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The Impact of Private and Public Childcare Provision on the Distribution of Children's Incomes in Germany

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Abstract

This paper investigates the impact of extending disposable cash income of children by the monetary value of private and public childcare provision on economic inequality in Germany between 2009 and 2012. It takes account of the multidimensionality of children's well-being and access to economic resources. Combining survey data from the Socio-Economic Panel (SOEP) and *Familien in Deutschland* (FiD) with administrative data from the German Federal Statistical Office, extended income inequality is found to be significantly lower than cash income inequality across all years. This difference is strongly influenced by the expansion of public childcare provision, which profits children living with single parents most, and gives additional evidence for its equalizing potential as a policy instrument.

JEL Classification: D13 D31 H52 I24

Keywords: In-kind Benefits, Opportunity Costs, Non-cash Incomes,
Extended Income, Economic Inequality

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1 Introduction

Improving the work-life-balance of parents with dependent children has been one of the major goals in German social policy during the past decade. One cornerstone of this policy has been the massive expansion of public childcare provision, including both early childhood care as well as all-day school care, to enhance female labour market participation ([Schober and Stahl, 2014](#)). Children need care, especially the very young, and parents often have to choose between staying at home or working in the labour market falling back to public childcare. This decision is largely driven by the composition and structure of families and their feasible economic resources. One of the most disadvantaged groups in terms of disposable cash income are single parents and their respective children who are most likely to belong to the bottom in the distribution of disposable cash income ([OECD, 2011](#)). Furthermore, [Bartels and Stockhausen \(2016\)](#) show that the share of children living with single parents has increased from 12.6% in 1991 to 19.9% in 2012. These children also tend to be disadvantaged in terms of parental education and parental time investments. Even though public childcare provision can partly compensate lower parental time investments, children from single parent families have command over relatively less parental resources which constitute their economic and social environment and determine the development of their cognitive and non-cognitive skills necessary to be successful in later life ([Heckman and Mosso, 2014](#)).

Thus, using disposable cash income as a single indicator of material well-being of children seems to be incomplete, even though disposable cash income is a widely accepted and resilient measure for material well-being ([Aaberge et al., 2010](#); [Garfinkel et al., 2006](#)). This paper argues that disposable cash income should be extended by the monetized value of public in-kind benefits and home production to receive a more complete measure of children's access to economic resources and material well-being, respectively. An extended version of Becker's full-income concept is constructed for this purpose which is the basis for quantifying the impact of extending the income definition by the imputed value of parental and non-parental childcare on the distribution of disposable cash income of children ([Becker, 1965](#)). Furthermore, expressing all dimensions in monetary units bears two additional advantages compared to other multidimensional analyses: (i) every dimension of well-being can still be intuitively interpreted from an economic perspective, and (ii) a classic pecuniary incidence analysis can be performed.¹

¹However, this approach implicitly assumes that the rate of substitution between each pair of dimensions is equal to one. A comprehensive overview on alternative multidimensional measures

An early and prominent paper that applied an extended income definition is [Jenkins and O’Leary \(1996\)](#) for the United Kingdom.² They investigate the impact of extending the cash income of households by the imputed value of household production time to consider the overall amount of economic resources. Estimating the distribution of extended income amongst non-elderly, one-family households in 1986, they find a substantially lower level of inequality in the distribution of extended income compared to disposable cash income, while overall inequality trends are similar. Furthermore, changes in the income distribution due to the extension of the income concept shift singles down the distribution relative to married couple families.

[Frick et al. \(2012\)](#) investigate the impact of home production on economic inequality in Germany. Their main finding is that extending cash income by the monetary value of home production has an inequality reducing effect independent of the evaluation technique and inequality measure used. Hence, their findings for Germany show the same patterns as the results of [Jenkins and O’Leary \(1996\)](#) for the United Kingdom. Recent U.S. studies have also found substantial inequality reducing effects if the monetary value of home production is taken into account (see, e.g., [Gottschalk and Mayer, 2002](#); [Zick et al., 2008](#); [Frazis and Stewart, 2011](#)).³ However, [Frick et al. \(2012\)](#) neither investigate the differences between family types nor do they consider the effects of both home production and in-kind benefits. Nevertheless, they show that childcare activities constitute a major part of home production whenever a household has children. Therefore, the expected transfers from parental childcare time are likely to be large among families with dependent children.

Another large strand of literature deals with the evaluation of public in-kind benefits, such as public education, public health services, or public housing, and investigates its distributional impact on disposable incomes (recent studies are, e.g., [Garfinkel et al., 2006](#); [Paulus et al., 2010](#); [Koutsampelas and Tsakloglou, 2013](#); [Higgins et al., 2015](#)).⁴ In general, all studies find substantial lower levels of disposable income inequality whenever the income concept is extended by the value of public

of inequality is given in ([Aaberge and Brandolini, 2015](#))

²Other early empirical works are [Bryant and Zick \(1985\)](#) or [Bonke \(1992\)](#), among others. See [Frick et al. \(2012\)](#) for a comprehensive overview of previous studies.

³Earlier studies also found a negative impact of extending the income definition.

⁴Previous studies on the impact of public in-kind benefits are, amongst others, [Ruggles and O’Higgins \(1981\)](#); [Le Grand \(1982\)](#); [Gemmell \(1985\)](#); [Smeeding et al. \(1993\)](#); [Evandrou et al. \(1993\)](#); [Ruggeri et al. \(1994\)](#); [Slesnick \(1996\)](#); [Antoninis and Tsakloglou \(2001\)](#).

in-kind benefits. In particular, pre-school and primary education is found to have a disproportionately high equalizing effect on disposable income inequality across countries (see, e.g., [Antoninis and Tsakloglou, 2001](#); [Paulus et al., 2010](#); [Higgins et al., 2015](#)).

