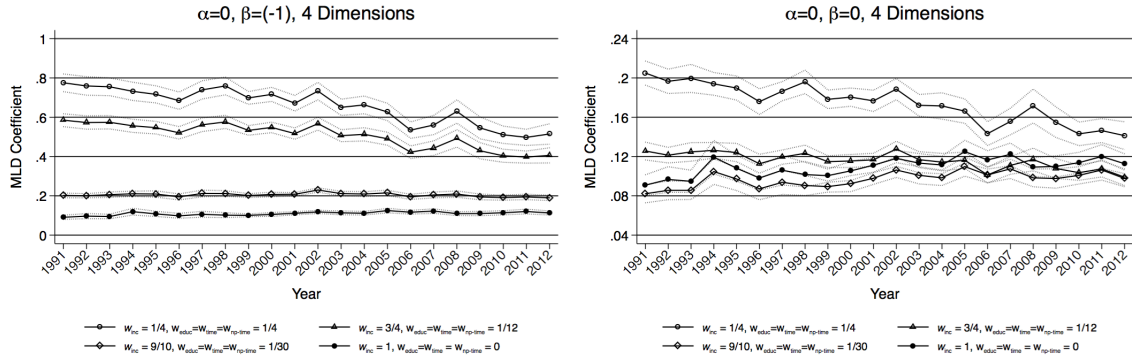
As a robustness check, we also computed multidimensional inequality using frequency-based weights. We broadly find the same trends and significance levels as for equal weighting.³⁴

So far we find that multidimensional inequality has decreased since the beginning of the 1990s and that this result is quite robust against different parameter settings. But how sensitive is the multidimensional inequality index to increasing the income weight, where univariate inequality increased over the past two decades. Figure 7 shows how our multidimensional index of inequality changes, if we gradually increase the weight of income towards unity under the restriction that the remaining three dimensions are equally weighted and that all dimensions sum up to one. Assuming a low degree of substitutability ($\beta = -1$) in the left-hand graph, we still find a decline in multidimensional inequality even when weighting income by 90 percent. Assuming a slightly higher degree of substitutability ($\beta = 0$) in the right-hand graph the trend reverses when weighting income by 90 percent.

Finally, we check if our results are indeed driven by the expansion of publicly provided childcare. Figure 3 shows that non-parental childcare time became more equally distributed over the time period under study. In fact, the declining trend

³⁴Figures A.2 are in Appendix.

Figure 7: Multidimensional inequality with varying income weights

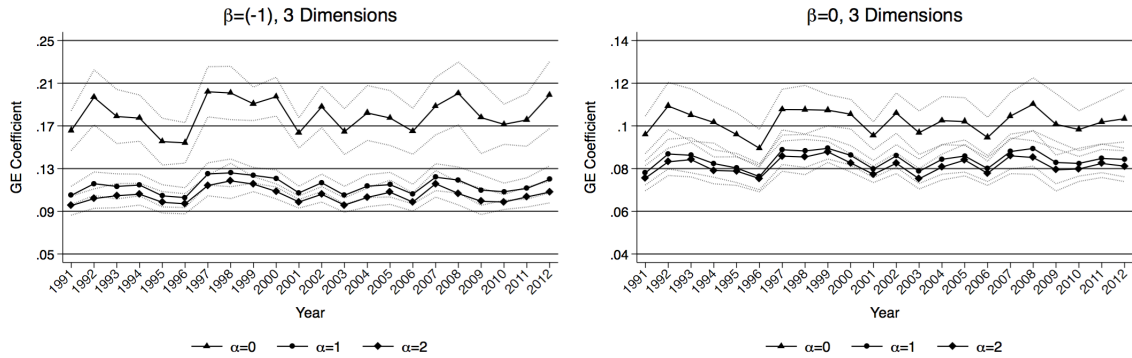


Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

disappears once we exclude publicly provided childcare and consider only the three other dimensions as shown in Figure 8.

Figure 8: Multidimensional inequality excluding non-parental childcare time



Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

5.3 Decomposition of Multidimensional Inequality by Family Type

We now turn to the impact of increasing non-traditional families on children's multidimensional inequality between 1991 and 2012. Table 1 depicts to what extent the total change in multidimensional inequality given in the second column can be attributed to changes in the four components: changing inequality (1) within family types; (4) changing inequality between family types; and the effect of changing family patterns on (2) within and (3) between family type inequality. The observed

decrease in multidimensional inequality tends to be higher for low degrees of substitutability. Reduced inequality within family types, (1), is the main explanatory component. In contrast, inequality changes between family types, (4), as well as family type's share on within, (2), and between, (3), family type inequality only negligibly contribute to the decline in multidimensional inequality and signs are not robust to different time period specifications.

Table 1: Multidimensional inequality (MLD) decomposition by family type, 1991-2012

| β | Absolute % Change in I_0 due to | | | | |
|---------|-----------------------------------|---------------------|----------------------|---------------------|----------------------|
| | Total (ΔI_0 in %) | Within I_0 (1) | Between I_0 (4) | Family Structure | |
| | | | | Within I_0 (2) | Between I_0 (3) |
| (-10) | -33.26 | -33.55 | 0.12 | 0.08 | 0.09 |
| (-1) | -33.84 | -34.15 | 0.03 | 0.26 | 0.01 |
| 0 | -31.89 | -32.49 | 0.03 | 0.78 | -0.21 |
| 0.5 | -29.39 | -29.30 | -0.09 | 0.64 | -0.64 |
| 1 | -27.17 | -25.83 | -0.06 | -0.41 | -0.87 |

Source: SOEP (v30), own calculations.

Note: Differences between ΔI_0 in % and the sum of components are due to rounding (after computation).

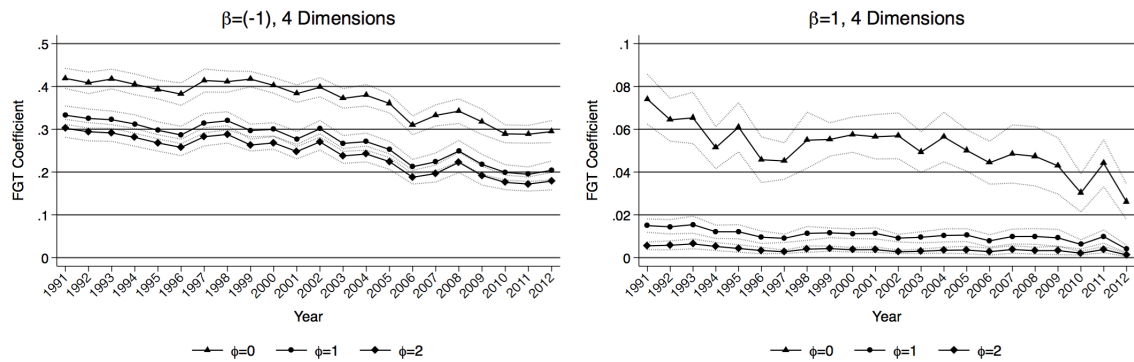
5.4 Multidimensional Poverty

The decline of multidimensional inequality may be due to losses of the better-off children or due to gains of children at the bottom of the opportunity indicator distribution. One might argue that a combination of multiple deprivations in attributes necessary for success later in life reduces children's opportunities even more than just the sum of each. To uncover the changes for those in the bottom of the multidimensional distribution, we now turn to the trends of multidimensional poverty. We also find a decline in multidimensional poverty, which is similarly robust to different parameter values and dimension specifications.

Figure 9 shows multidimensional poverty trends for three different poverty measures, which are headcount ratio ($\phi = 0$), poverty gap ($\phi = 1$), and poverty intensity ($\phi = 2$). All poverty measures exhibit a significant decline between 1991

and 2012.

Figure 9: Multidimensional poverty measures

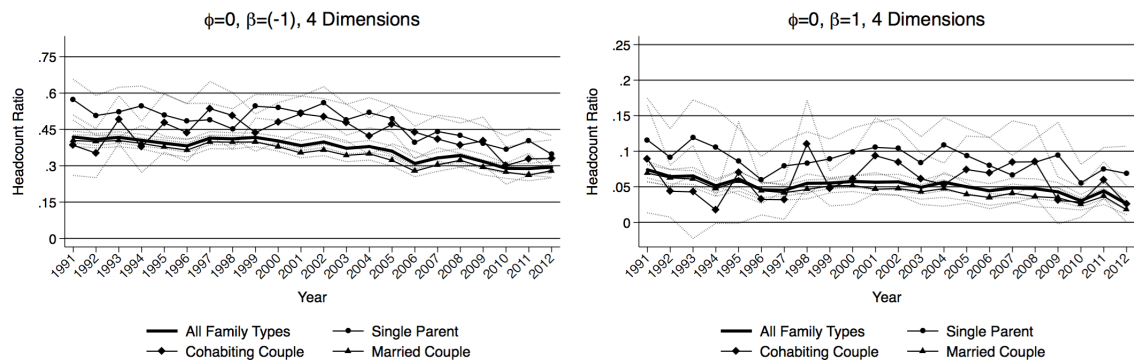


Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

As Figure 10 depicts, differentiating between family types reveals a higher multidimensional poverty risk for children from single parent families compared to children from married and cohabiting families. Nevertheless, for both low and high degrees of substitutability we find a considerable decline in multidimensional poverty across all family types and the gap between them has become smaller over time.

Figure 10: Multidimensional poverty by family type



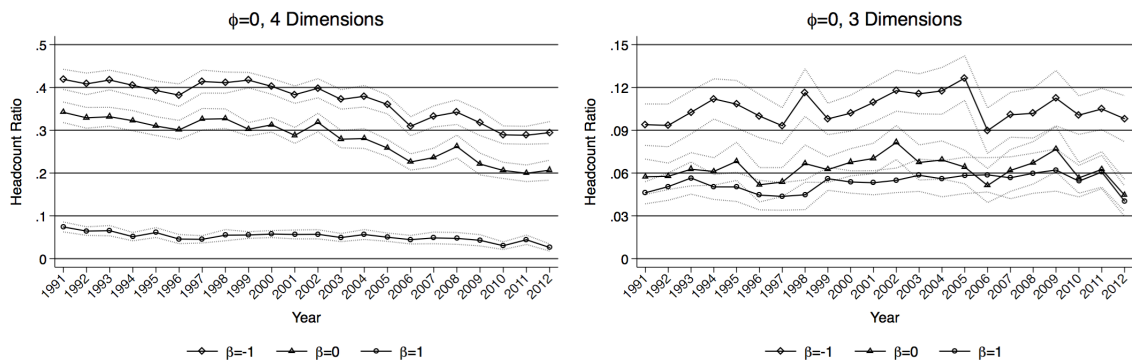
Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

The poverty decline is robust to different assumptions on the substitutability between dimensions as can be taken from the left-hand graph of Figure 11. The level of multidimensional poverty increases in the assumed degree of substitution between dimensions. If we assume perfect substitutability ($\beta = 1$), our measure for children's opportunities is a simple arithmetic mean of all dimensions. One unit less income can be perfectly offset by more parental time. However, this assumption

does not appear very realistic. The more complementary the dimensions, the heavier is the effect of the worst dimension on the individual opportunity indicator and the higher is the number of deprived children. The declining trend mostly disappears if we sum up parental and non-parental childcare time to one dimension as shown in the right-hand graph of Figure 11. Again, this occurs because of the new weighting structure: when time is collapsed into one dimension, the weight of each dimension is halved in comparison to education and income. In contrast, multidimensional inequality still slightly declined for this setting, but not significantly anymore.

Figure 11: Multidimensional poverty with varying degrees of substitution



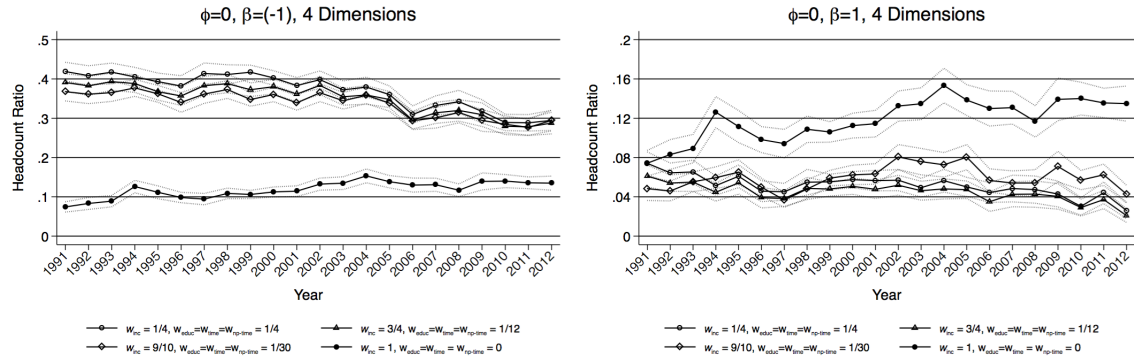
Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

Figure 12 shows how our multidimensional poverty index changes, if we gradually increase the income weight towards unity under the restriction that the remaining three dimensions are equally weighted and that all dimensions sum up to one. It depends on the assumption on the degree of substitutability, if more or less children are deprived in the multidimensional case than in the univariate case with income only. For $\beta = 1$, e.g., low income is perfectly compensated by higher levels in childcare time or parental education and less children are counted as multidimensionally poor than in the univariate case. For $\beta = -1$, low levels in one dimensions are not outweighed by higher levels in the other dimensions and, hence, more children are counted as poor than for income only. If we judge the assumption of less than perfect substitutability as more realistic, then more children face difficult circumstances than if we would only focus on incomes. In 2012, 30 percent of all children experienced multidimensional poverty risk ($\beta = -1$), whereas the share of children living under income poverty risk was 14 percent. In comparison to income

only, many children are additionally counted as poor in the multidimensional setting because of low levels of non-parental childcare time, but also low levels of parental childcare time.

Figure 12: Multidimensional poverty for varying income weights



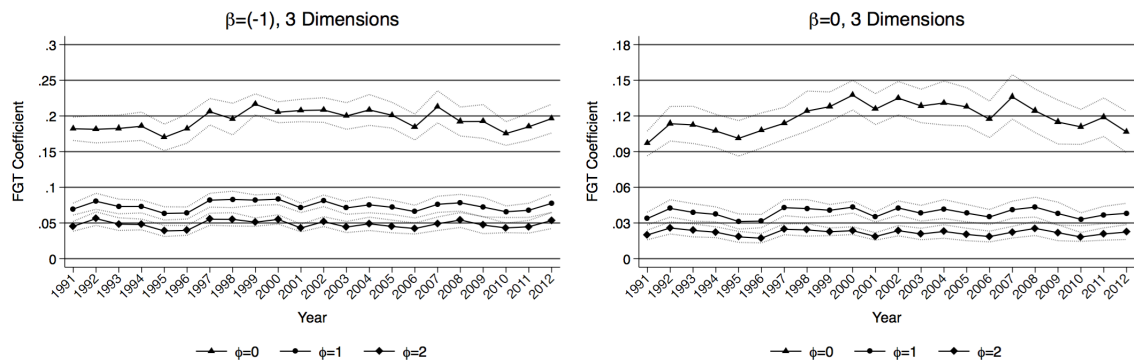
Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

As a robustness check, we compute multidimensional poverty risk using frequency-based weights. As for multidimensional inequality, we broadly find the same trends and similar levels. Multidimensional poverty risk rates based on frequency-based weights tend to be slightly lower for all rates of substitution.³⁵

Finally, Figure 13 checks if multidimensional poverty risk is driven by the expansion of non-parental childcare time. As for multidimensional inequality, excluding non-parental childcare takes away the declining trend.

Figure 13: Multidimensional poverty excluding non-parental time



Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

³⁵Figures A.3 are in the Appendix.

6 Conclusion

An increasing number of children in Germany are growing up in non-traditional families, particularly in single parent families. These children are often disadvantaged along three dimensions: parental income, parental educational and parental childcare time. Disadvantages may be partly compensated by publicly provided childcare and education. Since the mid-2000s, the German welfare state has heavily expanded publicly provided childcare.

Based on broad empirical evidence, we take parental income, parental education and childcare time as proxies for circumstances that are beyond children's control, but strongly contribute to their later achievements. We apply Maasoumi's index for multidimensional inequality and poverty to measure how the disparity of children's opportunities has evolved since the beginning of the 1990s.

Focusing on income only we find that both inequality and poverty among children increased. However, adding parental education and care time to the picture we find that both multidimensional inequality and poverty among children decreased over time. The expansion of childcare provided by the welfare state more than offsets the disequalizing trends observed for income only. This finding is robust against different parameter values for inequality and poverty aversion as well as the degree of substitutability between dimensions. However, increasing the weight of income and decreasing the weight of publicly provided childcare takes away the declining trend in some constellations. An inequality decomposition by family type reveals that the observed decline in multidimensional inequality is mainly due to reduced differences within family types. In contrast, the effect of changing family patterns on the inequality decline seems negligible. The share of multidimensional poor children decreased for all family types and the gap between them has become smaller over time. More children are counted as poor in the multidimensional setting than if considering income only, because of low levels of non-parental and parental childcare time devoted to them.

In sum, our analysis highlights the importance to consider more than one dimension in inequality and poverty analysis when conclusions about developments over time shall be drawn. Particularly, in-kind benefits such as publicly provided

childcare and education should be accounted for to get a more complete picture of the welfare state's role in redistributing resources and providing less unequal opportunities.

References

- Aaberge, R. and Brandolini, A. (2015). Multidimensional poverty and inequality. In Atkinson, A. B. and Bourguignon, F., editors, *Handbook of Income Distribution*, volume 2, chapter 3, pages 141–216. Elsevier.
- Alkire, S. and Foster, J. (2011). Counting and multidimensional poverty measurement. *Journal of Public Economics*, 95:476–487.
- Becker, G. S. and Tomes, N. (1979). An equilibrium theory of the distribution of income and intergenerational mobility. *Journal of Political Economy*, 87(6):1153–1189.
- Becker, G. S. and Tomes, N. (1986). Human capital and the rise and fall of families. *Journal of Labor Economics*, 4(3):S1–S39.
- Black, S. E. and Devereux, P. J. (2011). Recent developments in intergenerational mobility. In *Handbook of Labor Economics*, volume 4b. Elsevier B.V.
- Bönke, T. and Schröder, C. (2012). Country inequality rankings and conversion schemes. *Economics: The Open-Access, Open-Assessment E-Journal*, 6(28):1–44.
- Bourguignon, F. and Chakravarty, S. R. (2003). The measurement of multidimensional poverty. *Journal of Economic Inequality*, 1:25–49.
- Camehl, G., Stahl, J., P., S., and Spieß, K. (2015). Höhere qualität und geringere kosten von kindertageseinrichtungen - zufriedener eltern? *DIW Wochenbericht Nr. 46*.
- Cheli, B. and Lemmi, A. (1995). A "totally" fuzzy and relative approach to the multidimensional analysis of poverty. *Economic Notes*, 24(1):115–134.
- Corneo, G. and Grüner, P. (2002). Individual preferences for political redistribution. *Journal of Public Economics*, 83:83–107.
- Danziger, S. and Gottschalk, P. (1993). Family structure, family size, and family income: Accounting for changes in the economic well-being of children, 1968-1986. In Danziger, S. and Gottschalk, P., editors, *Uneven Tides: Rising Inequality in America*, pages 167–193. Russell Sage Foundation, New York.
- Decancq, K. and Lugo, M. A. (2013). Weights in multidimensional indices of well-being: An overview. *Econometric Reviews*, 32(1):7–34.
- Deutsch, J. and Silber, J. (2005). Measuring multidimensional poverty: An empirical comparison of various approaches. *Review of Income and Wealth*, 51(1):145–174.
- Doyle, O., Harmon, C. P., Heckman, J. J., and Tremblay, R. E. (2009). Investing in early human development: Timing and economic efficiency. *Economics and Human Biology*, 7:1–6.
- Federal Statistical Office (2013). Bevölkerung und Erwerbstätigkeit: Haushalte und Familien. (Reihe 3).