However, there is no paper, so far, that incorporates both the value of in-kind benefits and home production into an extended income concept. This paper closes this gap putting special emphasis on the available resources of children in Germany and, thus, providing a complete measure of children's current well-being and opportunities in later life. The rest of the paper is organized as follows: In Section 2, a theoretical concept is introduced to define each component of extended income. An extended version of Becker's (1965) full-income concept is used for this purpose. In Section 3, the data sources are described and it is shown how each extended income component is measured. In Section 4, the distributional effects of extending the income definition are discussed. Finally, in Section 5, the results are summarized and conclusions discussed.

2 Definition of Extended Income

To define extended income I rely on the full-income concept introduced by [Becker \(1965\)](#). It provides the basis for a multidimensional approach to measure a child's access to economic resources and considers the different needs of heterogeneous individuals. This approach is, thus, able to take account of non-monetary resources that are similarly important for children's well-being and the development of their later capabilities. But before the level of children's well-being in terms of disposable income can be derived, the household level has to be considered first. This is a necessary intermediate step because children do not generate income by themselves and, thus, are dependent on their parents and other household members which are able to generate income. In general, full-income, F , of an adult household member is defined as

$$F = wT + v, \tag{1}$$

where w is the gross hourly wage rate, T is the time endowment, and v is unearned income including, for instance, capital income.⁵ A main property of the

⁵[Garfinkel and Haveman \(1977\)](#), for instance, apply a different approach using a fixed number of work hours instead of the time endowment of a person.

full-income concept is that income opportunities are measured independently of preferences as long as two assumptions are fulfilled: first, time spent at home and at work can be freely substituted for one another. Second, the budget constraint is linear such that the opportunity cost of each hour of a person's time is constant at all levels of paid work (Jenkins and O'Leary, 1996). This full-income concept is further extended by a factor, B , covering the value of in-kind benefits, and a factor, OP , which is out-of-pocket payments for non-parental educational goods and services each child, $j = 1, \dots, C$, receives.⁶ Furthermore, it is assumed that the time endowment, T , of all adult household members, $i = 1, \dots, N$, can be perfectly split into market working time, M , home production time, H , and leisure time, L .⁷ Furthermore, opportunity costs of time are assumed to differ between time allocation categories and individuals. The modified full-income of a household can therefore be written as the sum of the value of market income and unearned income, the value of non-market income from home production, and the net value of publicly provided in-kind benefits:

$$F = \sum_{i=1}^N w_i M_i + \omega_i L_i + v_i + \sum_{p=1}^P \lambda_i H_i + \sum_{j=1}^C B_j - \sum_{j=1}^C OP_j. \quad (2)$$

The coefficients w , ω , and λ are shadow prices of M , L , and H , respectively. Due to the difficulties in measuring leisure and identifying different kinds of leisure activities, leisure will be excluded from the analysis such that extended income of a household, E , is finally defined as

$$E = \underbrace{\sum_{i=1}^N w_i M_i + v_i}_Y + \underbrace{\sum_{p=1}^P \lambda_i H_i}_D + \underbrace{\sum_{j=1}^C B_j - \sum_{j=1}^C OP_j}_K.$$

Accordingly, disposable extended income, E , of a family is the sum of disposable cash income from labour, Y , non-cash income from parental childcare activities, D , and non-cash income from non-parental childcare net of out-of-pocket payments for education and childcare, K .

⁶Out-of-pocket payments include fees for schooling, cribs, kindergartens, after school care clubs, and private childminders.

⁷Only biological and non-biological parents, $p = 1, \dots, P$ are considered in determining the value of home production time. Grandparents and other relatives living in the same household are not considered in this case.

Equivalence Scales

In most applications, extended income is assumed to be shared equally among household members. For this purpose, a common equivalence scale, like the modified OECD scale or the square root scale, is applied on the extended income of a household. However, there are valid arguments to treat each income source differently. As [Garfinkel et al. \(2006\)](#) point out, for instance, educational in-kind benefits are consumed by the receiving child only and are not shared within the household. Therefore, a child's full income should be the sum of equivalized disposable cash income and the full value of public childcare and/or schooling he directly receives.

In this research, only disposable cash income is equivalized using the modified OECD scale to account for different household sizes and composition. In contrast, income from parental childcare time, D , is equivalized using a generalized version of the square root scale: $D_{eq} = \frac{D}{s^\theta}$ where s is the number of siblings aged 13 years or below living in the same family. θ is an equivalence elasticity. Setting $\theta = 0.5$ yields the square root equivalence scale which is also applied here. The monetary value of net in-kind benefits are not equivalized.

3 Data and Measurement of Extended Income

The main analysis is based on data from the Socio Economic Panel (SOEP), which is an annually repeated survey among German households. It includes a broad range of demographic and socio-economic characteristics for all years since 1984. East German households are included in the panel since 1990. By 2012, 12,322 households participated in the SOEP which corresponds to 18,577 individuals ([Wagner et al., 2007](#); [Schupp and Rahmann, 2013](#)). The sample includes East and West German children and information from their parents.⁸ Children are defined as individuals aged 13 or below and still living with their parents.

Since the SOEP does not provide detailed information on expenditures for schooling, private and public childcare, and other related educational expenditures encompassing, for instance, private tutoring, information from the supplement panel survey "Familien in Deutschland" (FiD) is used to augment SOEP by means of imputation. The FiD was first launched in 2010 and covers more than 4,500 households every year and puts a special focus on single parents, families with more than two

⁸Immigrants from the first wave of the new IAB-SOEP migration sample (Sample M) are not included since the likelihood of non-response is higher among first-time interviewees.

children, low-income families, and families with very young children in the German population ([Schröder et al., 2013](#)). Due to the limited availability of the FiD, the analysis covers the years between 2010 and 2013.

Furthermore, the panel survey data is extended by information from official statistics from the German Federal Statistical Office on the number of and total expenditures on children enrolled in publicly provided or subsidized childcare institutions and schools ([Statistisches Bundesamt, 2014a,b,c](#)).

3.1 Cash Income

Cash income, Y , is measured as real net equivalent household income including imputed rents. 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.

3.2 Net Monetary Value of Non-Parental Childcare Time

The monetary value of non-parental childcare time, K , is derived by a standard production cost approach. This approach is associated with the assumption that the value of public childcare provision is as high as the expenditures of providing it ([Aaberge et al., 2010](#)). A drawback of this evaluation approach is that existing regional differences in the quality and efficiency of childcare provision cannot be considered at its best. To slightly reduce this problem and to allow for some degree of regional heterogeneity, public expenditures are, at least, differentiated on the federal state level. However, it is assumed that children living in the same federal state and attending the same educational level receive a similar amount of non-cash income from childcare and education.⁹

Data on public spending on childcare and schooling is provided by the German Federal Statistical Office for each federal state on an annual basis ([Statistisches Bundesamt, 2014a,b,c](#)).¹⁰ Average annual public expenditures on childcare per child

⁹Undoubtedly, there are further differences in the quality of schools and educational qualities of childcare within federal states also, which cannot be considered due to the limitation of available data.

¹⁰Public spendings are defined on grounds of a basic funds concept where spendings of a specific public sector, e.g. primary schools, are reduced by its revenues, e.g. schooling fees. In addition, public spendings comprise expenditures on employees and administrative staff including pensions for civil servants, aid expenditures (*Beihilfeaufwendungen*), current operating expenses and capital expenditures. This definition of public spendings is comparable to OECD's definition of spendings on educational core services and widely used in economic studies of evaluating the distributional

is obtained as the sum of public expenditures on cribs, kindergartens, after-school care clubs, and other forms of publicly subsidized day care divided by the total number of children consuming these services.¹¹ Average annual public expenditures on schooling per pupil are defined as the sum of public expenditures on general primary and secondary schools and vocational schools divided by the total number of pupils enrolled in these institutions.¹² All expenditures are measured in 2010 Euros.¹³

Since families have to bear some of the costs that are related to access public childcare and schooling services, these out-of-pocket payments or on-top fees are deducted from the monetary value of publicly provided childcare to receive its net value. The scope of payments depends on the number of children consuming childcare services at the same time and on a household's gross income level. Although out-of-pocket-payments and other direct private spendings on education constitute relatively small amounts of overall educational spendings in Germany, (Schröder et al., 2015) show that especially low-income families spend a higher share of their disposable cash income on education and care services for children than high income families as long as households with positive spendings on education are considered only. Thus, the distributional impact of direct private spendings on education seems to be worth investigating and is incorporated in this research.

Since information on yearly out-of-pocket payments for schooling, private and public childcare, and related educational expenditures, P , are not directly provided by the SOEP they are imputed by means of the FiD. In a first step, a simple OLS regression model is applied to regress the log of monthly spendings on childcare and schooling, S , for each child on a broad set of covariates including child's sex, child's age and age squared, real monthly net family income, household type, parental education in years of schooling, federal state of residence at the time of the interview, migrational background, and the number of family members aged 0-2 years, 3-5 years, and 6-13 years. The OLS regression equation, thus, has the form:

$$\ln(S) = \alpha + \beta X + \epsilon, \quad (3)$$

impact of public in-kind benefits (see, for instance, Garfinkel et al., 2006).

¹¹If a child receives half day care in the respective year of observation, yearly public expenditures on childcare are divided by two (see Frick et al., 2011)

¹²Unfortunately, there is no disaggregated data on public expenditures on general primary and secondary schools.

¹³An overview of public spendings on childcare and schooling by federal state is depicted in Tables A.1 and A.2 in the Appendix.

with α being an intercept, β being a row vector of regression coefficients, X being the matrix of described covariates, and ϵ being a vector of i.i.d. white noise errors. The regression is computed for each year separately and restricted to children aged between zero and fourteen years living in their parents' private household only. The estimated β coefficients from the FiD sample are, then, used for an out-of-sample prediction using the SOEP data set to impute the monthly spendings on childcare and schooling for children aged below fourteen years. Since all socio-economic control variables are also available in the SOEP and, furthermore, identically measured, this approach is quite straightforward and returns ample approximations at the mean with less variation in the tails.¹⁴ According to the number of children in a family, the child related spendings are summed up across all children in a family and are annualized.¹⁵

3.3 Monetary Value of Parental Childcare Time

The monetary value of parental childcare time, D , constitutes a major part of home production that is not reflected in the household's cash income flow, although it is associated with positive effects on household's welfare (Frick et al., 2012). Therefore, the objective of this chapter is to discuss possible ways to quantify the value of non-market working time in general and of parental childcare time in particular. The main challenge is the absence of market prices for private childcare as part of home production. There are two widely used approaches to derive (gross) hourly wage rates for non-market workers: (1) the housekeeper wage approach, and (2) the opportunity cost approach. Both approaches mainly differ in their assumption on the underlying productivity of individuals: the housekeeper wage approach assumes that all individuals are similarly productive, whereas the opportunity cost approach accounts for the heterogeneity in the productivity of individuals.

3.3.1 Housekeeper Wage Approach

The major feature of the housekeeper wage approach is that a uniform hourly wage rate is assigned to all parents participating in childcare activities on an average week day. Each individual is assumed to be similarly productive and differences in the

¹⁴One percent of predicted monthly spendings on education is truncated at each tail to reduce potential biases from ill predicted outliers. Furthermore, see Tables A.6 to A.7 in the Appendix for descriptive statistics of the original and fitted values.

¹⁵An overview of private spendings on childcare services and schooling is shown in Table A.3 in the Appendix.

productivity of unskilled home workers and skilled labour force are also neglected. One way to derive the gross hourly wage rate is to use the average wage rates of employees working in sectors that produce comparable goods and services as in home production. Therefore, the housekeeper approach is close to a market value approach, where the hourly wage rate is comparable to the market price.