- Fong, C. (2001). Social preferences, self-interest, and the demand for redistribution. *Journal of Public Economics*, 82:225–246.
- Foster, J. E. and Shneyerov, A. A. (2000). Path independent inequality measures. *Journal of Economic Theory*, 91:199–222.
- Gerstorf, S. and Schupp, J., editors (2015). *SOEP Wave Report 2014*.
- Heckman, J. J. and Mosso, S. (2014). The economic of human development and social mobility. *Annual Review of Economics*, 6(19925):689–733.
- Jenkins, S. P. and Jäntti, M. (2015). Income mobility. In *Handbook of Income Distribution*, volume 2A, chapter 10. Elsevier B.V.
- Justino, P. (2012). Multidimensional welfare distributions: empirical application to household panel data from Vietnam. *Applied Economics*, 44:3391–3405.
- Kühhirt, M. (2012). Childbirth and the long-term division of labour within couples: How do substitution, bargaining power, and norms affect parents time allocation in West Germany? *European Sociological Review*, 28(5):1–18.
- Lambert, P. J., Millimet, D. L., and Slottje, D. (2003). Inequality aversion and the natural rate of subjective inequality. *Journal of Public Economics*, 87:1061–1090.
- Lesthaeghe, R. (2010). The unfolding story of the second demographic transition. *Population and Development Review*, 36(2):211–251.
- Lugo, M. A. (2007). Comparing multidimensional indices of inequality: Methods and application. In Bishop, J. and Amiel, Y., editors, *Inequality and Poverty: Papers from the Society for the Study of Economic Inequality's Inaugural Meeting, Research on Economic Inequality*, volume 14, pages 213–236. Elsevier JAI.
- Lugo, M. A. and Maasoumi, E. (2008). Multidimensional poverty measures from an information theory perspective. *ECINEQ Working Paper*, 85:38.
- Maasoumi, E. (1986). The measurement and decomposition of multi-dimensional inequality. *Econometrica*, 54(4):991–997.
- Maasoumi, E. (1999). Multidimensioned approaches to welfare analysis. In Silber, J., editor, *Handbook of Income Inequality Measurement*, pages 437–476. Springer.
- McLanahan, S. (2004). Diverging destinies: How children are faring under the second demographic transition. *Demography*, 41(4):607–627.
- McLanahan, S. and Percheski, C. (2008). Family structure and the reproduction of inequalities. *Annual Review of Sociology*, 34(1):257–276.
- Mookherjee, D. and Shorrocks, A. (1982). A decomposition analysis of the trend in UK income inequality. *The Economic Journal*, 92(368):886–902.
- Niehues, J. and Peichl, A. (2014). Upper bounds of inequality of opportunity: theory and evidence for Germany and the US. *Social Choice and Welfare*, 43:73–99.

- Nilsson, T. (2010). Health, wealth and wisdom: Exploring multidimensional inequality in a developing country. *Social Indicators Research*, 95:299–323.
- Peichl, A., Pestel, N., and Schneider, H. (2012). Does size matter? The impact of changes in household structure on income distribution in Germany. *Review of Income and Wealth*, 58(1):118–141.
- Peuckert, R. (2012). *Familienformen im sozialen Wandel*. Springer VS, Münster, 8th edition.
- Rawls, J. (1971). *A Theory of Justice*. Harvard University Press.
- Roemer, J. E. (1993). A pragmatic theory of responsibility for the egalitarian planner. *Philosophy & Public Affairs*, 22:146–166.
- Roemer, J. E. (1998). *Equality of Opportunity*. Harvard University Press.
- Rohde, N. and Guest, R. (2013). Multidimensional racial inequality in the United States. *Social Indicators Research*, 114:591–605.
- Schober, P. and Stahl, J. (2014). Trends in der Kinderbetreuung - Sozio-ökonomische Unterschiede verstärken sich in Ost und West. *DIW Wochenbericht Nr. 40*.
- Sen, A. (1985). Well-being, agency, and freedom: The dewey lectures 1984. *Journal of Philosophy*, 82:169–221.
- Shorrocks, A. (1980). The class of additively decomposable inequality measures. *Econometrica*, 48:613–625.
- Tsui, K. Y. (1999). Multidimensional inequality and multidimensional generalized entropy measures: An axiomatic derivation. *Social Choice and Welfare*, 16:145–157.
- United Nations Development Programme (2014). Human Development Report 2014.
- Verbist, G. and Matsaganis, M. (2014). The redistributive capacity of services in the EU. In Cantillon, B. and Vandenbroucke, F., editors, *Reconciling Work and Poverty Reduction: How Successful Are European Welfare States?* Oxford University Press.
- Wagner, G. G., Frick, J. R., and Schupp, J. (2007). The German Socio-Economic Panel Study (SOEP): Scope, evolution and enhancements. *Schmollers Jahrbuch*, 127(1):139–169.
- Weymark, J. A. (2006). The normative approach to the measurement of multidimensional inequality. In Farina, F. and Savaglio, E., editors, *Inequality and Economic Integration*, pages 303–328. Routledge, London.

A Appendix

Table A.1: Number of observed children (aged 0-14) by family type (un-weighted)

| Year | Single Parent | Cohabiting Parents | Married Parents | Total |
|-------|---------------|--------------------|-----------------|--------|
| 1991 | 208 | 99 | 2,723 | 3,030 |
| 1992 | 198 | 110 | 2,586 | 2,894 |
| 1993 | 197 | 123 | 2,645 | 2,965 |
| 1994 | 219 | 133 | 2,657 | 3,009 |
| 1995 | 209 | 122 | 2,526 | 2,857 |
| 1996 | 234 | 137 | 2,408 | 2,779 |
| 1997 | 245 | 173 | 2,522 | 2,940 |
| 1998 | 269 | 200 | 2,420 | 2,889 |
| 1999 | 479 | 278 | 4,230 | 4,987 |
| 2000 | 393 | 307 | 3,650 | 4,350 |
| 2001 | 371 | 310 | 3,754 | 4,435 |
| 2002 | 361 | 312 | 3,406 | 4,079 |
| 2003 | 348 | 320 | 3,107 | 3,775 |
| 2004 | 375 | 307 | 2,853 | 3,535 |
| 2005 | 440 | 317 | 2,978 | 3,735 |
| 2006 | 399 | 315 | 2,739 | 3,453 |
| 2007 | 376 | 294 | 2,447 | 3,117 |
| 2008 | 429 | 331 | 2,583 | 3,343 |
| 2009 | 381 | 281 | 2,236 | 2,898 |
| 2010 | 432 | 296 | 2,426 | 3,154 |
| 2011 | 449 | 354 | 2,373 | 3,176 |
| 2012 | 373 | 325 | 2,111 | 2,809 |
| Total | 7,385 | 5,444 | 61,380 | 74,209 |

Source: SOEP (v30), own calculations.

Note: Children with missing information on at least one of the four dimensions are excluded.

Table A.2: Descriptive statistics (weighted)

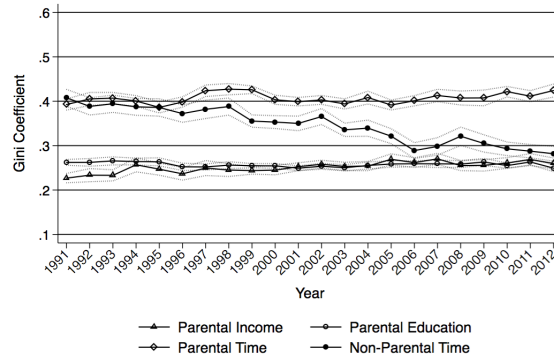
| Year | Family Type | Parental Income | | | Parental Education | | | Parental Time | | | Non-Parental Time | | | Total Time | | | | | | | |
|------|-------------|-----------------|--------|-------|--------------------|------|----|---------------|-----|------|-------------------|-----|-----|------------|----|-----|-----|----|---|---|----|
| | | Mean | SD | Min | Max | Mean | SD | Min | Max | Mean | SD | Min | Max | Mean | SD | Min | Max | | | | |
| 1991 | Single | 12,144 | 6,963 | 1,913 | 36,590 | 12 | 2 | 7 | 18 | 5 | 5 | 0 | 24 | 4 | 3 | 0 | 12 | 9 | 5 | 0 | 28 |
| | Cohabiting | 16,155 | 5,409 | 6,321 | 40,319 | 13 | 3 | 9 | 18 | 6 | 4 | 0 | 19 | 4 | 3 | 0 | 8 | 10 | 4 | 0 | 23 |
| | Married | 18,491 | 7,610 | 1,550 | 70,415 | 13 | 3 | 7 | 18 | 6 | 4 | 0 | 30 | 3 | 3 | 0 | 14 | 9 | 4 | 0 | 32 |
| 1992 | Single | 12,565 | 6,567 | 721 | 34,536 | 12 | 2 | 7 | 18 | 5 | 5 | 0 | 24 | 4 | 3 | 0 | 14 | 9 | 4 | 1 | 24 |
| | Cohabiting | 16,186 | 5,021 | 6,569 | 36,210 | 12 | 3 | 9 | 18 | 5 | 3 | 0 | 24 | 4 | 3 | 0 | 12 | 9 | 4 | 0 | 24 |
| | Married | 18,890 | 9,234 | 4,942 | 166,946 | 13 | 3 | 7 | 18 | 6 | 5 | 0 | 28 | 4 | 3 | 0 | 12 | 9 | 4 | 0 | 32 |
| 1993 | Single | 12,736 | 7,143 | 1,012 | 38,680 | 11 | 3 | 7 | 18 | 5 | 4 | 0 | 24 | 4 | 3 | 0 | 12 | 9 | 4 | 1 | 24 |
| | Cohabiting | 16,944 | 5,987 | 6,315 | 37,069 | 13 | 2 | 9 | 18 | 7 | 7 | 0 | 48 | 4 | 3 | 0 | 12 | 11 | 7 | 2 | 52 |
| | Married | 18,994 | 8,864 | 3,190 | 140,065 | 13 | 3 | 7 | 18 | 6 | 5 | 0 | 28 | 3 | 3 | 0 | 12 | 9 | 4 | 0 | 35 |
| 1994 | Single | 11,420 | 7,165 | 438 | 46,137 | 11 | 2 | 7 | 18 | 6 | 6 | 0 | 24 | 4 | 3 | 0 | 12 | 11 | 6 | 0 | 29 |
| | Cohabiting | 17,050 | 7,809 | 4,310 | 67,208 | 13 | 3 | 9 | 18 | 6 | 5 | 0 | 25 | 4 | 3 | 0 | 12 | 10 | 5 | 0 | 30 |
| | Married | 18,374 | 9,672 | 1,418 | 156,218 | 13 | 3 | 7 | 18 | 6 | 5 | 0 | 39 | 3 | 3 | 0 | 14 | 10 | 5 | 0 | 39 |
| 1995 | Single | 11,563 | 7,007 | 1,172 | 42,267 | 11 | 2 | 7 | 18 | 6 | 5 | 0 | 24 | 5 | 3 | 0 | 14 | 11 | 5 | 1 | 32 |
| | Cohabiting | 17,553 | 7,668 | 3,511 | 43,797 | 13 | 2 | 9 | 18 | 8 | 6 | 0 | 25 | 3 | 3 | 0 | 12 | 11 | 5 | 0 | 25 |
| | Married | 18,563 | 8,701 | 2,437 | 115,170 | 13 | 3 | 7 | 18 | 7 | 5 | 0 | 40 | 4 | 3 | 0 | 14 | 10 | 5 | 0 | 40 |
| 1996 | Single | 13,000 | 7,113 | 2,444 | 43,178 | 12 | 2 | 7 | 18 | 5 | 5 | 0 | 24 | 4 | 3 | 0 | 12 | 10 | 5 | 0 | 29 |
| | Cohabiting | 17,635 | 6,230 | 4,710 | 36,106 | 13 | 2 | 9 | 18 | 8 | 6 | 0 | 25 | 3 | 3 | 0 | 12 | 11 | 6 | 0 | 29 |
| | Married | 18,980 | 8,943 | 836 | 118,622 | 13 | 3 | 7 | 18 | 7 | 5 | 0 | 48 | 4 | 3 | 0 | 14 | 10 | 5 | 0 | 48 |
| 1997 | Single | 12,816 | 6,019 | 2,608 | 54,962 | 12 | 3 | 7 | 18 | 5 | 5 | 0 | 24 | 5 | 3 | 0 | 14 | 10 | 5 | 0 | 28 |
| | Cohabiting | 19,611 | 21,549 | 4,814 | 162,390 | 13 | 3 | 7 | 18 | 8 | 7 | 0 | 28 | 3 | 3 | 0 | 12 | 11 | 7 | 0 | 36 |
| | Married | 19,266 | 9,792 | 1,551 | 132,912 | 13 | 3 | 7 | 18 | 6 | 5 | 0 | 34 | 4 | 3 | 0 | 14 | 10 | 5 | 0 | 34 |
| 1998 | Single | 12,886 | 5,996 | 3,047 | 45,522 | 12 | 2 | 7 | 18 | 5 | 5 | 0 | 24 | 5 | 3 | 0 | 14 | 10 | 5 | 0 | 36 |
| | Cohabiting | 17,893 | 8,472 | 4,392 | 61,854 | 13 | 3 | 7 | 18 | 8 | 7 | 0 | 48 | 3 | 3 | 0 | 12 | 11 | 7 | 0 | 48 |
| | Married | 19,876 | 9,651 | 4,164 | 102,715 | 13 | 3 | 7 | 18 | 7 | 5 | 0 | 32 | 3 | 3 | 0 | 14 | 10 | 5 | 0 | 33 |
| 1999 | Single | 12,772 | 6,002 | 3,354 | 51,097 | 12 | 2 | 7 | 18 | 5 | 4 | 0 | 24 | 5 | 3 | 0 | 14 | 9 | 4 | 0 | 28 |
| | Cohabiting | 18,686 | 7,911 | 3,788 | 56,687 | 13 | 2 | 7 | 18 | 7 | 7 | 0 | 48 | 4 | 3 | 0 | 12 | 11 | 6 | 1 | 52 |
| | Married | 20,104 | 9,230 | 3,660 | 144,416 | 13 | 3 | 7 | 18 | 6 | 5 | 0 | 36 | 4 | 2 | 0 | 14 | 10 | 5 | 0 | 36 |
| 2000 | Single | 12,331 | 5,694 | 2,231 | 42,240 | 12 | 2 | 7 | 18 | 5 | 4 | 0 | 24 | 4 | 3 | 0 | 14 | 10 | 4 | 0 | 28 |
| | Cohabiting | 19,103 | 8,012 | 6,266 | 67,381 | 13 | 2 | 7 | 18 | 7 | 6 | 0 | 36 | 4 | 3 | 0 | 13 | 11 | 6 | 0 | 41 |
| | Married | 20,422 | 9,487 | 2,506 | 94,653 | 13 | 3 | 7 | 18 | 6 | 5 | 0 | 30 | 4 | 2 | 0 | 14 | 10 | 5 | 0 | 42 |
| 2001 | Single | 13,109 | 7,582 | 352 | 76,733 | 11 | 2 | 7 | 18 | 5 | 5 | 0 | 24 | 4 | 3 | 0 | 13 | 10 | 5 | 0 | 29 |
| | Cohabiting | 18,081 | 8,857 | 5,653 | 100,565 | 13 | 2 | 9 | 18 | 7 | 6 | 0 | 27 | 3 | 3 | 0 | 13 | 11 | 6 | 1 | 31 |
| | Married | 20,823 | 11,278 | 2,112 | 269,016 | 13 | 3 | 7 | 18 | 6 | 5 | 0 | 32 | 4 | 2 | 0 | 13 | 10 | 5 | 0 | 37 |