In particular, the shadow price of parental childcare time is directly derived from the SOEP using information on monthly gross earnings of childcare workers, w_m , which are identified by ISCO-88 code 5131. These are, then, transformed into gross hourly wage rates by:

$$w_h = \frac{w_m/4.3}{h_w},$$

where h_w denotes the actual weekly working hours of a childcare worker. This is done for each year separately. Next, the estimated gross hourly wage rates, w_h , are used to derive the monetary value of parental childcare time by multiplying them with the hours of parental childcare time on an average week day, ct_h . The estimated gross wage rates can be found in Tables A.16 and A.17 in the Appendix.¹⁶ To receive an annual value of parental childcare time, the following transformation is done

$$D_h = w_h \times ct_h \times (5 \times 4.3 \times 12), \quad (4)$$

where D_h is the annual gross income from parental childcare time according to the housekeeper wage approach.¹⁷ In this case, yearly gross income is not transformed into net values since a comparable service has to be paid at gross prices in the market (see, for instance, Jenkins and O’Leary, 1996). Finally, the monetary value of parental childcare time is deflated to the base year 2010 and summed up with the household’s equivalized disposable cash income and the net monetary value of publicly provided childcare.

¹⁶Another possibility is to use agreed wages of childcare workers working in the public sector only. This would result in much higher gross wage rates than those derived from the SOEP. Therefore, the results presented in Section 4 provide a lower bound for the distributional impact of the housekeeper wage approach. Using the lower wages could also be justified as an adjustment regarding the different productivity of trained childcare workers and untrained parents.

¹⁷It is assumed that an average year consists of 258 working days ($258days = 5days \times 4.3weeks \times 12months$). National holidays and private vacation (the minimum statutory holidays could be subtracted) or the fact that Saturdays are also working days are not considered for simplicity.

3.3.2 Opportunity Costs Approach

In contrast to the housekeeper wage approach, the opportunity cost approach allows for heterogeneity in the productivity of individuals and measures the foregone earnings that an individual with specific skills could have received in the labour market instead of doing childcare at home by himself. Furthermore, it is assumed that people can deliberately choose between working in the labour market or at home to satisfy a given set of needs for childcare. Thus, the decision to work at home or in the labour market depends on the individual's earnings capacity and its productivity in childcare. If a parent is more productive in childcare, more hours would be required to achieve comparable welfare from working in the labour market. Therefore, choosing home production is optimal. Furthermore, this is accompanied by the very strong assumption that individuals can freely choose the amount of working hours in the labour market. This is challenged by the presence of labour market rigidities, for instance, the existence of fix working hours that are part of contracts of employment (see [Frick et al., 2012](#)).

There are two widely used approaches to predict the shadow wage rates of home workers from the observable gross hourly wage rates of working age individuals: (i) the standard OLS regression model as well as (ii) the Heckman selection correction model. Selection correction is useful because it controls for correlation between gross hourly wage rates and unobserved characteristics that influence the participation decision. In each case, the value of parental childcare time is estimated using a different sample from the SOEP. Accordingly, the sample is restricted to the working age population (20-60 years) excluding all individuals who are still in education, in military or community service, in apprenticeship including trainee- and internships, who work as civil servants, who are pensioners (e.g. early retirement), and who help in family business.¹⁸

OLS Regression

First, a Mincerian OLS wage regression is applied to predict the shadow price of parental childcare time in home production ([Mincer, 1958](#)). This is done separately for each year and sex (the subscripts are left out for simplicity) estimating the following equation:

$$\ln(w) = \alpha + \beta X + \epsilon, \quad (5)$$

¹⁸Again, immigrants from the first wave of the new IAB-SOEP migration sample (Sample M) are dropped since the likelihood of non-response is higher among first-time interviewees.

where w is the gross hourly wage rate of an individual. The matrix X contains a broad set of commonly used covariates.¹⁹

The estimated coefficients are then used to predict the log of gross hourly wage rates for all men/women in the respective year. Note that predicted wage rates are only used if information on gross hourly wages is missing.²⁰ After exponentiating predicted log wage rates, they are multiplied with the hours of childcare activities on an average week day. These are then annualized for each parent and summed up across all biological and non-biological parents living in the same household. The yearly gross income is multiplied by the household’s marginal tax rate to derive disposable incomes.²¹ Finally, disposable income is deflated to the base year 2010.

Heckman Selection Correction Model

In order to reduce potential estimation bias due to self-selection into paid work, a two-step Heckman selection correction model is estimated for comparison. It controls for possible relations between gross hourly wages and unobserved characteristics that might influence the decision to work or to take care of the child at home. Again, the regressions are done separately for each year and sex. In a first step, an unrestricted binary outcome model (probit model) is estimated to predict the probability of observing positive earnings:

$$p_i = \alpha + \beta_1 X_1' + \epsilon_1, \epsilon_1 \approx N(0, 1) \quad (6)$$

where p_i is a binary response variable that is one if an individual, i , is working and zero if it is not working. The column vector X_1' contains a wide set of control variables.²² In addition, self-rated health (very good (reference), good, satisfactory,

¹⁹It is controlled for: age and age squared, full-time and part-time working experience as well as their squared terms, schooling (lower secondary (reference), intermediate, college), vocational education (none (reference), basic vocational, higher vocational, tertiary), federal state (Schleswig-Holstein (reference), etc.), migrational background (no migrational background (reference), 1st generation migrant, 2nd generation, information not available), self-rated health (very good (reference), good, satisfactory, bad, very bad), marital status (married (reference), single, divorced, widowed), the number of children younger than 6 years (none(reference), one child, two and more children), and the location in 1989 (GDR (reference), FRG, abroad).

²⁰In addition, one percent of predicted gross wage rates is truncated at each tail to reduce potential biases from ill predicted outliers.

²¹A household’s marginal tax rate is estimated from a simultaneously quantile regression of log household direct tax and social insurance payments on a quadratic in household log gross income. This is done for each year separately. Further details are available from the author (see [Jenkins and O’Leary, 1996](#), for a similar approach).

²²It includes: age and age squared, full-time and part-time working experience as well as their squared terms, schooling (lower secondary (reference), intermediate, college), vocational education (none (reference), basic vocational, higher vocational), federal state of residence (Schleswig-

bad, very bad), marital status (married (reference), single, divorced, widowed), and the number of children younger than 6 years (none (reference), one child, two and more children) are used as exclusion restrictions such that they are assumed to only influence the decision to work but not the level of earnings. This choice might be debatable, but it is widely accepted that the number of dependent children and marital status are important determinants for the choice to work, especially for women. Being mentally or physically ill is also very likely to influence the ability to work more than the level of earnings due to anti-discrimination legacy.

In a second step, the restricted linear regression model (OLS)

$$\ln(w) = \alpha + \beta_2 X'_2 + \epsilon_2, \quad \epsilon_2 \sim N(0, \sigma) \quad (7)$$

is estimated by

$$E[\ln(w)|X'_2, p^* > 0] = \beta_2 X'_2 + \sigma_{12} \lambda(\beta_1 X'_1), \quad (8)$$

where the inverse Mills ratio $\lambda = \phi(\cdot)/\psi(\cdot)$ such that $E[\epsilon_2|p^* > 0] = \sigma_{12} \lambda(\beta_1 X'_1)$.

Furthermore, it is assumed that the correlated error terms, ϵ_1 and ϵ_2 , are jointly normally distributed and homoskedastic. These two assumptions are vital to receive unbiased estimators of the variance and covariance. In most empirical specifications, the assumption of homoskedasticity is violated due to insufficient model applications. However, this will not automatically lead to biased coefficients, but the estimated standard errors will be biased such that test statistics are misleading. Being aware of this, gross hourly wages and the corresponding income from parental childcare are derived as described before using the predicted coefficients from the Heckman model.²³

4 Results

Extending the income definition by income from parental and non-parental childcare time has a remarkably large effect on both the level and distribution of children's disposable income. Accordingly, I will first investigate the changes in disposable

Holstein (reference), etc.), migrational background (no migrational background (reference), 1st generation migrant, 2nd generation, information not available), and the location in 1989 (GDR (reference), FRG, abroad).

²³See Table A.16 and Table A.17 in the Appendix for an overview of estimated gross wage rates according to the different approaches. Again, one percent of predicted gross wage rates is truncated at each tail to reduce potential biases from ill predicted outliers.

income levels and, then, describe the distributional impact of extending the income definition.

Level Effects

Table 1 depicts the trends in yearly mean real equivalized disposable incomes by component between 2009 and 2012. Cash incomes have slightly increased from 21,052 Euro in 2009 to 21,273 in 2012 (+1.1%). The value of in-kind benefits has also increased over time (by 11.3%). It was 4,144 Euro in 2009 (19.7% of cash income) and 4,613 Euro in 2012 (21.7% of cash income). The increasing importance of in-kind benefits is very likely to be explained by the substantial expansion of publicly provided childcare in Germany and a greater willingness of parents to send their children to public childcare institutions. The motives for the latter might originate from a change in role models as well as a rising economic pressure on families which results in the demand for a second earner and translates into a rising female labour market participation rate.

Families slightly raised their educational spendings, too. In 2009, they spent 1,522 Euro, while it was 1,563 Euro in 2012 (+2.7%). The transfer added when using the housekeeper wage approach was 12,964 Euro in 2009 and 12,129 Euro in 2012 (-6.4%), which is 61.6% and 57% of cash income, respectively. Both opportunity cost approaches yield a smaller total amount in all years but in 2012, which is close to the evolution of wage rates (see Appendix Tables A.16 to A.18). Accordingly, the transfer added when using the OLS (Heckman) approach was 12,286 Euro (12,134 Euro) in 2009 and 12,241 Euro (12,241 Euro) in 2012. This is a decrease (increase) of 3.7% (2.3%).

Table 1: *Mean Real Equivalized Disposable Incomes by Component, 2009-2012 (in Euro)*

	Cash	In-Kind	Educ.	HK Wage	Opp. Cost	Appr.	Total	Extended	Income
Year	Income	Benefits	Spendings	Approach	OLS	HM	HK	OLS	HM
2009	21,052	4,144	1,522	12,964	12,286	12,134	36,638	35,961	35,808
2010	21,466	4,508	1,469	13,934	12,473	12,447	38,439	36,978	36,952
2011	21,062	4,551	1,583	13,193	11,475	11,344	37,223	35,505	35,374
2012	21,273	4,613	1,563	12,129	12,241	12,414	36,453	36,564	36,737

Note: All incomes and expenditures are in 2010 Euros. Disposable cash income was equivalized using the modified OECD scale. Incomes from parental childcare time were equivalized using the square root scale. In-kind benefits and educational spendings were not equivalized.

Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Table 2 shows the trends in yearly mean real equivalized disposable incomes

by component and family type between 2009 and 2012. Differentiating between family types reveals that children living with single parents profit most from in-kind benefits. In 2009, their mean income from in-kind benefits summed up to 4,803 Euro which is 33% of cash income. Regarding children from cohabiting and married couple families the same share was only 19% and 18%, respectively. In 2012, the shares have slightly increased to 34% for children living with single parents, 22% for children living with cohabiting parents, and 21% for children living with married parents.

In contrast, the monetary value of parental childcare time is smallest for children living with single parents in almost all years. In 2009, the mean transfer added from parental childcare time was 12,735 Euro for children living with single parent families compared to an average of 13,041 Euro for children living with married couple parents when applying the housekeeper wage approach. The monetary value tends to be a bit smaller if the opportunity cost approaches are used.²⁴ Trends over time are ambiguous: income from parental childcare time decreased for children living with single parents if the housekeeper wage rate is applied, while it has slightly increased if the opportunity cost approaches are used. In contrast, children living with married parents experienced a loss in disposable income from parental childcare time if the housekeeper wage approach and the OLS specification of the opportunity cost approach are applied.