Table A.3: *Continued: Descriptive statistics (weighted)*

| Year | Family Type | Parental Income | | | | | Parental Education | | | | | Parental Time | | | | | Non-Parental Time | | | | | Total Time | | | | |
|------|-------------|-----------------|--------|-------|---------|----|--------------------|----|-----|-----|---|---------------|----|-----|-----|---|-------------------|----|-----|-----|---|------------|----|-----|-----|--|
| | | Mean | SD | Min | Max | | Mean | SD | Min | Max | | Mean | SD | Min | Max | | Mean | SD | Min | Max | | Mean | SD | Min | Max | |
| 2002 | Single | 12,082 | 6,286 | 1,727 | 62,231 | 11 | 2 | 7 | 18 | 18 | 6 | 5 | 0 | 24 | 4 | 3 | 0 | 13 | 11 | 5 | 1 | 32 | | | | |
| | Cohabiting | 18,289 | 9,478 | 4,938 | 104,115 | 13 | 3 | 9 | 18 | 18 | 8 | 6 | 0 | 45 | 3 | 3 | 0 | 13 | 11 | 6 | 0 | 45 | | | | |
| | Married | 21,147 | 10,292 | 4,262 | 131,635 | 13 | 3 | 7 | 18 | 18 | 7 | 5 | 0 | 36 | 4 | 3 | 0 | 15 | 11 | 5 | 0 | 41 | | | | |
| 2003 | Single | 12,177 | 5,918 | 1,004 | 61,793 | 11 | 2 | 7 | 18 | 18 | 6 | 5 | 0 | 24 | 5 | 3 | 0 | 13 | 11 | 5 | 0 | 36 | | | | |
| | Cohabiting | 17,992 | 9,587 | 4,742 | 83,652 | 12 | 2 | 7 | 18 | 18 | 7 | 6 | 0 | 29 | 4 | 3 | 0 | 14 | 11 | 6 | 0 | 34 | | | | |
| | Married | 21,035 | 10,029 | 3,715 | 207,782 | 13 | 3 | 7 | 18 | 18 | 7 | 5 | 0 | 48 | 4 | 2 | 0 | 13 | 10 | 5 | 0 | 60 | | | | |
| 2004 | Single | 11,927 | 5,428 | 2,538 | 77,639 | 12 | 2 | 7 | 18 | 18 | 7 | 6 | 0 | 24 | 4 | 3 | 0 | 13 | 11 | 5 | 1 | 28 | | | | |
| | Cohabiting | 18,183 | 9,182 | 3,515 | 111,304 | 13 | 3 | 9 | 18 | 18 | 9 | 7 | 0 | 31 | 4 | 3 | 0 | 13 | 13 | 7 | 0 | 39 | | | | |
| | Married | 21,321 | 9,991 | 1,269 | 166,880 | 13 | 3 | 7 | 18 | 18 | 7 | 5 | 0 | 48 | 4 | 2 | 0 | 13 | 11 | 5 | 0 | 54 | | | | |
| 2005 | Single | 12,491 | 5,812 | 2,498 | 111,617 | 12 | 3 | 7 | 18 | 18 | 6 | 5 | 0 | 24 | 5 | 3 | 0 | 14 | 11 | 5 | 1 | 38 | | | | |
| | Cohabiting | 17,172 | 8,907 | 2,217 | 59,178 | 13 | 2 | 9 | 18 | 18 | 8 | 6 | 0 | 30 | 4 | 3 | 0 | 13 | 12 | 6 | 0 | 31 | | | | |
| | Married | 21,490 | 11,785 | 2,187 | 158,590 | 13 | 3 | 7 | 18 | 18 | 7 | 5 | 0 | 48 | 4 | 2 | 0 | 14 | 11 | 5 | 0 | 48 | | | | |
| 2006 | Single | 12,591 | 5,418 | 2,521 | 92,204 | 12 | 3 | 7 | 18 | 18 | 6 | 5 | 0 | 24 | 5 | 3 | 0 | 14 | 11 | 6 | 1 | 38 | | | | |
| | Cohabiting | 19,452 | 9,406 | 3,726 | 67,915 | 13 | 3 | 7 | 18 | 18 | 8 | 6 | 0 | 36 | 4 | 3 | 0 | 12 | 12 | 6 | 0 | 42 | | | | |
| | Married | 21,689 | 11,574 | 3,902 | 182,342 | 13 | 3 | 7 | 18 | 18 | 7 | 5 | 0 | 48 | 4 | 2 | 0 | 14 | 11 | 5 | 0 | 52 | | | | |
| 2007 | Single | 12,839 | 5,258 | 2,208 | 56,365 | 12 | 3 | 7 | 18 | 18 | 6 | 5 | 0 | 24 | 5 | 3 | 0 | 14 | 11 | 5 | 0 | 30 | | | | |
| | Cohabiting | 19,998 | 13,250 | 3,108 | 70,051 | 13 | 3 | 9 | 18 | 18 | 8 | 7 | 0 | 40 | 4 | 3 | 0 | 14 | 12 | 6 | 0 | 40 | | | | |
| | Married | 21,875 | 11,451 | 4,496 | 129,508 | 13 | 3 | 7 | 18 | 18 | 7 | 5 | 0 | 36 | 4 | 2 | 0 | 14 | 11 | 5 | 0 | 42 | | | | |
| 2008 | Single | 13,110 | 5,881 | 1,616 | 65,233 | 12 | 3 | 7 | 18 | 18 | 6 | 4 | 0 | 24 | 5 | 2 | 0 | 13 | 11 | 5 | 0 | 28 | | | | |
| | Cohabiting | 19,683 | 9,905 | 4,318 | 50,624 | 13 | 3 | 7 | 18 | 18 | 9 | 7 | 0 | 48 | 4 | 3 | 0 | 12 | 13 | 7 | 0 | 48 | | | | |
| | Married | 21,520 | 10,125 | 4,056 | 107,732 | 13 | 3 | 7 | 18 | 18 | 7 | 5 | 0 | 36 | 4 | 2 | 0 | 12 | 11 | 5 | 0 | 40 | | | | |
| 2009 | Single | 13,663 | 5,919 | 1,493 | 42,507 | 12 | 3 | 7 | 18 | 18 | 6 | 5 | 0 | 24 | 5 | 2 | 0 | 14 | 11 | 5 | 0 | 32 | | | | |
| | Cohabiting | 20,391 | 12,578 | 907 | 65,367 | 13 | 3 | 7 | 18 | 18 | 8 | 7 | 0 | 48 | 5 | 3 | 0 | 12 | 12 | 6 | 2 | 48 | | | | |
| | Married | 21,779 | 9,964 | 3,891 | 128,101 | 13 | 3 | 7 | 18 | 18 | 6 | 5 | 0 | 34 | 5 | 3 | 0 | 12 | 11 | 5 | 0 | 42 | | | | |
| 2010 | Single | 13,345 | 5,999 | 2,233 | 53,494 | 12 | 3 | 7 | 18 | 18 | 6 | 5 | 0 | 24 | 6 | 2 | 0 | 14 | 11 | 5 | 0 | 32 | | | | |
| | Cohabiting | 19,972 | 8,147 | 2,744 | 57,932 | 13 | 3 | 7 | 18 | 18 | 9 | 8 | 0 | 48 | 5 | 3 | 0 | 12 | 14 | 7 | 1 | 52 | | | | |
| | Married | 22,210 | 11,097 | 3,490 | 132,710 | 14 | 3 | 7 | 18 | 18 | 7 | 5 | 0 | 48 | 5 | 3 | 0 | 13 | 11 | 5 | 0 | 52 | | | | |
| 2011 | Single | 14,075 | 7,913 | 3,696 | 99,350 | 12 | 3 | 7 | 18 | 18 | 5 | 5 | 0 | 24 | 6 | 3 | 0 | 15 | 11 | 5 | 0 | 33 | | | | |
| | Cohabiting | 19,285 | 8,238 | 1,798 | 146,790 | 13 | 2 | 7 | 18 | 18 | 6 | 5 | 0 | 48 | 5 | 3 | 0 | 14 | 11 | 5 | 0 | 48 | | | | |
| | Married | 21,833 | 11,952 | 2,880 | 137,571 | 13 | 3 | 7 | 18 | 18 | 6 | 5 | 0 | 34 | 5 | 2 | 0 | 14 | 11 | 5 | 0 | 42 | | | | |
| 2012 | Single | 14,279 | 7,178 | 2,357 | 55,967 | 12 | 3 | 7 | 18 | 18 | 6 | 6 | 0 | 24 | 6 | 2 | 0 | 13 | 12 | 6 | 0 | 30 | | | | |
| | Cohabiting | 19,517 | 9,475 | 1,757 | 106,335 | 13 | 2 | 7 | 18 | 18 | 7 | 6 | 0 | 48 | 5 | 3 | 0 | 13 | 12 | 5 | 0 | 48 | | | | |
| | Married | 22,707 | 11,461 | 2,850 | 129,842 | 14 | 3 | 7 | 18 | 18 | 6 | 5 | 0 | 48 | 5 | 2 | 0 | 12 | 11 | 5 | 0 | 48 | | | | |

Source: SOEP (v30), own calculations.

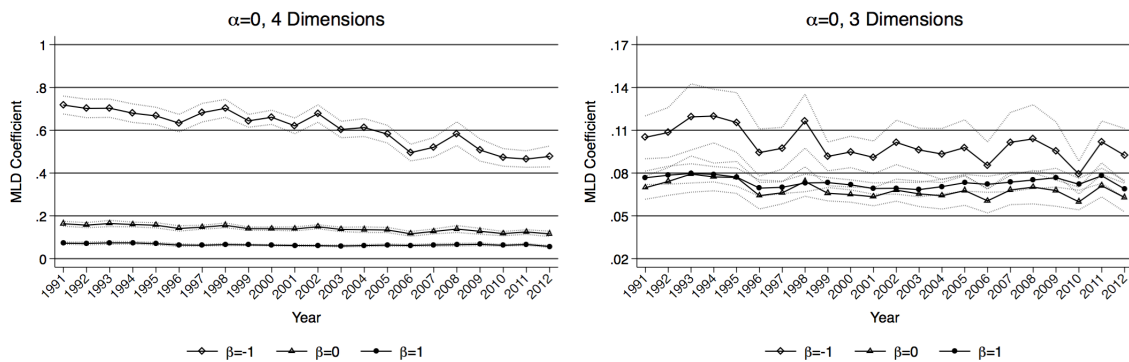
Figure A.1: Inequality by dimension (Gini coefficient)



Source: SOEP (v30), own calculations.

Note: Parental time is equalized according to the number of children in the family. Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.

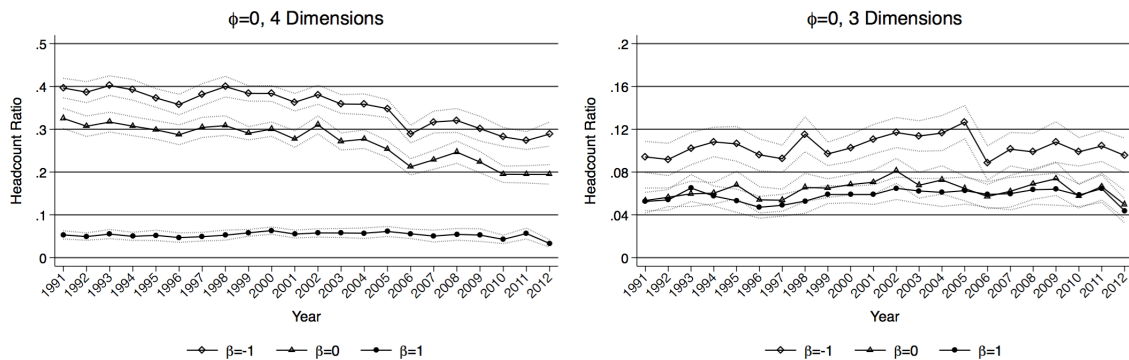
Figure A.2: Multidimensional inequality (with frequency-based weights)



Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications. Frequency-based weights, 4 dimensions: $w_{inc} = .2835$, $w_{educ} = .3492$, $w_{time} = .1699$, and $w_{np-time} = .1974$. Frequency-based weights, 3 dimensions: $w_{inc} = .3091$, $w_{educ} = .3819$, and $w_{total-time} = .3090$.

Figure A.3: Multidimensional poverty (with frequency-based weights)



Source: SOEP (v30), own calculations.

Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications. Frequency-based weights, 4 dimensions: $w_{inc} = .2835$, $w_{educ} = .3492$, $w_{time} = .1699$, and $w_{np-time} = .1974$. Frequency-based weights, 3 dimensions: $w_{inc} = .3091$, $w_{educ} = .3819$, and $w_{total-time} = .3090$.

Table A.4: **Multidimensional inequality** (weighting scheme: $w_{inc} = \frac{1}{4}$, $w_{educ} = \frac{1}{4}$, $w_{time} = \frac{1}{4}$, and $w_{np-time} = \frac{1}{4}$)

| Year | $\alpha = 0$ | | | | | | | | |
|------|--------------|-------|----------|-------------|-------|----------|-------------|-------|----------|
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.775 | 0.730 | 0.820 | 0.205 | 0.193 | 0.217 | 0.062 | 0.058 | 0.066 |
| 1992 | 0.759 | 0.712 | 0.806 | 0.197 | 0.184 | 0.209 | 0.061 | 0.056 | 0.066 |
| 1993 | 0.755 | 0.710 | 0.800 | 0.200 | 0.185 | 0.214 | 0.063 | 0.058 | 0.069 |
| 1994 | 0.732 | 0.685 | 0.778 | 0.194 | 0.182 | 0.206 | 0.063 | 0.058 | 0.068 |
| 1995 | 0.716 | 0.673 | 0.760 | 0.190 | 0.177 | 0.202 | 0.059 | 0.054 | 0.065 |
| 1996 | 0.684 | 0.640 | 0.728 | 0.176 | 0.163 | 0.189 | 0.054 | 0.049 | 0.060 |
| 1997 | 0.739 | 0.693 | 0.786 | 0.186 | 0.177 | 0.196 | 0.054 | 0.051 | 0.057 |
| 1998 | 0.759 | 0.714 | 0.804 | 0.196 | 0.184 | 0.208 | 0.057 | 0.053 | 0.062 |
| 1999 | 0.698 | 0.666 | 0.731 | 0.178 | 0.169 | 0.188 | 0.055 | 0.052 | 0.059 |
| 2000 | 0.716 | 0.680 | 0.752 | 0.180 | 0.171 | 0.190 | 0.053 | 0.050 | 0.056 |
| 2001 | 0.671 | 0.632 | 0.711 | 0.177 | 0.166 | 0.187 | 0.053 | 0.049 | 0.057 |
| 2002 | 0.733 | 0.689 | 0.777 | 0.189 | 0.178 | 0.199 | 0.052 | 0.049 | 0.055 |
| 2003 | 0.650 | 0.609 | 0.692 | 0.172 | 0.161 | 0.183 | 0.051 | 0.047 | 0.055 |
| 2004 | 0.663 | 0.618 | 0.708 | 0.171 | 0.158 | 0.185 | 0.052 | 0.048 | 0.056 |
| 2005 | 0.627 | 0.582 | 0.671 | 0.166 | 0.154 | 0.179 | 0.052 | 0.048 | 0.057 |
| 2006 | 0.534 | 0.493 | 0.576 | 0.143 | 0.131 | 0.155 | 0.050 | 0.046 | 0.055 |
| 2007 | 0.560 | 0.511 | 0.609 | 0.156 | 0.142 | 0.169 | 0.053 | 0.048 | 0.058 |
| 2008 | 0.629 | 0.570 | 0.689 | 0.171 | 0.154 | 0.189 | 0.055 | 0.049 | 0.060 |
| 2009 | 0.546 | 0.490 | 0.601 | 0.155 | 0.139 | 0.170 | 0.056 | 0.050 | 0.061 |
| 2010 | 0.511 | 0.467 | 0.555 | 0.143 | 0.131 | 0.155 | 0.052 | 0.048 | 0.056 |
| 2011 | 0.498 | 0.456 | 0.539 | 0.146 | 0.134 | 0.159 | 0.055 | 0.050 | 0.060 |
| 2012 | 0.515 | 0.463 | 0.566 | 0.141 | 0.127 | 0.155 | 0.047 | 0.043 | 0.050 |
| Year | $\alpha = 1$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.383 | 0.355 | 0.411 | 0.160 | 0.150 | 0.170 | 0.058 | 0.055 | 0.061 |
| 1992 | 0.371 | 0.344 | 0.399 | 0.153 | 0.143 | 0.163 | 0.056 | 0.052 | 0.060 |
| 1993 | 0.372 | 0.346 | 0.398 | 0.156 | 0.145 | 0.167 | 0.059 | 0.054 | 0.063 |
| 1994 | 0.361 | 0.334 | 0.388 | 0.152 | 0.142 | 0.162 | 0.059 | 0.055 | 0.063 |
| 1995 | 0.346 | 0.322 | 0.370 | 0.149 | 0.140 | 0.158 | 0.056 | 0.052 | 0.061 |
| 1996 | 0.329 | 0.305 | 0.352 | 0.139 | 0.129 | 0.149 | 0.052 | 0.048 | 0.057 |
| 1997 | 0.367 | 0.340 | 0.395 | 0.150 | 0.141 | 0.159 | 0.052 | 0.049 | 0.055 |
| 1998 | 0.373 | 0.347 | 0.400 | 0.155 | 0.145 | 0.164 | 0.054 | 0.050 | 0.057 |
| 1999 | 0.343 | 0.325 | 0.361 | 0.141 | 0.134 | 0.148 | 0.052 | 0.050 | 0.055 |
| 2000 | 0.345 | 0.325 | 0.365 | 0.142 | 0.135 | 0.150 | 0.050 | 0.048 | 0.053 |
| 2001 | 0.319 | 0.299 | 0.340 | 0.138 | 0.130 | 0.146 | 0.050 | 0.047 | 0.053 |
| 2002 | 0.350 | 0.325 | 0.374 | 0.148 | 0.140 | 0.157 | 0.049 | 0.047 | 0.052 |
| 2003 | 0.306 | 0.284 | 0.327 | 0.134 | 0.125 | 0.142 | 0.048 | 0.045 | 0.052 |
| 2004 | 0.312 | 0.288 | 0.335 | 0.134 | 0.124 | 0.144 | 0.049 | 0.045 | 0.052 |
| 2005 | 0.295 | 0.273 | 0.317 | 0.129 | 0.120 | 0.138 | 0.049 | 0.046 | 0.053 |
| 2006 | 0.247 | 0.227 | 0.267 | 0.111 | 0.103 | 0.120 | 0.047 | 0.044 | 0.051 |
| 2007 | 0.263 | 0.239 | 0.286 | 0.119 | 0.110 | 0.128 | 0.049 | 0.045 | 0.053 |
| 2008 | 0.291 | 0.262 | 0.321 | 0.132 | 0.119 | 0.144 | 0.051 | 0.047 | 0.055 |
| 2009 | 0.250 | 0.224 | 0.277 | 0.117 | 0.106 | 0.128 | 0.052 | 0.047 | 0.056 |
| 2010 | 0.235 | 0.215 | 0.255 | 0.110 | 0.101 | 0.118 | 0.049 | 0.046 | 0.052 |
| 2011 | 0.230 | 0.211 | 0.249 | 0.110 | 0.101 | 0.118 | 0.051 | 0.047 | 0.054 |
| 2012 | 0.240 | 0.215 | 0.264 | 0.109 | 0.098 | 0.119 | 0.044 | 0.041 | 0.048 |
| Year | $\alpha = 2$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.303 | 0.277 | 0.330 | 0.145 | 0.135 | 0.155 | 0.058 | 0.055 | 0.061 |
| 1992 | 0.290 | 0.265 | 0.316 | 0.138 | 0.129 | 0.148 | 0.056 | 0.053 | 0.059 |
| 1993 | 0.296 | 0.271 | 0.320 | 0.142 | 0.131 | 0.153 | 0.059 | 0.055 | 0.062 |
| 1994 | 0.287 | 0.261 | 0.312 | 0.138 | 0.128 | 0.148 | 0.059 | 0.056 | 0.063 |
| 1995 | 0.273 | 0.251 | 0.294 | 0.136 | 0.126 | 0.145 | 0.057 | 0.052 | 0.062 |
| 1996 | 0.256 | 0.235 | 0.278 | 0.127 | 0.117 | 0.137 | 0.053 | 0.048 | 0.058 |
| 1997 | 0.295 | 0.269 | 0.321 | 0.138 | 0.128 | 0.148 | 0.053 | 0.050 | 0.056 |
| 1998 | 0.301 | 0.274 | 0.328 | 0.141 | 0.132 | 0.151 | 0.053 | 0.050 | 0.057 |
| 1999 | 0.275 | 0.258 | 0.291 | 0.129 | 0.122 | 0.136 | 0.052 | 0.050 | 0.054 |
| 2000 | 0.271 | 0.252 | 0.289 | 0.129 | 0.122 | 0.136 | 0.050 | 0.048 | 0.052 |
| 2001 | 0.247 | 0.230 | 0.265 | 0.123 | 0.116 | 0.131 | 0.050 | 0.047 | 0.053 |
| 2002 | 0.274 | 0.252 | 0.296 | 0.135 | 0.126 | 0.144 | 0.050 | 0.047 | 0.052 |
| 2003 | 0.236 | 0.217 | 0.254 | 0.120 | 0.112 | 0.128 | 0.049 | 0.045 | 0.052 |
| 2004 | 0.240 | 0.219 | 0.261 | 0.120 | 0.111 | 0.130 | 0.049 | 0.045 | 0.052 |
| 2005 | 0.229 | 0.209 | 0.248 | 0.116 | 0.108 | 0.124 | 0.049 | 0.046 | 0.052 |
| 2006 | 0.189 | 0.172 | 0.205 | 0.099 | 0.092 | 0.107 | 0.048 | 0.044 | 0.051 |
| 2007 | 0.205 | 0.185 | 0.225 | 0.106 | 0.098 | 0.115 | 0.049 | 0.045 | 0.052 |
| 2008 | 0.224 | 0.199 | 0.249 | 0.117 | 0.106 | 0.129 | 0.050 | 0.046 | 0.054 |
| 2009 | 0.188 | 0.167 | 0.209 | 0.102 | 0.092 | 0.112 | 0.051 | 0.047 | 0.055 |
| 2010 | 0.178 | 0.162 | 0.194 | 0.097 | 0.089 | 0.104 | 0.048 | 0.045 | 0.051 |
| 2011 | 0.175 | 0.160 | 0.190 | 0.096 | 0.088 | 0.103 | 0.050 | 0.046 | 0.053 |
| 2012 | 0.183 | 0.163 | 0.203 | 0.096 | 0.087 | 0.106 | 0.044 | 0.041 | 0.047 |

Source: SOEP (v30), own calculations.