In any case, the income differential between children from single and married couple parents decreases if the income definition is extended. In 2009, the mean cash income differential amounted to 7,523 Euro, whereas the extended income differential was only 6,530 Euro when using the housekeeper wage approach. If the OLS and Heckman approaches are used instead, the extended income differentials are 7,425 Euro and 7,485 Euro, respectively. In 2012, the mean cash income differential decreased to 6,908 Euro, while the extended income differential was 6,141 Euro when using the housekeeper wage approach. If the OLS and Heckman approaches are used instead, the extended income differentials are 6,569 Euro and 6,518 Euro, respectively. All in all, they are still slightly smaller than the initial cash income differential such that the transfers added from parental and non-parental time tend to equalize the income distribution.

²⁴Note that income from parental childcare time is stated in gross terms when using the housekeeper wage approach, since it is a market value approach. This mainly explains the observed level differences.

Table 2: *Mean Real Equivalized Disposable Incomes by Component and Family Type, 2009-2012 (in Euro)*

Year	Family Type	Cash	In-Kind	Educ.	Housekeeper	Opportunity Cost	Appr.	Total Extended Income		
		Income	Benefits	Spending	Wage Appr.	OLS	Heckman	Housekeeper	OLS	Heckman
2009	Single	14,540	4,803	1,039	12,735	11,327	11,117	31,039	29,630	29,421
	Cohabiting	21,076	3,990	1,546	12,608	11,496	11,388	36,128	35,015	34,907
	Married	22,063	4,060	1,595	13,041	12,527	12,378	37,569	37,055	36,906
2010	Single	14,449	5,458	1,080	12,272	10,314	10,220	31,099	29,141	29,047
	Cohabiting	20,879	4,561	1,278	15,754	13,558	13,573	39,915	37,720	37,734
	Married	22,536	4,366	1,545	13,975	12,666	12,645	39,332	38,022	38,001
2011	Single	15,272	5,207	1,131	11,945	9,835	9,661	31,294	29,183	29,010
	Cohabiting	19,894	4,688	1,339	13,691	10,615	10,535	36,934	33,857	33,778
	Married	22,080	4,435	1,683	13,311	11,834	11,704	38,143	36,667	36,536
2012	Single	15,356	5,189	1,019	11,454	11,342	11,555	30,980	30,868	31,081
	Cohabiting	20,088	4,366	1,197	14,106	12,825	13,040	37,363	36,082	36,297
	Married	22,264	4,562	1,686	11,981	12,297	12,459	37,121	37,437	37,599

Note: All incomes and expenditures are in 2010 Euros. Disposable cash income was equivalized using the modified OECD scale. Incomes from parental childcare time were equivalized using the square root scale. In-kind benefits and educational spendings were not equivalized.

Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Distributional Effects

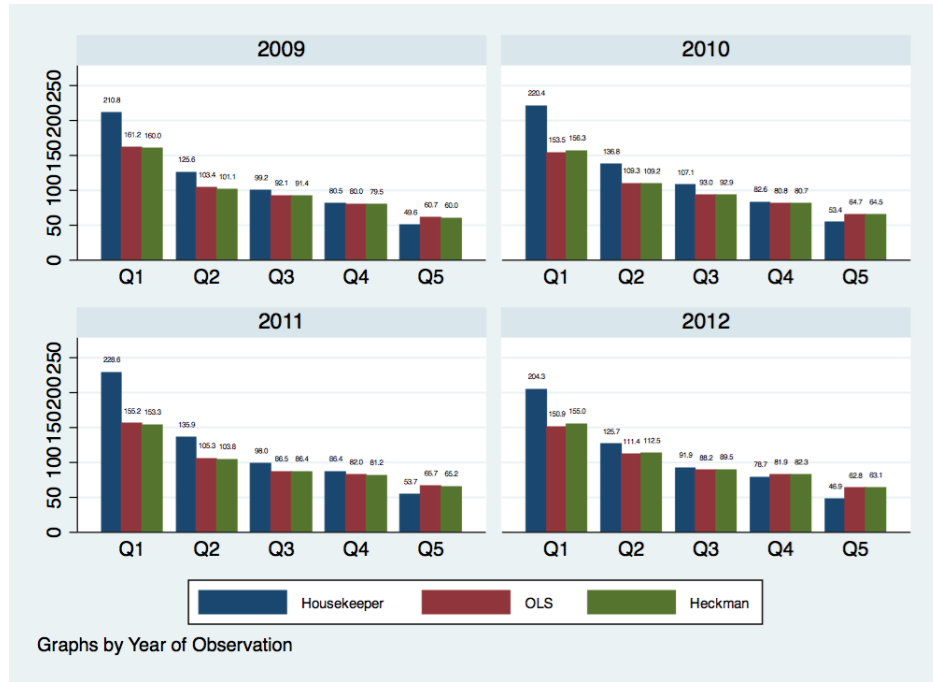
Since children from single parent families are more likely to be found at the lower part of the income distribution, a closer look at the different regions of the cash and extended income distribution is also of great interest (see also [OECD, 2011](#)). Figure 1 provides insights into this question by showing the relative change in mean incomes by the initial cash income quintiles for each year. In general, all children benefit from adding transfers from parental and non-parental childcare time, but the relative increase in extended income is the largest for children from the lowest quintile and diminishes with higher quintiles.

In 2009, extended income of the first quintile was 211% larger than cash income when using the housekeeper wage approach. Using the opportunity cost approaches yields smaller increases: 161% and 160%. In the fifth quintile, mean extended incomes are still 50% larger than the respective cash incomes when using the housekeeper wage approach. In addition, the relative increase of mean incomes is larger when using the opportunity cost approaches (61% and 60%). In 2012, extended income of the first quintile is 204% larger than cash income when using the housekeeper wage approach. Using the opportunity cost approaches yields smaller increases: 151% (OLS) and 155% (Heckman). In the fifth quintile, mean extended incomes are still 47% larger than the respective cash incomes when using the housekeeper wage approach. Again, the relative increase of mean incomes is larger when using the opportunity cost approaches (around 63% for both specifications).