Table A.5: **Multidimensional inequality** (weighting scheme: $w_{inc} = \frac{1}{2}$, $w_{educ} = \frac{1}{6}$, $w_{time} = \frac{1}{6}$, and $w_{np-time} = \frac{1}{6}$)

| $\alpha = 0$ | | | | | | | | | |
|--------------|--------|----------------|-------------|----------------|--------|----------------|--------|----------------|-------|
| $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | | |
| Year | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | |
| 1991 | 0.585 | 0.552 | 0.618 | 0.126 | 0.117 | 0.135 | 0.055 | 0.052 | 0.059 |
| 1992 | 0.573 | 0.539 | 0.607 | 0.121 | 0.113 | 0.129 | 0.055 | 0.050 | 0.059 |
| 1993 | 0.574 | 0.540 | 0.608 | 0.125 | 0.115 | 0.134 | 0.056 | 0.052 | 0.061 |
| 1994 | 0.556 | 0.523 | 0.590 | 0.126 | 0.118 | 0.134 | 0.058 | 0.054 | 0.062 |
| 1995 | 0.547 | 0.515 | 0.579 | 0.124 | 0.115 | 0.133 | 0.055 | 0.050 | 0.060 |
| 1996 | 0.521 | 0.489 | 0.552 | 0.113 | 0.103 | 0.122 | 0.050 | 0.046 | 0.055 |
| 1997 | 0.562 | 0.527 | 0.596 | 0.119 | 0.112 | 0.127 | 0.051 | 0.048 | 0.054 |
| 1998 | 0.576 | 0.543 | 0.610 | 0.123 | 0.115 | 0.132 | 0.053 | 0.049 | 0.057 |
| 1999 | 0.533 | 0.508 | 0.557 | 0.115 | 0.109 | 0.121 | 0.052 | 0.049 | 0.055 |
| 2000 | 0.548 | 0.521 | 0.575 | 0.115 | 0.109 | 0.122 | 0.050 | 0.048 | 0.053 |
| 2001 | 0.517 | 0.488 | 0.545 | 0.117 | 0.110 | 0.123 | 0.051 | 0.048 | 0.054 |
| 2002 | 0.567 | 0.535 | 0.600 | 0.128 | 0.120 | 0.136 | 0.050 | 0.048 | 0.053 |
| 2003 | 0.506 | 0.476 | 0.536 | 0.117 | 0.109 | 0.125 | 0.049 | 0.045 | 0.052 |
| 2004 | 0.513 | 0.479 | 0.547 | 0.114 | 0.105 | 0.123 | 0.049 | 0.046 | 0.053 |
| 2005 | 0.490 | 0.457 | 0.523 | 0.116 | 0.108 | 0.125 | 0.051 | 0.047 | 0.055 |
| 2006 | 0.422 | 0.390 | 0.454 | 0.101 | 0.093 | 0.109 | 0.049 | 0.045 | 0.052 |
| 2007 | 0.443 | 0.406 | 0.480 | 0.111 | 0.102 | 0.120 | 0.051 | 0.047 | 0.056 |
| 2008 | 0.492 | 0.448 | 0.536 | 0.117 | 0.105 | 0.129 | 0.052 | 0.047 | 0.057 |
| 2009 | 0.429 | 0.388 | 0.471 | 0.108 | 0.098 | 0.118 | 0.053 | 0.048 | 0.058 |
| 2010 | 0.404 | 0.371 | 0.437 | 0.104 | 0.096 | 0.111 | 0.050 | 0.047 | 0.054 |
| 2011 | 0.397 | 0.366 | 0.428 | 0.107 | 0.099 | 0.116 | 0.054 | 0.049 | 0.058 |
| 2012 | 0.406 | 0.367 | 0.444 | 0.099 | 0.091 | 0.107 | 0.045 | 0.042 | 0.049 |
| $\alpha = 1$ | | | | | | | | | |
| $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | | |
| Year | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | |
| 1991 | 0.340 | 0.316 | 0.363 | 0.108 | 0.101 | 0.116 | 0.052 | 0.049 | 0.055 |
| 1992 | 0.330 | 0.306 | 0.353 | 0.104 | 0.098 | 0.111 | 0.052 | 0.048 | 0.055 |
| 1993 | 0.332 | 0.309 | 0.356 | 0.109 | 0.101 | 0.117 | 0.054 | 0.050 | 0.058 |
| 1994 | 0.326 | 0.303 | 0.349 | 0.110 | 0.103 | 0.116 | 0.055 | 0.052 | 0.059 |
| 1995 | 0.317 | 0.295 | 0.339 | 0.109 | 0.101 | 0.117 | 0.053 | 0.049 | 0.057 |
| 1996 | 0.299 | 0.278 | 0.319 | 0.100 | 0.091 | 0.109 | 0.049 | 0.045 | 0.053 |
| 1997 | 0.331 | 0.306 | 0.356 | 0.109 | 0.101 | 0.116 | 0.050 | 0.047 | 0.053 |
| 1998 | 0.335 | 0.311 | 0.359 | 0.110 | 0.102 | 0.117 | 0.051 | 0.047 | 0.054 |
| 1999 | 0.308 | 0.292 | 0.324 | 0.102 | 0.096 | 0.107 | 0.050 | 0.047 | 0.052 |
| 2000 | 0.313 | 0.295 | 0.331 | 0.102 | 0.096 | 0.107 | 0.048 | 0.046 | 0.050 |
| 2001 | 0.292 | 0.274 | 0.309 | 0.103 | 0.097 | 0.108 | 0.049 | 0.047 | 0.052 |
| 2002 | 0.322 | 0.301 | 0.344 | 0.112 | 0.105 | 0.118 | 0.049 | 0.046 | 0.052 |
| 2003 | 0.284 | 0.266 | 0.302 | 0.102 | 0.096 | 0.108 | 0.047 | 0.044 | 0.050 |
| 2004 | 0.288 | 0.267 | 0.309 | 0.100 | 0.093 | 0.107 | 0.047 | 0.044 | 0.051 |
| 2005 | 0.278 | 0.258 | 0.298 | 0.103 | 0.096 | 0.110 | 0.049 | 0.046 | 0.053 |
| 2006 | 0.236 | 0.218 | 0.255 | 0.090 | 0.083 | 0.097 | 0.047 | 0.044 | 0.050 |
| 2007 | 0.250 | 0.228 | 0.271 | 0.097 | 0.090 | 0.105 | 0.049 | 0.045 | 0.053 |
| 2008 | 0.274 | 0.248 | 0.299 | 0.102 | 0.092 | 0.111 | 0.049 | 0.045 | 0.054 |
| 2009 | 0.236 | 0.213 | 0.259 | 0.093 | 0.085 | 0.101 | 0.050 | 0.046 | 0.054 |
| 2010 | 0.222 | 0.204 | 0.240 | 0.090 | 0.083 | 0.096 | 0.048 | 0.045 | 0.051 |
| 2011 | 0.222 | 0.205 | 0.238 | 0.093 | 0.086 | 0.100 | 0.051 | 0.047 | 0.054 |
| 2012 | 0.226 | 0.204 | 0.247 | 0.088 | 0.080 | 0.095 | 0.044 | 0.041 | 0.047 |
| $\alpha = 2$ | | | | | | | | | |
| $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | | |
| Year | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | |
| 1991 | 0.284 | 0.260 | 0.308 | 0.105 | 0.097 | 0.112 | 0.053 | 0.050 | 0.055 |
| 1992 | 0.271 | 0.248 | 0.294 | 0.100 | 0.094 | 0.106 | 0.052 | 0.049 | 0.056 |
| 1993 | 0.279 | 0.254 | 0.304 | 0.106 | 0.097 | 0.116 | 0.055 | 0.051 | 0.059 |
| 1994 | 0.275 | 0.251 | 0.299 | 0.107 | 0.100 | 0.114 | 0.057 | 0.052 | 0.061 |
| 1995 | 0.270 | 0.245 | 0.295 | 0.107 | 0.097 | 0.117 | 0.054 | 0.049 | 0.058 |
| 1996 | 0.252 | 0.230 | 0.274 | 0.100 | 0.089 | 0.110 | 0.051 | 0.046 | 0.055 |
| 1997 | 0.287 | 0.259 | 0.316 | 0.110 | 0.100 | 0.121 | 0.052 | 0.049 | 0.055 |
| 1998 | 0.287 | 0.258 | 0.317 | 0.109 | 0.099 | 0.119 | 0.051 | 0.047 | 0.055 |
| 1999 | 0.261 | 0.244 | 0.278 | 0.101 | 0.095 | 0.107 | 0.050 | 0.048 | 0.052 |
| 2000 | 0.260 | 0.242 | 0.279 | 0.099 | 0.093 | 0.105 | 0.048 | 0.046 | 0.051 |
| 2001 | 0.242 | 0.226 | 0.258 | 0.101 | 0.096 | 0.107 | 0.050 | 0.048 | 0.053 |
| 2002 | 0.271 | 0.250 | 0.292 | 0.110 | 0.103 | 0.117 | 0.050 | 0.047 | 0.053 |
| 2003 | 0.235 | 0.218 | 0.252 | 0.100 | 0.094 | 0.106 | 0.048 | 0.045 | 0.051 |
| 2004 | 0.238 | 0.219 | 0.257 | 0.098 | 0.090 | 0.105 | 0.048 | 0.044 | 0.051 |
| 2005 | 0.235 | 0.214 | 0.256 | 0.102 | 0.094 | 0.111 | 0.050 | 0.046 | 0.053 |
| 2006 | 0.199 | 0.181 | 0.217 | 0.089 | 0.082 | 0.097 | 0.048 | 0.045 | 0.051 |
| 2007 | 0.213 | 0.192 | 0.234 | 0.096 | 0.088 | 0.105 | 0.049 | 0.046 | 0.053 |
| 2008 | 0.228 | 0.203 | 0.252 | 0.099 | 0.090 | 0.109 | 0.049 | 0.045 | 0.053 |
| 2009 | 0.192 | 0.172 | 0.212 | 0.089 | 0.081 | 0.097 | 0.050 | 0.046 | 0.054 |
| 2010 | 0.181 | 0.166 | 0.196 | 0.087 | 0.080 | 0.093 | 0.048 | 0.045 | 0.051 |
| 2011 | 0.185 | 0.170 | 0.200 | 0.092 | 0.084 | 0.099 | 0.051 | 0.047 | 0.054 |
| 2012 | 0.187 | 0.167 | 0.206 | 0.086 | 0.078 | 0.095 | 0.045 | 0.042 | 0.048 |

Source: SOEP (v30), own calculations.

Table A.6: **Multidimensional inequality** (weighting scheme: $w_{inc} = \frac{3}{4}$, $w_{educ} = \frac{1}{12}$, $w_{time} = \frac{1}{12}$, and $w_{np-time} = \frac{1}{12}$)

| Year | $\alpha = 0$ | | | | | | | | |
|------|--------------|-------|----------|-------------|-------|----------|-------------|-------|----------|
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.585 | 0.354 | 0.394 | 0.085 | 0.076 | 0.093 | 0.050 | 0.047 | 0.054 |
| 1992 | 0.573 | 0.348 | 0.388 | 0.085 | 0.078 | 0.092 | 0.052 | 0.047 | 0.057 |
| 1993 | 0.574 | 0.351 | 0.394 | 0.087 | 0.079 | 0.095 | 0.053 | 0.048 | 0.058 |
| 1994 | 0.556 | 0.344 | 0.385 | 0.099 | 0.089 | 0.108 | 0.057 | 0.052 | 0.063 |
| 1995 | 0.547 | 0.340 | 0.382 | 0.095 | 0.085 | 0.105 | 0.054 | 0.049 | 0.059 |
| 1996 | 0.521 | 0.322 | 0.362 | 0.084 | 0.075 | 0.094 | 0.050 | 0.045 | 0.055 |
| 1997 | 0.562 | 0.347 | 0.392 | 0.090 | 0.081 | 0.099 | 0.053 | 0.048 | 0.058 |
| 1998 | 0.576 | 0.355 | 0.397 | 0.089 | 0.081 | 0.097 | 0.052 | 0.047 | 0.057 |
| 1999 | 0.533 | 0.336 | 0.368 | 0.087 | 0.082 | 0.091 | 0.053 | 0.050 | 0.056 |
| 2000 | 0.548 | 0.345 | 0.379 | 0.088 | 0.081 | 0.095 | 0.052 | 0.049 | 0.056 |
| 2001 | 0.517 | 0.332 | 0.365 | 0.092 | 0.087 | 0.097 | 0.055 | 0.052 | 0.058 |
| 2002 | 0.567 | 0.364 | 0.403 | 0.102 | 0.095 | 0.109 | 0.055 | 0.052 | 0.059 |
| 2003 | 0.506 | 0.328 | 0.365 | 0.095 | 0.087 | 0.103 | 0.052 | 0.049 | 0.056 |
| 2004 | 0.513 | 0.327 | 0.369 | 0.092 | 0.085 | 0.099 | 0.052 | 0.049 | 0.056 |
| 2005 | 0.490 | 0.320 | 0.362 | 0.100 | 0.092 | 0.108 | 0.057 | 0.053 | 0.062 |
| 2006 | 0.422 | 0.279 | 0.321 | 0.090 | 0.083 | 0.097 | 0.053 | 0.049 | 0.057 |
| 2007 | 0.443 | 0.291 | 0.338 | 0.098 | 0.089 | 0.106 | 0.057 | 0.052 | 0.062 |
| 2008 | 0.492 | 0.312 | 0.367 | 0.094 | 0.085 | 0.103 | 0.054 | 0.050 | 0.059 |
| 2009 | 0.429 | 0.278 | 0.328 | 0.091 | 0.082 | 0.100 | 0.056 | 0.050 | 0.061 |
| 2010 | 0.404 | 0.268 | 0.310 | 0.092 | 0.085 | 0.099 | 0.054 | 0.050 | 0.058 |
| 2011 | 0.397 | 0.269 | 0.308 | 0.097 | 0.088 | 0.105 | 0.058 | 0.053 | 0.063 |
| 2012 | 0.406 | 0.266 | 0.313 | 0.087 | 0.080 | 0.094 | 0.050 | 0.046 | 0.054 |
| Year | $\alpha = 1$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.272 | 0.255 | 0.289 | 0.079 | 0.072 | 0.086 | 0.049 | 0.046 | 0.052 |
| 1992 | 0.266 | 0.249 | 0.283 | 0.081 | 0.074 | 0.087 | 0.052 | 0.046 | 0.057 |
| 1993 | 0.271 | 0.252 | 0.290 | 0.084 | 0.076 | 0.093 | 0.053 | 0.048 | 0.059 |
| 1994 | 0.268 | 0.251 | 0.285 | 0.093 | 0.085 | 0.102 | 0.057 | 0.051 | 0.064 |
| 1995 | 0.266 | 0.246 | 0.287 | 0.091 | 0.080 | 0.102 | 0.054 | 0.049 | 0.059 |
| 1996 | 0.251 | 0.232 | 0.269 | 0.083 | 0.071 | 0.095 | 0.050 | 0.045 | 0.056 |
| 1997 | 0.278 | 0.255 | 0.302 | 0.093 | 0.081 | 0.106 | 0.055 | 0.049 | 0.062 |
| 1998 | 0.276 | 0.256 | 0.296 | 0.089 | 0.079 | 0.099 | 0.053 | 0.047 | 0.058 |
| 1999 | 0.256 | 0.243 | 0.270 | 0.084 | 0.079 | 0.090 | 0.052 | 0.050 | 0.055 |
| 2000 | 0.261 | 0.247 | 0.276 | 0.084 | 0.078 | 0.090 | 0.052 | 0.048 | 0.055 |
| 2001 | 0.251 | 0.238 | 0.264 | 0.092 | 0.086 | 0.097 | 0.056 | 0.053 | 0.059 |
| 2002 | 0.277 | 0.261 | 0.293 | 0.098 | 0.092 | 0.104 | 0.055 | 0.052 | 0.059 |
| 2003 | 0.248 | 0.234 | 0.262 | 0.091 | 0.085 | 0.098 | 0.053 | 0.049 | 0.056 |
| 2004 | 0.249 | 0.233 | 0.266 | 0.089 | 0.082 | 0.096 | 0.052 | 0.048 | 0.056 |
| 2005 | 0.249 | 0.232 | 0.267 | 0.100 | 0.091 | 0.109 | 0.058 | 0.053 | 0.063 |
| 2006 | 0.218 | 0.201 | 0.234 | 0.091 | 0.083 | 0.099 | 0.054 | 0.050 | 0.058 |
| 2007 | 0.229 | 0.210 | 0.248 | 0.097 | 0.088 | 0.106 | 0.057 | 0.052 | 0.062 |
| 2008 | 0.242 | 0.221 | 0.262 | 0.092 | 0.083 | 0.101 | 0.054 | 0.049 | 0.058 |
| 2009 | 0.214 | 0.196 | 0.232 | 0.088 | 0.079 | 0.097 | 0.054 | 0.049 | 0.059 |
| 2010 | 0.204 | 0.189 | 0.220 | 0.089 | 0.082 | 0.097 | 0.053 | 0.049 | 0.057 |
| 2011 | 0.209 | 0.194 | 0.224 | 0.097 | 0.087 | 0.106 | 0.058 | 0.053 | 0.063 |
| 2012 | 0.207 | 0.190 | 0.225 | 0.087 | 0.079 | 0.096 | 0.051 | 0.046 | 0.055 |
| Year | $\alpha = 2$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.252 | 0.232 | 0.272 | 0.082 | 0.074 | 0.090 | 0.051 | 0.047 | 0.054 |
| 1992 | 0.243 | 0.224 | 0.263 | 0.085 | 0.077 | 0.094 | 0.055 | 0.047 | 0.063 |
| 1993 | 0.253 | 0.229 | 0.278 | 0.091 | 0.079 | 0.102 | 0.057 | 0.049 | 0.065 |
| 1994 | 0.253 | 0.231 | 0.274 | 0.100 | 0.088 | 0.112 | 0.062 | 0.052 | 0.072 |
| 1995 | 0.259 | 0.224 | 0.293 | 0.099 | 0.081 | 0.116 | 0.057 | 0.050 | 0.064 |
| 1996 | 0.244 | 0.212 | 0.276 | 0.092 | 0.073 | 0.112 | 0.054 | 0.046 | 0.062 |
| 1997 | 0.280 | 0.240 | 0.320 | 0.111 | 0.088 | 0.134 | 0.062 | 0.052 | 0.072 |
| 1998 | 0.266 | 0.233 | 0.299 | 0.099 | 0.083 | 0.115 | 0.056 | 0.049 | 0.064 |
| 1999 | 0.242 | 0.225 | 0.259 | 0.091 | 0.084 | 0.098 | 0.055 | 0.052 | 0.058 |
| 2000 | 0.244 | 0.226 | 0.262 | 0.089 | 0.082 | 0.097 | 0.054 | 0.050 | 0.057 |
| 2001 | 0.240 | 0.224 | 0.255 | 0.106 | 0.097 | 0.114 | 0.062 | 0.058 | 0.067 |
| 2002 | 0.265 | 0.246 | 0.284 | 0.107 | 0.099 | 0.114 | 0.059 | 0.055 | 0.063 |
| 2003 | 0.233 | 0.217 | 0.249 | 0.100 | 0.093 | 0.107 | 0.056 | 0.053 | 0.060 |
| 2004 | 0.234 | 0.215 | 0.252 | 0.097 | 0.087 | 0.106 | 0.055 | 0.050 | 0.059 |
| 2005 | 0.244 | 0.220 | 0.268 | 0.114 | 0.099 | 0.128 | 0.063 | 0.056 | 0.070 |
| 2006 | 0.213 | 0.193 | 0.233 | 0.104 | 0.093 | 0.115 | 0.059 | 0.054 | 0.064 |
| 2007 | 0.225 | 0.201 | 0.250 | 0.109 | 0.096 | 0.123 | 0.061 | 0.055 | 0.068 |
| 2008 | 0.229 | 0.206 | 0.251 | 0.099 | 0.088 | 0.110 | 0.056 | 0.050 | 0.061 |
| 2009 | 0.199 | 0.179 | 0.219 | 0.094 | 0.082 | 0.106 | 0.056 | 0.050 | 0.062 |
| 2010 | 0.191 | 0.174 | 0.208 | 0.097 | 0.086 | 0.107 | 0.056 | 0.051 | 0.061 |
| 2011 | 0.204 | 0.184 | 0.223 | 0.109 | 0.095 | 0.123 | 0.062 | 0.055 | 0.069 |
| 2012 | 0.197 | 0.176 | 0.218 | 0.097 | 0.085 | 0.109 | 0.055 | 0.049 | 0.060 |

Source: SOEP (v30), own calculations.

Table A.7: **Multidimensional inequality** (weighting scheme: $w_{inc} = \frac{9}{10}$, $w_{educ} = \frac{1}{30}$, $w_{time} = \frac{1}{30}$, and $w_{np-time} = \frac{1}{30}$)

| $\alpha = 0$ | | | | | | | | | |
|--------------|--------|----------------|-------------|----------------|--------|----------------|--------|----------------|-------|
| $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | | |
| Year | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | |
| 1991 | 0.202 | 0.190 | 0.214 | 0.082 | 0.073 | 0.091 | 0.058 | 0.053 | 0.062 |
| 1992 | 0.200 | 0.190 | 0.211 | 0.086 | 0.076 | 0.095 | 0.062 | 0.054 | 0.069 |
| 1993 | 0.206 | 0.192 | 0.219 | 0.086 | 0.076 | 0.095 | 0.062 | 0.055 | 0.069 |
| 1994 | 0.210 | 0.197 | 0.224 | 0.105 | 0.092 | 0.118 | 0.071 | 0.062 | 0.080 |
| 1995 | 0.209 | 0.193 | 0.225 | 0.097 | 0.085 | 0.109 | 0.067 | 0.059 | 0.074 |
| 1996 | 0.195 | 0.179 | 0.210 | 0.087 | 0.076 | 0.098 | 0.061 | 0.054 | 0.069 |
| 1997 | 0.212 | 0.195 | 0.229 | 0.094 | 0.081 | 0.106 | 0.068 | 0.059 | 0.077 |
| 1998 | 0.212 | 0.197 | 0.226 | 0.091 | 0.080 | 0.101 | 0.065 | 0.057 | 0.072 |
| 1999 | 0.201 | 0.192 | 0.211 | 0.089 | 0.084 | 0.095 | 0.066 | 0.062 | 0.070 |
| 2000 | 0.207 | 0.196 | 0.218 | 0.092 | 0.084 | 0.101 | 0.067 | 0.061 | 0.072 |
| 2001 | 0.208 | 0.199 | 0.217 | 0.098 | 0.092 | 0.104 | 0.071 | 0.067 | 0.076 |
| 2002 | 0.230 | 0.219 | 0.241 | 0.106 | 0.099 | 0.114 | 0.074 | 0.069 | 0.079 |
| 2003 | 0.211 | 0.200 | 0.223 | 0.101 | 0.092 | 0.110 | 0.070 | 0.064 | 0.075 |
| 2004 | 0.209 | 0.197 | 0.221 | 0.098 | 0.091 | 0.106 | 0.068 | 0.063 | 0.074 |
| 2005 | 0.215 | 0.201 | 0.228 | 0.110 | 0.100 | 0.120 | 0.077 | 0.070 | 0.084 |
| 2006 | 0.195 | 0.182 | 0.208 | 0.101 | 0.093 | 0.109 | 0.071 | 0.066 | 0.077 |
| 2007 | 0.204 | 0.190 | 0.219 | 0.107 | 0.098 | 0.117 | 0.076 | 0.069 | 0.083 |
| 2008 | 0.209 | 0.193 | 0.225 | 0.098 | 0.089 | 0.107 | 0.069 | 0.063 | 0.075 |
| 2009 | 0.194 | 0.180 | 0.209 | 0.098 | 0.088 | 0.107 | 0.070 | 0.063 | 0.078 |
| 2010 | 0.191 | 0.178 | 0.204 | 0.101 | 0.092 | 0.110 | 0.070 | 0.065 | 0.076 |
| 2011 | 0.195 | 0.181 | 0.208 | 0.106 | 0.096 | 0.117 | 0.076 | 0.068 | 0.083 |
| 2012 | 0.190 | 0.176 | 0.203 | 0.098 | 0.089 | 0.106 | 0.068 | 0.062 | 0.075 |
| $\alpha = 1$ | | | | | | | | | |
| $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | | |
| Year | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | |
| 1991 | 0.181 | 0.170 | 0.192 | 0.079 | 0.071 | 0.087 | 0.058 | 0.053 | 0.063 |
| 1992 | 0.179 | 0.168 | 0.190 | 0.086 | 0.074 | 0.098 | 0.065 | 0.054 | 0.075 |
| 1993 | 0.185 | 0.171 | 0.199 | 0.086 | 0.075 | 0.097 | 0.065 | 0.055 | 0.074 |
| 1994 | 0.189 | 0.177 | 0.201 | 0.102 | 0.088 | 0.117 | 0.074 | 0.061 | 0.087 |
| 1995 | 0.192 | 0.172 | 0.211 | 0.095 | 0.082 | 0.109 | 0.068 | 0.059 | 0.077 |
| 1996 | 0.180 | 0.160 | 0.199 | 0.088 | 0.074 | 0.103 | 0.064 | 0.054 | 0.075 |
| 1997 | 0.204 | 0.181 | 0.228 | 0.103 | 0.084 | 0.122 | 0.075 | 0.061 | 0.089 |
| 1998 | 0.195 | 0.178 | 0.212 | 0.094 | 0.081 | 0.107 | 0.068 | 0.058 | 0.078 |
| 1999 | 0.183 | 0.173 | 0.194 | 0.090 | 0.084 | 0.096 | 0.067 | 0.063 | 0.072 |
| 2000 | 0.186 | 0.175 | 0.198 | 0.091 | 0.083 | 0.099 | 0.068 | 0.062 | 0.073 |
| 2001 | 0.191 | 0.182 | 0.200 | 0.103 | 0.095 | 0.110 | 0.077 | 0.071 | 0.082 |
| 2002 | 0.207 | 0.196 | 0.218 | 0.105 | 0.098 | 0.112 | 0.075 | 0.070 | 0.080 |
| 2003 | 0.190 | 0.180 | 0.199 | 0.100 | 0.092 | 0.107 | 0.072 | 0.067 | 0.076 |
| 2004 | 0.188 | 0.176 | 0.201 | 0.098 | 0.089 | 0.107 | 0.070 | 0.064 | 0.076 |
| 2005 | 0.200 | 0.183 | 0.216 | 0.114 | 0.101 | 0.126 | 0.082 | 0.073 | 0.090 |
| 2006 | 0.180 | 0.166 | 0.194 | 0.106 | 0.096 | 0.116 | 0.076 | 0.069 | 0.083 |
| 2007 | 0.188 | 0.172 | 0.205 | 0.112 | 0.100 | 0.123 | 0.080 | 0.071 | 0.089 |
| 2008 | 0.187 | 0.172 | 0.202 | 0.099 | 0.089 | 0.108 | 0.070 | 0.064 | 0.077 |
| 2009 | 0.173 | 0.159 | 0.188 | 0.097 | 0.086 | 0.108 | 0.071 | 0.063 | 0.079 |
| 2010 | 0.170 | 0.157 | 0.184 | 0.102 | 0.091 | 0.112 | 0.072 | 0.065 | 0.080 |
| 2011 | 0.179 | 0.164 | 0.194 | 0.111 | 0.098 | 0.124 | 0.080 | 0.071 | 0.089 |
| 2012 | 0.172 | 0.157 | 0.187 | 0.101 | 0.090 | 0.112 | 0.072 | 0.064 | 0.080 |
| $\alpha = 2$ | | | | | | | | | |
| $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | | |
| Year | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | Coeff. | Conf. Interval | |
| 1991 | 0.188 | 0.173 | 0.203 | 0.085 | 0.075 | 0.094 | 0.062 | 0.056 | 0.069 |
| 1992 | 0.187 | 0.171 | 0.202 | 0.101 | 0.080 | 0.122 | 0.077 | 0.057 | 0.097 |
| 1993 | 0.197 | 0.175 | 0.218 | 0.100 | 0.079 | 0.120 | 0.075 | 0.057 | 0.093 |
| 1994 | 0.203 | 0.184 | 0.222 | 0.121 | 0.092 | 0.150 | 0.089 | 0.063 | 0.115 |
| 1995 | 0.214 | 0.173 | 0.255 | 0.109 | 0.084 | 0.134 | 0.076 | 0.061 | 0.092 |
| 1996 | 0.203 | 0.162 | 0.244 | 0.105 | 0.077 | 0.132 | 0.074 | 0.057 | 0.092 |
| 1997 | 0.246 | 0.194 | 0.298 | 0.135 | 0.096 | 0.175 | 0.095 | 0.068 | 0.122 |
| 1998 | 0.216 | 0.183 | 0.249 | 0.111 | 0.088 | 0.134 | 0.079 | 0.064 | 0.095 |
| 1999 | 0.197 | 0.182 | 0.213 | 0.101 | 0.092 | 0.110 | 0.074 | 0.068 | 0.080 |
| 2000 | 0.200 | 0.183 | 0.217 | 0.101 | 0.090 | 0.112 | 0.075 | 0.067 | 0.082 |
| 2001 | 0.217 | 0.201 | 0.234 | 0.131 | 0.115 | 0.146 | 0.096 | 0.084 | 0.107 |
| 2002 | 0.228 | 0.213 | 0.243 | 0.120 | 0.111 | 0.129 | 0.085 | 0.079 | 0.091 |
| 2003 | 0.206 | 0.193 | 0.219 | 0.115 | 0.106 | 0.124 | 0.082 | 0.076 | 0.088 |
| 2004 | 0.204 | 0.185 | 0.222 | 0.112 | 0.098 | 0.125 | 0.079 | 0.070 | 0.088 |
| 2005 | 0.231 | 0.201 | 0.261 | 0.140 | 0.117 | 0.163 | 0.098 | 0.083 | 0.114 |
| 2006 | 0.206 | 0.184 | 0.229 | 0.130 | 0.113 | 0.147 | 0.091 | 0.080 | 0.102 |
| 2007 | 0.215 | 0.186 | 0.244 | 0.134 | 0.114 | 0.154 | 0.094 | 0.081 | 0.107 |
| 2008 | 0.202 | 0.182 | 0.222 | 0.112 | 0.099 | 0.124 | 0.078 | 0.069 | 0.086 |
| 2009 | 0.186 | 0.164 | 0.207 | 0.110 | 0.094 | 0.126 | 0.078 | 0.067 | 0.088 |
| 2010 | 0.184 | 0.163 | 0.204 | 0.117 | 0.101 | 0.133 | 0.081 | 0.071 | 0.092 |
| 2011 | 0.205 | 0.179 | 0.230 | 0.135 | 0.114 | 0.156 | 0.094 | 0.080 | 0.109 |
| 2012 | 0.190 | 0.166 | 0.213 | 0.119 | 0.102 | 0.136 | 0.083 | 0.071 | 0.094 |

Source: SOEP (v30), own calculations.

Table A.8: **Multidimensional inequality** (weighting scheme: $w_{inc} = \frac{1}{3}$, $w_{educ} = \frac{1}{3}$, $w_{time} = \frac{1}{3}$, and $w_{np-time} = 0$)