Next, I turn to the question of how cash income is generally related to income advantages from each income component and whether the latter tend to generally increase or decrease inequality. Table 3 depicts the correlation coefficients between cash income and income from parental and non-parental childcare, respectively. On the one hand, there is a very small positive correlation between cash income and income from in-kind benefits. In contrast, the correlation between income from parental childcare based on the housekeeper wage approach and cash income is unambiguously negative and, therefore, tends to equalize the income distribution.

On the other hand, cash income is positively correlated with income from parental childcare time regarding both opportunity cost approaches. Therefore, the opportunity cost approaches tend to reproduce existing cash income inequalities, because it reproduces inequalities from existing differences in the productivity of children's parents that are highly correlated with their market cash income, whereas income according to the housekeeper wage approach tends to slightly decrease in-

Figure 1: Relative Change in Mean Incomes Across Cash Income Quintiles by Year



Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

equality. This is due to a simple mechanism: the housekeeper wage rate is flat and the same for all parents and, thus, narrows the income distribution more.

Table 3: *Correlations Between Cash Income and Income From Parental and Non-Parental Childcare*

Year	In-Kind Benefits	Housekeeper	OLS	Heckman
2009	0.075	-0.127	0.169	0.169
2010	0.083	-0.089	0.194	0.192
2011	0.099	-0.070	0.289	0.291
2012	0.073	-0.079	0.263	0.253

Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Table 4 depicts the weighted (cumulative) income shares by cash income deciles for each income definition and for each year. Extending the income definition increases the income shares of the first to the seventh deciles and decreases those of the eight to the tenth deciles. The change is largest when the housekeeper wage approach is applied to determine the value of parental childcare time. The estimated cumulative income shares already imply that the extended income Lorenz curves will lie above the Lorenz curve of initial cash income. Thus, extended incomes are very likely to be more equally distributed than cash incomes.

Table 4: *Income Shares, 2009-2012 (Weighted)*

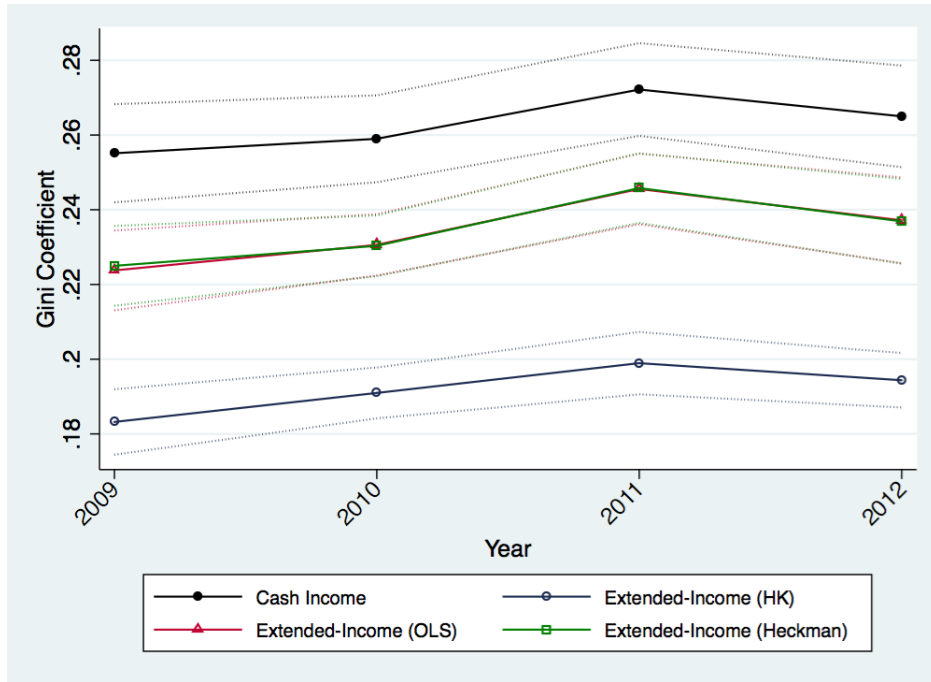
Decile	Income Shares (in Percent)				Cumul. Income Shares (in Percent)			
	CI	EI(HK)	EI(OLS)	EI(HM)	CI	EI(HK)	EI(OLS)	EI(HM)
2009								
1	3.9	5.0	4.4	4.4	3.9	5.0	4.4	4.4
2	6.0	6.7	6.0	5.9	10.0	11.7	10.3	10.4
3	6.3	7.7	7.1	7.2	16.3	19.4	17.4	17.6
4	7.8	8.6	8.1	8.0	24.1	28.0	25.6	25.6
5	8.5	9.2	9.0	8.9	32.6	37.2	34.5	34.5
6	9.6	10.4	10.1	9.8	42.2	47.6	44.6	44.3
7	10.7	10.8	10.7	10.8	52.9	58.4	55.3	55.1
8	12.0	11.8	12.0	12.0	64.9	70.2	67.3	67.1
9	14.0	13.2	13.9	14.0	78.9	83.4	81.1	81.1
10	21.1	16.6	18.9	18.9	100.0	100.0	100.0	100.0
2010								
1	4.1	4.9	4.4	4.5	4.1	4.9	4.4	4.5
2	5.5	6.6	6.0	6.0	9.6	11.6	10.4	10.4
3	6.7	7.5	7.0	7.0	16.3	19.1	17.4	17.4
4	7.5	8.4	7.9	7.9	23.8	27.6	25.4	25.4
5	8.5	9.1	8.7	8.7	32.3	36.7	34.1	34.1
6	9.5	10.1	9.7	9.7	41.8	46.8	43.8	43.7
7	10.7	10.7	10.6	10.6	52.5	57.5	54.4	54.4
8	12.0	11.9	12.0	12.0	64.5	69.5	66.4	66.4
9	14.2	13.3	14.4	14.5	78.7	82.8	80.8	80.9
10	21.3	17.2	19.2	19.1	100.0	100.0	100.0	100.0
2011								
1	3.9	4.9	4.2	4.3	3.9	4.9	4.2	4.3
2	5.3	6.6	5.8	5.8	9.3	11.5	10.0	10.2
3	6.4	7.6	6.8	6.7	15.6	19.0	16.9	16.9
4	7.5	8.3	7.8	7.7	23.2	27.3	24.6	24.6
5	8.3	9.0	8.6	8.6	31.4	36.3	33.2	33.2
6	9.6	9.8	9.5	9.6	41.0	46.1	42.8	42.8
7	10.7	10.7	10.6	10.5	51.6	56.8	53.3	53.3
8	11.9	11.8	12.0	12.0	63.5	68.6	65.3	65.2
9	14.3	13.4	14.2	14.2	77.9	82.1	79.5	79.4
10	22.1	17.9	20.5	20.6	100.0	100.0	100.0	100.0
2012								
1	4.1	5.2	4.6	4.6	4.1	5.2	4.6	4.6
2	5.6	6.6	5.9	5.9	9.7	11.9	10.5	10.5
3	6.6	7.4	6.9	6.9	16.3	19.3	17.4	17.4
4	7.3	8.3	7.9	7.8	23.6	27.6	25.3	25.2
5	8.3	8.9	8.5	8.6	31.9	36.6	33.8	33.7
6	9.4	9.8	9.5	9.6	41.3	46.4	43.3	43.3
7	10.5	10.6	10.6	10.5	51.8	57.0	53.9	53.9
8	12.1	11.8	11.8	11.9	63.9	68.8	65.7	65.7
9	14.2	13.5	14.1	14.0	78.1	82.3	79.8	79.8
10	21.9	17.7	20.2	20.2	100.0	100.0	100.0	100.0