| Year | $\alpha = 0$ | | | | | | | | |
|------|--------------|-------|----------|-------------|-------|----------|-------------|-------|----------|
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.166 | 0.147 | 0.184 | 0.096 | 0.087 | 0.105 | 0.082 | 0.077 | 0.088 |
| 1992 | 0.197 | 0.171 | 0.223 | 0.109 | 0.098 | 0.120 | 0.086 | 0.080 | 0.093 |
| 1993 | 0.179 | 0.153 | 0.204 | 0.105 | 0.093 | 0.117 | 0.086 | 0.080 | 0.093 |
| 1994 | 0.177 | 0.156 | 0.199 | 0.102 | 0.092 | 0.111 | 0.085 | 0.079 | 0.090 |
| 1995 | 0.155 | 0.133 | 0.177 | 0.096 | 0.086 | 0.106 | 0.084 | 0.077 | 0.090 |
| 1996 | 0.154 | 0.135 | 0.173 | 0.090 | 0.081 | 0.098 | 0.076 | 0.070 | 0.082 |
| 1997 | 0.202 | 0.178 | 0.225 | 0.108 | 0.098 | 0.117 | 0.079 | 0.074 | 0.084 |
| 1998 | 0.201 | 0.176 | 0.226 | 0.108 | 0.096 | 0.119 | 0.081 | 0.074 | 0.089 |
| 1999 | 0.191 | 0.175 | 0.206 | 0.107 | 0.100 | 0.115 | 0.084 | 0.079 | 0.088 |
| 2000 | 0.197 | 0.179 | 0.216 | 0.105 | 0.099 | 0.112 | 0.081 | 0.077 | 0.085 |
| 2001 | 0.163 | 0.149 | 0.178 | 0.095 | 0.089 | 0.102 | 0.078 | 0.073 | 0.082 |
| 2002 | 0.188 | 0.168 | 0.207 | 0.106 | 0.097 | 0.115 | 0.080 | 0.074 | 0.086 |
| 2003 | 0.165 | 0.143 | 0.186 | 0.097 | 0.087 | 0.107 | 0.078 | 0.072 | 0.085 |
| 2004 | 0.182 | 0.156 | 0.208 | 0.102 | 0.091 | 0.114 | 0.080 | 0.074 | 0.087 |
| 2005 | 0.177 | 0.152 | 0.203 | 0.102 | 0.091 | 0.113 | 0.082 | 0.076 | 0.089 |
| 2006 | 0.165 | 0.143 | 0.186 | 0.095 | 0.085 | 0.104 | 0.081 | 0.075 | 0.087 |
| 2007 | 0.188 | 0.162 | 0.215 | 0.105 | 0.094 | 0.116 | 0.082 | 0.075 | 0.089 |
| 2008 | 0.200 | 0.171 | 0.230 | 0.110 | 0.098 | 0.123 | 0.084 | 0.078 | 0.090 |
| 2009 | 0.178 | 0.144 | 0.211 | 0.101 | 0.086 | 0.115 | 0.085 | 0.077 | 0.092 |
| 2010 | 0.171 | 0.153 | 0.190 | 0.098 | 0.090 | 0.107 | 0.082 | 0.077 | 0.088 |
| 2011 | 0.176 | 0.151 | 0.200 | 0.102 | 0.092 | 0.112 | 0.089 | 0.083 | 0.096 |
| 2012 | 0.199 | 0.168 | 0.230 | 0.103 | 0.090 | 0.117 | 0.081 | 0.072 | 0.090 |
| Year | $\alpha = 1$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.105 | 0.096 | 0.113 | 0.078 | 0.072 | 0.084 | 0.078 | 0.074 | 0.082 |
| 1992 | 0.116 | 0.105 | 0.127 | 0.087 | 0.080 | 0.094 | 0.081 | 0.076 | 0.085 |
| 1993 | 0.113 | 0.102 | 0.125 | 0.086 | 0.078 | 0.094 | 0.082 | 0.076 | 0.087 |
| 1994 | 0.115 | 0.104 | 0.125 | 0.082 | 0.076 | 0.089 | 0.079 | 0.075 | 0.083 |
| 1995 | 0.104 | 0.094 | 0.115 | 0.080 | 0.073 | 0.087 | 0.078 | 0.073 | 0.083 |
| 1996 | 0.103 | 0.093 | 0.112 | 0.076 | 0.070 | 0.082 | 0.072 | 0.067 | 0.076 |
| 1997 | 0.125 | 0.115 | 0.135 | 0.089 | 0.082 | 0.096 | 0.074 | 0.070 | 0.078 |
| 1998 | 0.126 | 0.113 | 0.139 | 0.088 | 0.081 | 0.096 | 0.075 | 0.070 | 0.081 |
| 1999 | 0.124 | 0.116 | 0.131 | 0.089 | 0.084 | 0.094 | 0.077 | 0.074 | 0.081 |
| 2000 | 0.121 | 0.113 | 0.129 | 0.086 | 0.082 | 0.091 | 0.074 | 0.071 | 0.078 |
| 2001 | 0.107 | 0.101 | 0.113 | 0.080 | 0.076 | 0.084 | 0.073 | 0.070 | 0.076 |
| 2002 | 0.117 | 0.109 | 0.125 | 0.086 | 0.081 | 0.091 | 0.074 | 0.070 | 0.077 |
| 2003 | 0.105 | 0.097 | 0.113 | 0.079 | 0.073 | 0.084 | 0.072 | 0.068 | 0.076 |
| 2004 | 0.114 | 0.103 | 0.124 | 0.084 | 0.077 | 0.091 | 0.075 | 0.070 | 0.080 |
| 2005 | 0.115 | 0.103 | 0.126 | 0.086 | 0.078 | 0.093 | 0.077 | 0.072 | 0.082 |
| 2006 | 0.106 | 0.097 | 0.115 | 0.080 | 0.074 | 0.086 | 0.076 | 0.071 | 0.080 |
| 2007 | 0.122 | 0.109 | 0.135 | 0.088 | 0.080 | 0.096 | 0.076 | 0.071 | 0.082 |
| 2008 | 0.119 | 0.107 | 0.131 | 0.089 | 0.081 | 0.098 | 0.078 | 0.073 | 0.082 |
| 2009 | 0.110 | 0.096 | 0.124 | 0.083 | 0.073 | 0.093 | 0.078 | 0.072 | 0.084 |
| 2010 | 0.108 | 0.100 | 0.116 | 0.082 | 0.076 | 0.088 | 0.076 | 0.072 | 0.080 |
| 2011 | 0.111 | 0.101 | 0.121 | 0.085 | 0.078 | 0.091 | 0.081 | 0.076 | 0.086 |
| 2012 | 0.120 | 0.107 | 0.133 | 0.084 | 0.076 | 0.092 | 0.072 | 0.067 | 0.078 |
| Year | $\alpha = 2$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.095 | 0.086 | 0.104 | 0.076 | 0.070 | 0.081 | 0.080 | 0.076 | 0.084 |
| 1992 | 0.102 | 0.093 | 0.111 | 0.083 | 0.077 | 0.090 | 0.083 | 0.079 | 0.088 |
| 1993 | 0.105 | 0.093 | 0.116 | 0.084 | 0.076 | 0.092 | 0.085 | 0.079 | 0.090 |
| 1994 | 0.106 | 0.096 | 0.116 | 0.079 | 0.073 | 0.085 | 0.080 | 0.076 | 0.085 |
| 1995 | 0.098 | 0.088 | 0.108 | 0.079 | 0.072 | 0.085 | 0.080 | 0.075 | 0.085 |
| 1996 | 0.097 | 0.088 | 0.106 | 0.075 | 0.069 | 0.082 | 0.074 | 0.069 | 0.078 |
| 1997 | 0.114 | 0.105 | 0.124 | 0.086 | 0.079 | 0.093 | 0.076 | 0.071 | 0.080 |
| 1998 | 0.118 | 0.102 | 0.135 | 0.085 | 0.077 | 0.094 | 0.076 | 0.071 | 0.081 |
| 1999 | 0.115 | 0.108 | 0.122 | 0.088 | 0.083 | 0.093 | 0.079 | 0.075 | 0.082 |
| 2000 | 0.109 | 0.102 | 0.116 | 0.083 | 0.078 | 0.087 | 0.075 | 0.072 | 0.078 |
| 2001 | 0.099 | 0.093 | 0.104 | 0.077 | 0.073 | 0.081 | 0.074 | 0.071 | 0.077 |
| 2002 | 0.106 | 0.099 | 0.113 | 0.082 | 0.078 | 0.087 | 0.074 | 0.071 | 0.078 |
| 2003 | 0.096 | 0.089 | 0.103 | 0.075 | 0.070 | 0.080 | 0.072 | 0.068 | 0.076 |
| 2004 | 0.103 | 0.094 | 0.112 | 0.081 | 0.075 | 0.087 | 0.076 | 0.071 | 0.080 |
| 2005 | 0.108 | 0.096 | 0.119 | 0.084 | 0.077 | 0.091 | 0.078 | 0.073 | 0.082 |
| 2006 | 0.099 | 0.090 | 0.107 | 0.078 | 0.072 | 0.083 | 0.076 | 0.072 | 0.080 |
| 2007 | 0.116 | 0.103 | 0.128 | 0.086 | 0.078 | 0.094 | 0.076 | 0.071 | 0.082 |
| 2008 | 0.107 | 0.096 | 0.117 | 0.085 | 0.077 | 0.093 | 0.078 | 0.073 | 0.082 |
| 2009 | 0.099 | 0.087 | 0.112 | 0.079 | 0.069 | 0.089 | 0.077 | 0.071 | 0.083 |
| 2010 | 0.099 | 0.092 | 0.106 | 0.080 | 0.074 | 0.086 | 0.075 | 0.071 | 0.080 |
| 2011 | 0.103 | 0.094 | 0.113 | 0.082 | 0.076 | 0.089 | 0.080 | 0.075 | 0.084 |
| 2012 | 0.108 | 0.098 | 0.118 | 0.081 | 0.074 | 0.088 | 0.071 | 0.066 | 0.076 |

Source: SOEP (v30), own calculations.

Table A.9: **Multidimensional poverty** (weighting scheme: $w_{inc} = \frac{1}{4}$, $w_{educ} = \frac{1}{4}$, $w_{time} = \frac{1}{4}$, and $w_{np-time} = \frac{1}{4}$)

| Year | $\phi = 0$ | | | | | | | | |
|------|--------------|-------|----------|-------------|-------|----------|-------------|-------|----------|
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.419 | 0.395 | 0.442 | 0.342 | 0.318 | 0.366 | 0.074 | 0.062 | 0.086 |
| 1992 | 0.408 | 0.383 | 0.434 | 0.329 | 0.305 | 0.353 | 0.064 | 0.054 | 0.074 |
| 1993 | 0.417 | 0.394 | 0.440 | 0.331 | 0.309 | 0.353 | 0.065 | 0.053 | 0.077 |
| 1994 | 0.405 | 0.381 | 0.429 | 0.322 | 0.299 | 0.346 | 0.051 | 0.042 | 0.061 |
| 1995 | 0.393 | 0.371 | 0.415 | 0.310 | 0.288 | 0.332 | 0.061 | 0.049 | 0.072 |
| 1996 | 0.382 | 0.356 | 0.408 | 0.301 | 0.279 | 0.323 | 0.046 | 0.035 | 0.056 |
| 1997 | 0.414 | 0.387 | 0.441 | 0.326 | 0.301 | 0.351 | 0.045 | 0.037 | 0.054 |
| 1998 | 0.411 | 0.386 | 0.436 | 0.327 | 0.304 | 0.350 | 0.055 | 0.042 | 0.068 |
| 1999 | 0.417 | 0.399 | 0.435 | 0.302 | 0.287 | 0.318 | 0.055 | 0.047 | 0.063 |
| 2000 | 0.402 | 0.384 | 0.421 | 0.313 | 0.296 | 0.330 | 0.057 | 0.049 | 0.066 |
| 2001 | 0.383 | 0.363 | 0.403 | 0.288 | 0.269 | 0.307 | 0.056 | 0.046 | 0.067 |
| 2002 | 0.398 | 0.376 | 0.420 | 0.318 | 0.297 | 0.340 | 0.057 | 0.046 | 0.068 |
| 2003 | 0.372 | 0.349 | 0.395 | 0.279 | 0.259 | 0.299 | 0.049 | 0.040 | 0.059 |
| 2004 | 0.379 | 0.354 | 0.404 | 0.281 | 0.258 | 0.304 | 0.056 | 0.045 | 0.068 |
| 2005 | 0.360 | 0.338 | 0.382 | 0.258 | 0.238 | 0.278 | 0.050 | 0.040 | 0.060 |
| 2006 | 0.309 | 0.287 | 0.331 | 0.226 | 0.207 | 0.245 | 0.044 | 0.034 | 0.054 |
| 2007 | 0.332 | 0.308 | 0.357 | 0.236 | 0.214 | 0.258 | 0.048 | 0.035 | 0.062 |
| 2008 | 0.342 | 0.313 | 0.371 | 0.262 | 0.235 | 0.289 | 0.047 | 0.034 | 0.061 |
| 2009 | 0.317 | 0.288 | 0.347 | 0.221 | 0.196 | 0.246 | 0.043 | 0.030 | 0.056 |
| 2010 | 0.289 | 0.268 | 0.310 | 0.206 | 0.187 | 0.225 | 0.030 | 0.021 | 0.039 |
| 2011 | 0.288 | 0.267 | 0.309 | 0.199 | 0.180 | 0.219 | 0.044 | 0.033 | 0.055 |
| 2012 | 0.294 | 0.269 | 0.320 | 0.207 | 0.183 | 0.230 | 0.026 | 0.018 | 0.034 |
| Year | $\phi = 1$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.333 | 0.311 | 0.354 | 0.179 | 0.165 | 0.192 | 0.015 | 0.012 | 0.018 |
| 1992 | 0.325 | 0.303 | 0.347 | 0.170 | 0.157 | 0.183 | 0.014 | 0.011 | 0.018 |
| 1993 | 0.322 | 0.302 | 0.342 | 0.171 | 0.158 | 0.185 | 0.015 | 0.011 | 0.019 |
| 1994 | 0.312 | 0.291 | 0.334 | 0.163 | 0.151 | 0.176 | 0.012 | 0.009 | 0.015 |
| 1995 | 0.297 | 0.278 | 0.317 | 0.158 | 0.146 | 0.170 | 0.012 | 0.009 | 0.015 |
| 1996 | 0.287 | 0.266 | 0.307 | 0.148 | 0.136 | 0.161 | 0.010 | 0.007 | 0.012 |
| 1997 | 0.314 | 0.292 | 0.337 | 0.161 | 0.149 | 0.173 | 0.009 | 0.007 | 0.011 |
| 1998 | 0.320 | 0.299 | 0.341 | 0.165 | 0.152 | 0.177 | 0.011 | 0.008 | 0.015 |
| 1999 | 0.297 | 0.282 | 0.312 | 0.150 | 0.141 | 0.159 | 0.012 | 0.009 | 0.014 |
| 2000 | 0.300 | 0.284 | 0.315 | 0.153 | 0.144 | 0.162 | 0.011 | 0.009 | 0.013 |
| 2001 | 0.277 | 0.259 | 0.295 | 0.145 | 0.134 | 0.156 | 0.011 | 0.009 | 0.014 |
| 2002 | 0.301 | 0.281 | 0.321 | 0.158 | 0.146 | 0.170 | 0.009 | 0.007 | 0.011 |
| 2003 | 0.267 | 0.248 | 0.285 | 0.140 | 0.129 | 0.150 | 0.010 | 0.007 | 0.012 |
| 2004 | 0.271 | 0.251 | 0.291 | 0.140 | 0.127 | 0.152 | 0.010 | 0.007 | 0.013 |
| 2005 | 0.253 | 0.234 | 0.271 | 0.129 | 0.118 | 0.141 | 0.011 | 0.008 | 0.014 |
| 2006 | 0.213 | 0.196 | 0.229 | 0.107 | 0.097 | 0.116 | 0.008 | 0.005 | 0.011 |
| 2007 | 0.224 | 0.203 | 0.244 | 0.114 | 0.102 | 0.126 | 0.010 | 0.006 | 0.013 |
| 2008 | 0.249 | 0.224 | 0.274 | 0.129 | 0.114 | 0.144 | 0.010 | 0.006 | 0.014 |
| 2009 | 0.218 | 0.194 | 0.241 | 0.111 | 0.097 | 0.125 | 0.009 | 0.005 | 0.013 |
| 2010 | 0.199 | 0.181 | 0.217 | 0.098 | 0.088 | 0.108 | 0.006 | 0.004 | 0.008 |
| 2011 | 0.195 | 0.178 | 0.212 | 0.100 | 0.089 | 0.111 | 0.010 | 0.007 | 0.013 |
| 2012 | 0.204 | 0.182 | 0.226 | 0.099 | 0.086 | 0.112 | 0.004 | 0.002 | 0.006 |
| Year | $\phi = 2$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.302 | 0.281 | 0.323 | 0.103 | 0.094 | 0.111 | 0.006 | 0.004 | 0.007 |
| 1992 | 0.294 | 0.273 | 0.315 | 0.097 | 0.089 | 0.105 | 0.006 | 0.004 | 0.008 |
| 1993 | 0.291 | 0.272 | 0.311 | 0.098 | 0.090 | 0.107 | 0.006 | 0.004 | 0.009 |
| 1994 | 0.281 | 0.260 | 0.301 | 0.092 | 0.084 | 0.099 | 0.005 | 0.003 | 0.007 |
| 1995 | 0.268 | 0.249 | 0.287 | 0.089 | 0.082 | 0.097 | 0.004 | 0.003 | 0.006 |
| 1996 | 0.258 | 0.238 | 0.277 | 0.083 | 0.075 | 0.091 | 0.003 | 0.002 | 0.005 |
| 1997 | 0.283 | 0.261 | 0.304 | 0.088 | 0.081 | 0.095 | 0.003 | 0.002 | 0.004 |
| 1998 | 0.288 | 0.268 | 0.308 | 0.092 | 0.084 | 0.100 | 0.004 | 0.002 | 0.005 |
| 1999 | 0.263 | 0.249 | 0.277 | 0.083 | 0.077 | 0.089 | 0.004 | 0.003 | 0.005 |
| 2000 | 0.268 | 0.253 | 0.283 | 0.085 | 0.079 | 0.091 | 0.004 | 0.003 | 0.005 |
| 2001 | 0.248 | 0.231 | 0.265 | 0.082 | 0.075 | 0.089 | 0.004 | 0.002 | 0.005 |
| 2002 | 0.270 | 0.252 | 0.289 | 0.090 | 0.082 | 0.097 | 0.003 | 0.002 | 0.003 |
| 2003 | 0.238 | 0.220 | 0.255 | 0.079 | 0.072 | 0.086 | 0.003 | 0.002 | 0.004 |
| 2004 | 0.242 | 0.223 | 0.261 | 0.078 | 0.070 | 0.086 | 0.003 | 0.002 | 0.005 |
| 2005 | 0.224 | 0.206 | 0.242 | 0.073 | 0.066 | 0.080 | 0.004 | 0.002 | 0.005 |
| 2006 | 0.188 | 0.172 | 0.204 | 0.059 | 0.052 | 0.066 | 0.003 | 0.001 | 0.004 |
| 2007 | 0.196 | 0.177 | 0.216 | 0.065 | 0.057 | 0.073 | 0.004 | 0.002 | 0.006 |
| 2008 | 0.223 | 0.199 | 0.247 | 0.073 | 0.063 | 0.083 | 0.003 | 0.002 | 0.005 |
| 2009 | 0.192 | 0.170 | 0.214 | 0.063 | 0.054 | 0.072 | 0.003 | 0.001 | 0.005 |
| 2010 | 0.176 | 0.159 | 0.193 | 0.054 | 0.047 | 0.060 | 0.002 | 0.001 | 0.003 |
| 2011 | 0.172 | 0.156 | 0.188 | 0.058 | 0.051 | 0.065 | 0.004 | 0.002 | 0.005 |
| 2012 | 0.179 | 0.158 | 0.199 | 0.055 | 0.047 | 0.063 | 0.001 | 0.001 | 0.002 |

Source: SOEP (v30), own calculations.

Table A.10: **Multidimensional poverty** (weighting scheme: $w_{inc} = \frac{1}{2}$, $w_{educ} = \frac{1}{6}$, $w_{time} = \frac{1}{6}$, and $w_{np-time} = \frac{1}{6}$)

| Year | $\phi = 0$ | | | | | | | | |
|------|--------------|-------|----------|-------------|-------|----------|-------------|-------|----------|
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.391 | 0.368 | 0.413 | 0.317 | 0.293 | 0.340 | 0.061 | 0.050 | 0.072 |
| 1992 | 0.382 | 0.358 | 0.407 | 0.303 | 0.279 | 0.326 | 0.054 | 0.046 | 0.062 |
| 1993 | 0.393 | 0.371 | 0.415 | 0.306 | 0.282 | 0.329 | 0.055 | 0.046 | 0.064 |
| 1994 | 0.388 | 0.366 | 0.411 | 0.297 | 0.276 | 0.318 | 0.045 | 0.036 | 0.054 |
| 1995 | 0.367 | 0.346 | 0.389 | 0.296 | 0.275 | 0.318 | 0.054 | 0.043 | 0.066 |
| 1996 | 0.357 | 0.333 | 0.381 | 0.282 | 0.258 | 0.306 | 0.039 | 0.029 | 0.049 |
| 1997 | 0.383 | 0.359 | 0.407 | 0.294 | 0.270 | 0.318 | 0.038 | 0.030 | 0.046 |
| 1998 | 0.388 | 0.365 | 0.411 | 0.300 | 0.278 | 0.322 | 0.049 | 0.037 | 0.060 |
| 1999 | 0.373 | 0.355 | 0.390 | 0.279 | 0.263 | 0.294 | 0.048 | 0.041 | 0.055 |
| 2000 | 0.380 | 0.362 | 0.399 | 0.281 | 0.264 | 0.298 | 0.051 | 0.043 | 0.059 |
| 2001 | 0.362 | 0.342 | 0.381 | 0.264 | 0.245 | 0.283 | 0.048 | 0.038 | 0.057 |
| 2002 | 0.384 | 0.360 | 0.407 | 0.304 | 0.281 | 0.327 | 0.052 | 0.042 | 0.062 |
| 2003 | 0.355 | 0.333 | 0.376 | 0.270 | 0.250 | 0.290 | 0.046 | 0.037 | 0.056 |
| 2004 | 0.359 | 0.336 | 0.383 | 0.264 | 0.242 | 0.286 | 0.048 | 0.038 | 0.058 |
| 2005 | 0.348 | 0.327 | 0.368 | 0.257 | 0.237 | 0.277 | 0.047 | 0.038 | 0.056 |
| 2006 | 0.295 | 0.273 | 0.318 | 0.208 | 0.188 | 0.227 | 0.035 | 0.025 | 0.045 |
| 2007 | 0.314 | 0.287 | 0.341 | 0.218 | 0.196 | 0.240 | 0.043 | 0.030 | 0.055 |
| 2008 | 0.320 | 0.293 | 0.347 | 0.242 | 0.216 | 0.267 | 0.043 | 0.029 | 0.056 |
| 2009 | 0.309 | 0.279 | 0.339 | 0.211 | 0.187 | 0.234 | 0.040 | 0.027 | 0.053 |
| 2010 | 0.280 | 0.258 | 0.301 | 0.185 | 0.167 | 0.204 | 0.029 | 0.020 | 0.038 |
| 2011 | 0.278 | 0.256 | 0.300 | 0.186 | 0.167 | 0.205 | 0.037 | 0.028 | 0.046 |
| 2012 | 0.288 | 0.260 | 0.315 | 0.191 | 0.167 | 0.214 | 0.021 | 0.014 | 0.028 |
| Year | $\phi = 1$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.307 | 0.286 | 0.327 | 0.104 | 0.095 | 0.114 | 0.011 | 0.008 | 0.014 |
| 1992 | 0.299 | 0.278 | 0.320 | 0.099 | 0.091 | 0.107 | 0.011 | 0.008 | 0.014 |
| 1993 | 0.296 | 0.277 | 0.316 | 0.100 | 0.091 | 0.109 | 0.011 | 0.008 | 0.015 |
| 1994 | 0.289 | 0.269 | 0.309 | 0.098 | 0.090 | 0.106 | 0.010 | 0.007 | 0.013 |
| 1995 | 0.277 | 0.258 | 0.295 | 0.094 | 0.085 | 0.102 | 0.010 | 0.007 | 0.012 |
| 1996 | 0.264 | 0.245 | 0.283 | 0.085 | 0.076 | 0.094 | 0.007 | 0.005 | 0.010 |
| 1997 | 0.287 | 0.266 | 0.309 | 0.090 | 0.083 | 0.097 | 0.007 | 0.005 | 0.008 |
| 1998 | 0.293 | 0.273 | 0.313 | 0.096 | 0.087 | 0.105 | 0.009 | 0.006 | 0.011 |
| 1999 | 0.271 | 0.257 | 0.285 | 0.086 | 0.080 | 0.093 | 0.009 | 0.007 | 0.011 |
| 2000 | 0.278 | 0.263 | 0.293 | 0.089 | 0.082 | 0.096 | 0.009 | 0.007 | 0.011 |
| 2001 | 0.255 | 0.239 | 0.272 | 0.086 | 0.078 | 0.094 | 0.009 | 0.007 | 0.011 |
| 2002 | 0.281 | 0.262 | 0.300 | 0.098 | 0.089 | 0.106 | 0.008 | 0.006 | 0.010 |
| 2003 | 0.250 | 0.233 | 0.268 | 0.085 | 0.077 | 0.092 | 0.008 | 0.006 | 0.010 |
| 2004 | 0.253 | 0.234 | 0.271 | 0.084 | 0.075 | 0.093 | 0.009 | 0.006 | 0.011 |
| 2005 | 0.238 | 0.221 | 0.256 | 0.079 | 0.072 | 0.087 | 0.009 | 0.006 | 0.012 |
| 2006 | 0.197 | 0.181 | 0.213 | 0.063 | 0.056 | 0.071 | 0.007 | 0.004 | 0.009 |
| 2007 | 0.205 | 0.185 | 0.225 | 0.069 | 0.062 | 0.077 | 0.008 | 0.005 | 0.011 |
| 2008 | 0.230 | 0.206 | 0.254 | 0.077 | 0.067 | 0.088 | 0.008 | 0.005 | 0.011 |
| 2009 | 0.201 | 0.179 | 0.223 | 0.068 | 0.059 | 0.077 | 0.008 | 0.005 | 0.012 |
| 2010 | 0.184 | 0.168 | 0.201 | 0.060 | 0.052 | 0.067 | 0.005 | 0.004 | 0.007 |
| 2011 | 0.180 | 0.164 | 0.197 | 0.063 | 0.055 | 0.070 | 0.008 | 0.005 | 0.011 |
| 2012 | 0.187 | 0.166 | 0.207 | 0.058 | 0.050 | 0.067 | 0.003 | 0.002 | 0.005 |
| Year | $\phi = 2$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.268 | 0.249 | 0.287 | 0.045 | 0.039 | 0.050 | 0.004 | 0.002 | 0.005 |
| 1992 | 0.261 | 0.242 | 0.280 | 0.042 | 0.038 | 0.047 | 0.004 | 0.002 | 0.006 |
| 1993 | 0.259 | 0.241 | 0.276 | 0.043 | 0.038 | 0.048 | 0.004 | 0.003 | 0.006 |
| 1994 | 0.250 | 0.231 | 0.268 | 0.042 | 0.037 | 0.046 | 0.004 | 0.002 | 0.005 |
| 1995 | 0.240 | 0.223 | 0.257 | 0.040 | 0.035 | 0.045 | 0.003 | 0.002 | 0.004 |
| 1996 | 0.229 | 0.211 | 0.246 | 0.035 | 0.030 | 0.039 | 0.002 | 0.001 | 0.004 |
| 1997 | 0.249 | 0.230 | 0.269 | 0.035 | 0.032 | 0.038 | 0.002 | 0.001 | 0.003 |
| 1998 | 0.256 | 0.237 | 0.274 | 0.040 | 0.035 | 0.044 | 0.003 | 0.002 | 0.004 |
| 1999 | 0.233 | 0.221 | 0.246 | 0.036 | 0.032 | 0.039 | 0.003 | 0.002 | 0.004 |
| 2000 | 0.241 | 0.227 | 0.254 | 0.037 | 0.033 | 0.041 | 0.003 | 0.002 | 0.004 |
| 2001 | 0.221 | 0.206 | 0.236 | 0.036 | 0.032 | 0.040 | 0.003 | 0.002 | 0.004 |
| 2002 | 0.243 | 0.226 | 0.260 | 0.042 | 0.037 | 0.047 | 0.002 | 0.002 | 0.003 |
| 2003 | 0.214 | 0.199 | 0.230 | 0.036 | 0.032 | 0.040 | 0.002 | 0.001 | 0.003 |
| 2004 | 0.217 | 0.200 | 0.234 | 0.036 | 0.031 | 0.041 | 0.003 | 0.002 | 0.004 |
| 2005 | 0.202 | 0.186 | 0.219 | 0.034 | 0.029 | 0.038 | 0.003 | 0.001 | 0.004 |
| 2006 | 0.168 | 0.154 | 0.183 | 0.027 | 0.022 | 0.031 | 0.002 | 0.001 | 0.003 |
| 2007 | 0.175 | 0.157 | 0.193 | 0.031 | 0.026 | 0.035 | 0.003 | 0.002 | 0.004 |
| 2008 | 0.199 | 0.177 | 0.221 | 0.033 | 0.027 | 0.039 | 0.002 | 0.001 | 0.004 |
| 2009 | 0.172 | 0.152 | 0.192 | 0.029 | 0.024 | 0.035 | 0.003 | 0.001 | 0.004 |
| 2010 | 0.157 | 0.142 | 0.173 | 0.025 | 0.022 | 0.029 | 0.002 | 0.001 | 0.002 |
| 2011 | 0.154 | 0.139 | 0.169 | 0.028 | 0.024 | 0.033 | 0.003 | 0.002 | 0.004 |
| 2012 | 0.159 | 0.140 | 0.178 | 0.024 | 0.020 | 0.028 | 0.001 | 0.000 | 0.001 |

Source: SOEP (v30), own calculations.

Table A.11: **Multidimensional poverty** (weighting scheme: $w_{inc} = \frac{3}{4}$, $w_{educ} = \frac{1}{12}$, $w_{time} = \frac{1}{12}$, and $w_{np-time} = \frac{1}{12}$)

| Year | $\phi = 0$ | | | | | | | | |
|------|--------------|-------|----------|-------------|-------|----------|-------------|-------|----------|
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.391 | 0.347 | 0.393 | 0.163 | 0.145 | 0.180 | 0.047 | 0.036 | 0.059 |
| 1992 | 0.382 | 0.336 | 0.385 | 0.164 | 0.146 | 0.183 | 0.039 | 0.032 | 0.046 |
| 1993 | 0.393 | 0.346 | 0.391 | 0.178 | 0.158 | 0.198 | 0.045 | 0.037 | 0.054 |
| 1994 | 0.388 | 0.357 | 0.400 | 0.177 | 0.161 | 0.193 | 0.048 | 0.038 | 0.058 |
| 1995 | 0.367 | 0.344 | 0.387 | 0.179 | 0.159 | 0.199 | 0.046 | 0.037 | 0.055 |
| 1996 | 0.357 | 0.314 | 0.363 | 0.162 | 0.143 | 0.181 | 0.032 | 0.025 | 0.039 |
| 1997 | 0.383 | 0.339 | 0.386 | 0.159 | 0.143 | 0.175 | 0.025 | 0.019 | 0.032 |
| 1998 | 0.388 | 0.344 | 0.390 | 0.177 | 0.157 | 0.197 | 0.037 | 0.027 | 0.047 |
| 1999 | 0.373 | 0.334 | 0.368 | 0.170 | 0.156 | 0.183 | 0.043 | 0.036 | 0.049 |
| 2000 | 0.380 | 0.346 | 0.382 | 0.171 | 0.155 | 0.187 | 0.048 | 0.039 | 0.057 |
| 2001 | 0.362 | 0.320 | 0.358 | 0.171 | 0.154 | 0.188 | 0.041 | 0.032 | 0.050 |
| 2002 | 0.384 | 0.347 | 0.392 | 0.190 | 0.171 | 0.208 | 0.050 | 0.040 | 0.059 |
| 2003 | 0.355 | 0.320 | 0.362 | 0.192 | 0.173 | 0.211 | 0.041 | 0.032 | 0.050 |
| 2004 | 0.359 | 0.337 | 0.380 | 0.183 | 0.163 | 0.203 | 0.046 | 0.035 | 0.056 |
| 2005 | 0.348 | 0.318 | 0.360 | 0.194 | 0.176 | 0.212 | 0.052 | 0.042 | 0.061 |
| 2006 | 0.295 | 0.272 | 0.316 | 0.143 | 0.126 | 0.161 | 0.040 | 0.029 | 0.050 |
| 2007 | 0.314 | 0.274 | 0.326 | 0.168 | 0.150 | 0.186 | 0.044 | 0.032 | 0.056 |
| 2008 | 0.320 | 0.287 | 0.339 | 0.161 | 0.141 | 0.182 | 0.042 | 0.029 | 0.054 |
| 2009 | 0.309 | 0.265 | 0.319 | 0.158 | 0.138 | 0.177 | 0.048 | 0.034 | 0.061 |
| 2010 | 0.280 | 0.258 | 0.302 | 0.146 | 0.129 | 0.164 | 0.033 | 0.025 | 0.040 |
| 2011 | 0.278 | 0.248 | 0.290 | 0.156 | 0.139 | 0.174 | 0.041 | 0.031 | 0.051 |
| 2012 | 0.288 | 0.263 | 0.316 | 0.145 | 0.125 | 0.165 | 0.026 | 0.018 | 0.033 |
| Year | $\phi = 1$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.261 | 0.243 | 0.279 | 0.040 | 0.033 | 0.046 | 0.008 | 0.005 | 0.010 |
| 1992 | 0.255 | 0.237 | 0.273 | 0.039 | 0.033 | 0.045 | 0.008 | 0.005 | 0.010 |
| 1993 | 0.254 | 0.237 | 0.271 | 0.039 | 0.034 | 0.044 | 0.008 | 0.006 | 0.010 |
| 1994 | 0.248 | 0.232 | 0.265 | 0.044 | 0.038 | 0.050 | 0.008 | 0.006 | 0.010 |
| 1995 | 0.239 | 0.223 | 0.255 | 0.042 | 0.036 | 0.048 | 0.007 | 0.005 | 0.009 |
| 1996 | 0.227 | 0.210 | 0.244 | 0.035 | 0.030 | 0.040 | 0.005 | 0.003 | 0.007 |
| 1997 | 0.244 | 0.226 | 0.262 | 0.031 | 0.027 | 0.035 | 0.004 | 0.003 | 0.006 |
| 1998 | 0.253 | 0.235 | 0.270 | 0.038 | 0.032 | 0.043 | 0.005 | 0.004 | 0.007 |
| 1999 | 0.233 | 0.220 | 0.245 | 0.036 | 0.033 | 0.040 | 0.007 | 0.006 | 0.009 |
| 2000 | 0.242 | 0.229 | 0.255 | 0.040 | 0.035 | 0.045 | 0.008 | 0.006 | 0.010 |
| 2001 | 0.222 | 0.208 | 0.237 | 0.036 | 0.032 | 0.041 | 0.007 | 0.006 | 0.009 |
| 2002 | 0.245 | 0.229 | 0.262 | 0.047 | 0.041 | 0.053 | 0.009 | 0.007 | 0.011 |
| 2003 | 0.220 | 0.205 | 0.235 | 0.043 | 0.037 | 0.049 | 0.007 | 0.005 | 0.009 |
| 2004 | 0.222 | 0.206 | 0.238 | 0.041 | 0.035 | 0.046 | 0.008 | 0.005 | 0.010 |
| 2005 | 0.210 | 0.195 | 0.226 | 0.042 | 0.037 | 0.047 | 0.008 | 0.006 | 0.011 |
| 2006 | 0.173 | 0.159 | 0.187 | 0.032 | 0.027 | 0.037 | 0.006 | 0.004 | 0.008 |
| 2007 | 0.180 | 0.163 | 0.198 | 0.035 | 0.030 | 0.040 | 0.007 | 0.004 | 0.010 |
| 2008 | 0.201 | 0.180 | 0.221 | 0.036 | 0.029 | 0.043 | 0.006 | 0.004 | 0.009 |
| 2009 | 0.178 | 0.159 | 0.197 | 0.034 | 0.028 | 0.041 | 0.008 | 0.005 | 0.011 |
| 2010 | 0.164 | 0.149 | 0.178 | 0.032 | 0.027 | 0.036 | 0.005 | 0.003 | 0.006 |
| 2011 | 0.160 | 0.146 | 0.174 | 0.034 | 0.029 | 0.039 | 0.006 | 0.004 | 0.008 |
| 2012 | 0.166 | 0.148 | 0.184 | 0.026 | 0.022 | 0.030 | 0.003 | 0.002 | 0.004 |
| Year | $\phi = 2$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.197 | 0.183 | 0.211 | 0.016 | 0.011 | 0.020 | 0.002 | 0.001 | 0.003 |
| 1992 | 0.193 | 0.179 | 0.207 | 0.014 | 0.011 | 0.017 | 0.003 | 0.001 | 0.004 |
| 1993 | 0.192 | 0.178 | 0.205 | 0.014 | 0.011 | 0.016 | 0.002 | 0.001 | 0.003 |
| 1994 | 0.184 | 0.171 | 0.197 | 0.017 | 0.014 | 0.021 | 0.002 | 0.002 | 0.003 |
| 1995 | 0.177 | 0.165 | 0.189 | 0.015 | 0.012 | 0.019 | 0.002 | 0.001 | 0.003 |
| 1996 | 0.169 | 0.157 | 0.182 | 0.012 | 0.010 | 0.015 | 0.002 | 0.001 | 0.003 |
| 1997 | 0.183 | 0.169 | 0.196 | 0.010 | 0.008 | 0.012 | 0.001 | 0.001 | 0.002 |
| 1998 | 0.191 | 0.177 | 0.205 | 0.012 | 0.010 | 0.014 | 0.001 | 0.001 | 0.002 |
| 1999 | 0.174 | 0.165 | 0.184 | 0.012 | 0.011 | 0.014 | 0.002 | 0.002 | 0.003 |
| 2000 | 0.183 | 0.173 | 0.193 | 0.015 | 0.013 | 0.018 | 0.002 | 0.002 | 0.003 |
| 2001 | 0.167 | 0.156 | 0.179 | 0.013 | 0.011 | 0.015 | 0.002 | 0.001 | 0.003 |
| 2002 | 0.186 | 0.173 | 0.199 | 0.019 | 0.016 | 0.022 | 0.002 | 0.002 | 0.003 |
| 2003 | 0.165 | 0.153 | 0.176 | 0.016 | 0.012 | 0.019 | 0.002 | 0.001 | 0.003 |
| 2004 | 0.166 | 0.153 | 0.179 | 0.015 | 0.012 | 0.017 | 0.002 | 0.001 | 0.003 |
| 2005 | 0.155 | 0.143 | 0.167 | 0.015 | 0.012 | 0.017 | 0.002 | 0.001 | 0.003 |
| 2006 | 0.129 | 0.118 | 0.140 | 0.011 | 0.009 | 0.013 | 0.001 | 0.001 | 0.002 |
| 2007 | 0.134 | 0.120 | 0.148 | 0.012 | 0.009 | 0.015 | 0.002 | 0.001 | 0.003 |
| 2008 | 0.151 | 0.135 | 0.168 | 0.013 | 0.009 | 0.016 | 0.002 | 0.001 | 0.003 |
| 2009 | 0.132 | 0.117 | 0.148 | 0.012 | 0.009 | 0.015 | 0.002 | 0.001 | 0.003 |
| 2010 | 0.122 | 0.110 | 0.133 | 0.011 | 0.009 | 0.013 | 0.001 | 0.001 | 0.002 |
| 2011 | 0.119 | 0.107 | 0.130 | 0.011 | 0.010 | 0.013 | 0.002 | 0.001 | 0.002 |
| 2012 | 0.123 | 0.109 | 0.137 | 0.008 | 0.007 | 0.010 | 0.001 | 0.000 | 0.001 |

Source: SOEP (v30), own calculations.

Table A.12: **Multidimensional poverty** (weighting scheme: $w_{inc} = \frac{9}{10}$, $w_{educ} = \frac{1}{30}$, $w_{time} = \frac{1}{30}$, and $w_{np-time} = \frac{1}{30}$)

| Year | $\phi = 0$ | | | | | | | | |
|------|--------------|-------|----------|-------------|-------|----------|-------------|-------|----------|
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.368 | 0.344 | 0.391 | 0.098 | 0.083 | 0.112 | 0.048 | 0.036 | 0.060 |
| 1992 | 0.361 | 0.337 | 0.385 | 0.098 | 0.081 | 0.115 | 0.046 | 0.036 | 0.056 |
| 1993 | 0.365 | 0.343 | 0.387 | 0.112 | 0.097 | 0.128 | 0.055 | 0.045 | 0.065 |
| 1994 | 0.377 | 0.356 | 0.399 | 0.139 | 0.125 | 0.154 | 0.060 | 0.048 | 0.071 |
| 1995 | 0.362 | 0.341 | 0.383 | 0.131 | 0.113 | 0.148 | 0.065 | 0.053 | 0.078 |
| 1996 | 0.340 | 0.315 | 0.365 | 0.104 | 0.091 | 0.118 | 0.050 | 0.041 | 0.059 |
| 1997 | 0.361 | 0.338 | 0.385 | 0.099 | 0.084 | 0.114 | 0.037 | 0.029 | 0.044 |
| 1998 | 0.373 | 0.351 | 0.395 | 0.114 | 0.099 | 0.128 | 0.048 | 0.038 | 0.057 |
| 1999 | 0.347 | 0.331 | 0.364 | 0.121 | 0.111 | 0.132 | 0.059 | 0.051 | 0.067 |
| 2000 | 0.360 | 0.342 | 0.379 | 0.126 | 0.112 | 0.139 | 0.062 | 0.052 | 0.072 |
| 2001 | 0.339 | 0.321 | 0.357 | 0.121 | 0.107 | 0.134 | 0.063 | 0.053 | 0.074 |
| 2002 | 0.365 | 0.342 | 0.387 | 0.147 | 0.131 | 0.162 | 0.081 | 0.068 | 0.093 |
| 2003 | 0.344 | 0.323 | 0.365 | 0.142 | 0.125 | 0.160 | 0.076 | 0.062 | 0.089 |
| 2004 | 0.358 | 0.337 | 0.379 | 0.147 | 0.131 | 0.163 | 0.073 | 0.060 | 0.085 |
| 2005 | 0.339 | 0.318 | 0.359 | 0.152 | 0.136 | 0.169 | 0.080 | 0.068 | 0.093 |
| 2006 | 0.294 | 0.271 | 0.316 | 0.135 | 0.119 | 0.152 | 0.057 | 0.045 | 0.069 |
| 2007 | 0.301 | 0.275 | 0.327 | 0.137 | 0.120 | 0.154 | 0.054 | 0.042 | 0.066 |
| 2008 | 0.315 | 0.288 | 0.341 | 0.127 | 0.109 | 0.145 | 0.054 | 0.041 | 0.068 |
| 2009 | 0.294 | 0.267 | 0.322 | 0.132 | 0.112 | 0.151 | 0.071 | 0.055 | 0.086 |
| 2010 | 0.285 | 0.263 | 0.306 | 0.129 | 0.114 | 0.144 | 0.057 | 0.047 | 0.067 |
| 2011 | 0.277 | 0.257 | 0.297 | 0.135 | 0.119 | 0.150 | 0.062 | 0.052 | 0.073 |
| 2012 | 0.294 | 0.268 | 0.321 | 0.128 | 0.109 | 0.148 | 0.043 | 0.034 | 0.052 |
| Year | $\phi = 1$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.169 | 0.157 | 0.180 | 0.025 | 0.018 | 0.032 | 0.009 | 0.006 | 0.012 |
| 1992 | 0.167 | 0.154 | 0.179 | 0.025 | 0.018 | 0.031 | 0.008 | 0.006 | 0.011 |
| 1993 | 0.167 | 0.156 | 0.178 | 0.025 | 0.021 | 0.028 | 0.008 | 0.006 | 0.010 |
| 1994 | 0.164 | 0.154 | 0.175 | 0.033 | 0.028 | 0.038 | 0.011 | 0.008 | 0.013 |
| 1995 | 0.158 | 0.148 | 0.168 | 0.030 | 0.025 | 0.036 | 0.011 | 0.008 | 0.013 |
| 1996 | 0.150 | 0.139 | 0.161 | 0.026 | 0.021 | 0.030 | 0.007 | 0.005 | 0.010 |
| 1997 | 0.158 | 0.147 | 0.169 | 0.020 | 0.016 | 0.023 | 0.005 | 0.004 | 0.007 |
| 1998 | 0.169 | 0.157 | 0.181 | 0.025 | 0.020 | 0.029 | 0.006 | 0.005 | 0.008 |
| 1999 | 0.156 | 0.148 | 0.165 | 0.026 | 0.023 | 0.029 | 0.010 | 0.008 | 0.011 |
| 2000 | 0.166 | 0.157 | 0.175 | 0.031 | 0.026 | 0.036 | 0.012 | 0.009 | 0.015 |
| 2001 | 0.152 | 0.143 | 0.162 | 0.027 | 0.024 | 0.031 | 0.011 | 0.009 | 0.012 |
| 2002 | 0.172 | 0.160 | 0.184 | 0.038 | 0.032 | 0.043 | 0.015 | 0.012 | 0.018 |
| 2003 | 0.156 | 0.145 | 0.167 | 0.035 | 0.029 | 0.041 | 0.012 | 0.009 | 0.015 |
| 2004 | 0.157 | 0.145 | 0.168 | 0.034 | 0.029 | 0.038 | 0.012 | 0.010 | 0.014 |
| 2005 | 0.149 | 0.139 | 0.160 | 0.035 | 0.031 | 0.040 | 0.012 | 0.010 | 0.015 |
| 2006 | 0.123 | 0.114 | 0.133 | 0.027 | 0.023 | 0.031 | 0.009 | 0.006 | 0.011 |
| 2007 | 0.128 | 0.116 | 0.140 | 0.028 | 0.023 | 0.032 | 0.009 | 0.006 | 0.012 |
| 2008 | 0.139 | 0.125 | 0.154 | 0.026 | 0.021 | 0.032 | 0.009 | 0.006 | 0.012 |
| 2009 | 0.127 | 0.114 | 0.140 | 0.029 | 0.024 | 0.034 | 0.012 | 0.009 | 0.015 |
| 2010 | 0.118 | 0.108 | 0.128 | 0.028 | 0.024 | 0.032 | 0.008 | 0.006 | 0.010 |
| 2011 | 0.116 | 0.106 | 0.126 | 0.027 | 0.023 | 0.031 | 0.008 | 0.006 | 0.010 |
| 2012 | 0.120 | 0.108 | 0.132 | 0.024 | 0.020 | 0.027 | 0.006 | 0.005 | 0.008 |
| Year | $\phi = 2$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.084 | 0.077 | 0.091 | 0.011 | 0.007 | 0.015 | 0.003 | 0.001 | 0.004 |
| 1992 | 0.083 | 0.076 | 0.090 | 0.010 | 0.007 | 0.013 | 0.003 | 0.002 | 0.004 |
| 1993 | 0.083 | 0.077 | 0.089 | 0.009 | 0.007 | 0.011 | 0.002 | 0.001 | 0.003 |
| 1994 | 0.081 | 0.075 | 0.087 | 0.014 | 0.011 | 0.017 | 0.003 | 0.002 | 0.004 |
| 1995 | 0.077 | 0.071 | 0.083 | 0.012 | 0.009 | 0.016 | 0.003 | 0.002 | 0.004 |
| 1996 | 0.073 | 0.068 | 0.079 | 0.010 | 0.007 | 0.012 | 0.002 | 0.001 | 0.003 |
| 1997 | 0.076 | 0.070 | 0.082 | 0.006 | 0.005 | 0.008 | 0.001 | 0.001 | 0.002 |
| 1998 | 0.085 | 0.078 | 0.092 | 0.008 | 0.006 | 0.010 | 0.001 | 0.001 | 0.002 |
| 1999 | 0.078 | 0.074 | 0.083 | 0.009 | 0.008 | 0.011 | 0.003 | 0.002 | 0.003 |
| 2000 | 0.085 | 0.080 | 0.091 | 0.013 | 0.010 | 0.015 | 0.004 | 0.003 | 0.005 |
| 2001 | 0.077 | 0.072 | 0.083 | 0.010 | 0.008 | 0.011 | 0.003 | 0.002 | 0.004 |
| 2002 | 0.091 | 0.084 | 0.097 | 0.016 | 0.013 | 0.019 | 0.005 | 0.003 | 0.006 |
| 2003 | 0.081 | 0.074 | 0.087 | 0.014 | 0.010 | 0.017 | 0.003 | 0.002 | 0.005 |
| 2004 | 0.080 | 0.074 | 0.087 | 0.012 | 0.010 | 0.014 | 0.003 | 0.002 | 0.004 |
| 2005 | 0.075 | 0.069 | 0.081 | 0.012 | 0.010 | 0.015 | 0.003 | 0.002 | 0.004 |
| 2006 | 0.062 | 0.057 | 0.068 | 0.009 | 0.007 | 0.011 | 0.002 | 0.001 | 0.003 |
| 2007 | 0.065 | 0.059 | 0.072 | 0.009 | 0.007 | 0.012 | 0.003 | 0.001 | 0.004 |
| 2008 | 0.072 | 0.064 | 0.080 | 0.009 | 0.007 | 0.012 | 0.002 | 0.001 | 0.003 |
| 2009 | 0.065 | 0.057 | 0.072 | 0.010 | 0.007 | 0.012 | 0.003 | 0.002 | 0.004 |
| 2010 | 0.061 | 0.055 | 0.067 | 0.009 | 0.007 | 0.011 | 0.002 | 0.001 | 0.003 |
| 2011 | 0.059 | 0.054 | 0.065 | 0.009 | 0.007 | 0.010 | 0.002 | 0.001 | 0.003 |
| 2012 | 0.061 | 0.054 | 0.068 | 0.007 | 0.006 | 0.009 | 0.001 | 0.001 | 0.002 |

Source: SOEP (v30), own calculations.

Table A.13: **Multidimensional poverty** (weighting scheme: $w_{inc} = \frac{1}{3}$, $w_{educ} = \frac{1}{3}$, $w_{time} = \frac{1}{3}$, and $w_{np-time} = 0$)

| Year | $\phi = 0$ | | | | | | | | |
|------|--------------|-------|----------|-------------|-------|----------|-------------|-------|----------|
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.182 | 0.166 | 0.198 | 0.097 | 0.087 | 0.107 | 0.054 | 0.045 | 0.062 |
| 1992 | 0.181 | 0.162 | 0.200 | 0.114 | 0.099 | 0.128 | 0.054 | 0.045 | 0.064 |
| 1993 | 0.183 | 0.164 | 0.201 | 0.112 | 0.097 | 0.128 | 0.064 | 0.052 | 0.076 |
| 1994 | 0.186 | 0.166 | 0.205 | 0.107 | 0.093 | 0.121 | 0.057 | 0.048 | 0.066 |
| 1995 | 0.170 | 0.151 | 0.188 | 0.101 | 0.086 | 0.116 | 0.052 | 0.041 | 0.063 |
| 1996 | 0.182 | 0.162 | 0.202 | 0.108 | 0.093 | 0.123 | 0.049 | 0.039 | 0.059 |
| 1997 | 0.206 | 0.187 | 0.224 | 0.114 | 0.100 | 0.127 | 0.051 | 0.041 | 0.061 |
| 1998 | 0.196 | 0.173 | 0.218 | 0.124 | 0.107 | 0.141 | 0.049 | 0.039 | 0.059 |
| 1999 | 0.216 | 0.202 | 0.231 | 0.128 | 0.116 | 0.140 | 0.059 | 0.051 | 0.068 |
| 2000 | 0.205 | 0.191 | 0.220 | 0.137 | 0.125 | 0.150 | 0.058 | 0.050 | 0.067 |
| 2001 | 0.208 | 0.192 | 0.223 | 0.126 | 0.113 | 0.139 | 0.055 | 0.047 | 0.063 |
| 2002 | 0.208 | 0.191 | 0.226 | 0.135 | 0.121 | 0.149 | 0.069 | 0.059 | 0.079 |
| 2003 | 0.200 | 0.181 | 0.219 | 0.128 | 0.114 | 0.142 | 0.067 | 0.055 | 0.079 |
| 2004 | 0.208 | 0.187 | 0.230 | 0.131 | 0.112 | 0.149 | 0.066 | 0.054 | 0.078 |
| 2005 | 0.201 | 0.183 | 0.219 | 0.128 | 0.112 | 0.144 | 0.068 | 0.055 | 0.081 |
| 2006 | 0.184 | 0.166 | 0.203 | 0.117 | 0.102 | 0.133 | 0.063 | 0.050 | 0.077 |
| 2007 | 0.213 | 0.190 | 0.235 | 0.136 | 0.117 | 0.155 | 0.069 | 0.054 | 0.085 |
| 2008 | 0.192 | 0.172 | 0.212 | 0.124 | 0.106 | 0.143 | 0.067 | 0.053 | 0.081 |
| 2009 | 0.192 | 0.169 | 0.216 | 0.115 | 0.096 | 0.133 | 0.072 | 0.057 | 0.087 |
| 2010 | 0.175 | 0.159 | 0.192 | 0.111 | 0.096 | 0.126 | 0.056 | 0.045 | 0.067 |
| 2011 | 0.185 | 0.166 | 0.204 | 0.119 | 0.103 | 0.135 | 0.067 | 0.054 | 0.080 |
| 2012 | 0.196 | 0.176 | 0.216 | 0.107 | 0.089 | 0.124 | 0.049 | 0.038 | 0.060 |
| Year | $\phi = 1$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.070 | 0.061 | 0.078 | 0.034 | 0.028 | 0.039 | 0.014 | 0.011 | 0.017 |
| 1992 | 0.080 | 0.069 | 0.092 | 0.042 | 0.035 | 0.050 | 0.016 | 0.013 | 0.020 |
| 1993 | 0.073 | 0.063 | 0.083 | 0.039 | 0.032 | 0.046 | 0.017 | 0.013 | 0.021 |
| 1994 | 0.073 | 0.064 | 0.082 | 0.037 | 0.031 | 0.044 | 0.016 | 0.013 | 0.020 |
| 1995 | 0.063 | 0.054 | 0.073 | 0.031 | 0.025 | 0.038 | 0.016 | 0.011 | 0.020 |
| 1996 | 0.064 | 0.056 | 0.072 | 0.032 | 0.026 | 0.037 | 0.013 | 0.009 | 0.017 |
| 1997 | 0.082 | 0.072 | 0.092 | 0.043 | 0.036 | 0.050 | 0.013 | 0.010 | 0.016 |
| 1998 | 0.083 | 0.072 | 0.095 | 0.042 | 0.035 | 0.050 | 0.014 | 0.009 | 0.018 |
| 1999 | 0.082 | 0.075 | 0.089 | 0.041 | 0.036 | 0.046 | 0.016 | 0.013 | 0.018 |
| 2000 | 0.083 | 0.076 | 0.091 | 0.043 | 0.038 | 0.048 | 0.015 | 0.013 | 0.017 |
| 2001 | 0.071 | 0.065 | 0.078 | 0.035 | 0.031 | 0.039 | 0.014 | 0.011 | 0.017 |
| 2002 | 0.081 | 0.073 | 0.089 | 0.043 | 0.037 | 0.049 | 0.016 | 0.012 | 0.019 |
| 2003 | 0.071 | 0.062 | 0.080 | 0.038 | 0.032 | 0.045 | 0.017 | 0.013 | 0.021 |
| 2004 | 0.075 | 0.064 | 0.087 | 0.042 | 0.034 | 0.050 | 0.017 | 0.012 | 0.021 |
| 2005 | 0.072 | 0.062 | 0.082 | 0.038 | 0.031 | 0.046 | 0.016 | 0.012 | 0.020 |
| 2006 | 0.066 | 0.057 | 0.075 | 0.035 | 0.029 | 0.041 | 0.014 | 0.010 | 0.018 |
| 2007 | 0.076 | 0.065 | 0.087 | 0.041 | 0.034 | 0.048 | 0.016 | 0.011 | 0.020 |
| 2008 | 0.078 | 0.066 | 0.090 | 0.043 | 0.035 | 0.052 | 0.015 | 0.011 | 0.019 |
| 2009 | 0.072 | 0.059 | 0.086 | 0.038 | 0.028 | 0.048 | 0.017 | 0.012 | 0.022 |
| 2010 | 0.066 | 0.058 | 0.074 | 0.033 | 0.028 | 0.039 | 0.011 | 0.009 | 0.014 |
| 2011 | 0.068 | 0.058 | 0.078 | 0.037 | 0.029 | 0.044 | 0.017 | 0.013 | 0.021 |
| 2012 | 0.077 | 0.065 | 0.090 | 0.038 | 0.030 | 0.047 | 0.014 | 0.009 | 0.018 |
| Year | $\phi = 2$ | | | | | | | | |
| | $\beta = -1$ | | | $\beta = 0$ | | | $\beta = 1$ | | |
| | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval | Coeff. | Conf. | Interval |
| 1991 | 0.045 | 0.038 | 0.052 | 0.020 | 0.016 | 0.024 | 0.007 | 0.005 | 0.009 |
| 1992 | 0.056 | 0.047 | 0.066 | 0.026 | 0.021 | 0.031 | 0.008 | 0.006 | 0.010 |
| 1993 | 0.048 | 0.040 | 0.057 | 0.024 | 0.018 | 0.029 | 0.007 | 0.005 | 0.009 |
| 1994 | 0.048 | 0.040 | 0.055 | 0.022 | 0.018 | 0.027 | 0.008 | 0.005 | 0.010 |
| 1995 | 0.039 | 0.031 | 0.047 | 0.018 | 0.014 | 0.023 | 0.007 | 0.005 | 0.009 |
| 1996 | 0.040 | 0.033 | 0.046 | 0.017 | 0.013 | 0.021 | 0.006 | 0.004 | 0.008 |
| 1997 | 0.055 | 0.047 | 0.064 | 0.025 | 0.020 | 0.029 | 0.006 | 0.004 | 0.007 |
| 1998 | 0.055 | 0.046 | 0.064 | 0.024 | 0.019 | 0.029 | 0.006 | 0.003 | 0.009 |
| 1999 | 0.051 | 0.045 | 0.057 | 0.023 | 0.019 | 0.026 | 0.007 | 0.005 | 0.008 |
| 2000 | 0.055 | 0.049 | 0.062 | 0.024 | 0.020 | 0.027 | 0.006 | 0.005 | 0.008 |
| 2001 | 0.043 | 0.038 | 0.048 | 0.019 | 0.016 | 0.022 | 0.006 | 0.004 | 0.008 |
| 2002 | 0.052 | 0.045 | 0.059 | 0.024 | 0.019 | 0.028 | 0.007 | 0.004 | 0.009 |
| 2003 | 0.044 | 0.037 | 0.052 | 0.021 | 0.016 | 0.026 | 0.007 | 0.005 | 0.009 |
| 2004 | 0.049 | 0.039 | 0.058 | 0.023 | 0.017 | 0.029 | 0.006 | 0.004 | 0.009 |
| 2005 | 0.045 | 0.036 | 0.054 | 0.020 | 0.015 | 0.026 | 0.006 | 0.004 | 0.009 |
| 2006 | 0.042 | 0.035 | 0.050 | 0.019 | 0.014 | 0.023 | 0.005 | 0.003 | 0.008 |
| 2007 | 0.049 | 0.039 | 0.058 | 0.022 | 0.017 | 0.027 | 0.006 | 0.003 | 0.008 |
| 2008 | 0.054 | 0.044 | 0.065 | 0.025 | 0.019 | 0.031 | 0.006 | 0.004 | 0.008 |
| 2009 | 0.047 | 0.035 | 0.059 | 0.022 | 0.015 | 0.029 | 0.006 | 0.003 | 0.009 |
| 2010 | 0.043 | 0.036 | 0.050 | 0.018 | 0.015 | 0.022 | 0.004 | 0.003 | 0.005 |
| 2011 | 0.045 | 0.036 | 0.054 | 0.021 | 0.016 | 0.026 | 0.007 | 0.005 | 0.009 |
| 2012 | 0.053 | 0.042 | 0.065 | 0.022 | 0.016 | 0.029 | 0.007 | 0.003 | 0.010 |

Source: SOEP (v30), own calculations.

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