Source: SOEP (v30), own calculations.

Figure 2 shows the impact of extending the income definition for Germany between 2009 and 2012 using inequality coefficients that differ in their sensitivity to changes along the income distribution. A major finding is that extended income inequality is found to be significantly lower than cash income inequality across all years and inequality measures. Extended income inequality is the lowest if the monetary value of childcare is measured in terms of the housekeeper wage approach. This is as expected, since applying a flat wage rate to differently productive individuals will automatically narrow the income distribution by more than any approach allowing for heterogeneity in estimated wage rates.

Therefore, measured inequality in extended income using the opportunity cost approach is larger compared to the housekeeper wage approach but it is still significantly smaller than cash income inequality. However, extended income inequality increased at a higher rate between 2009 and 2012 than cash income inequality did. The Gini coefficient of cash income increased by 3.9% between 2009 and 2012, while it increased by 6.1% (HK), 6.0% (OLS), and 5.3% (Heckman).²⁵

Figure 2: *Trend in Extended Income Inequality, 2009-2012*

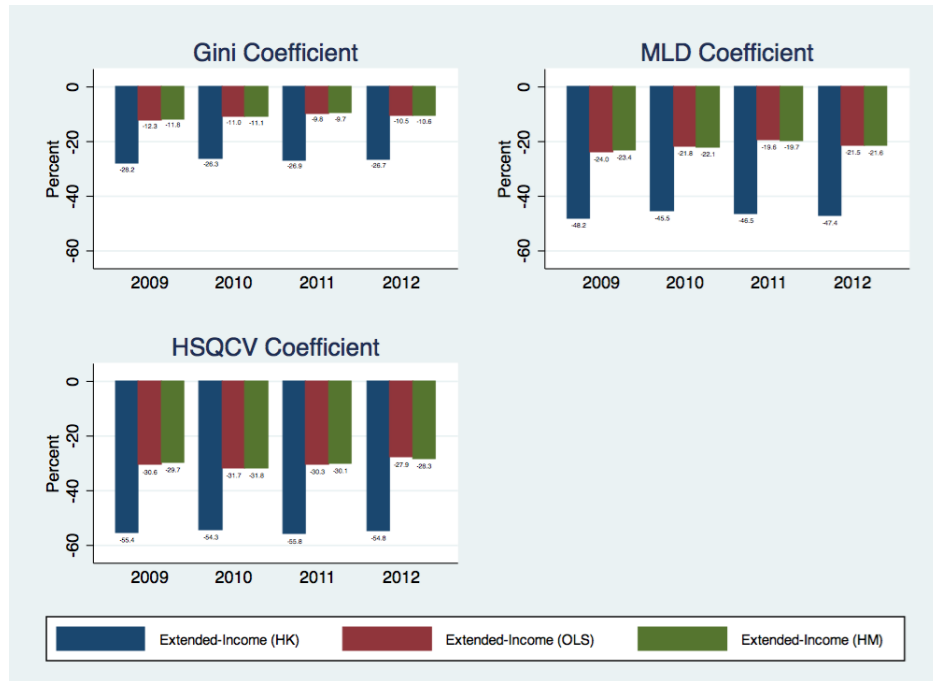


Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.
Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

²⁵It is not clear *a priori* whether the resulting extended income distribution has to be more equally distributed than the initial cash income distribution, since some extended income components are more but also less equally distributed than cash income as it is depicted in Appendix Figures A.4 to A.6

According to Figure 3, adding transfers from parental and non-parental child-care reduces inequality more if measures are used which are more sensitive for changes at the tails, namely the Mean Logarithmic Deviation (MLD) coefficient and half the square root coefficient of variation (HSQCV). Extending the income definition reduces the Gini coefficient by 10% to 28%, while the MLD coefficient decreases by 20% to 48%. The equalizing effect is largest if HSQCV is considered: it is more sensitive for changes at the top of the distribution and income inequality decreases by 28% to 56%. Note that the differences between the OLS and the Heckman selection correction model are, again, only small and almost negligible.

Figure 3: *Relative Change of Inequality, 2009-2012 (in Percent)*



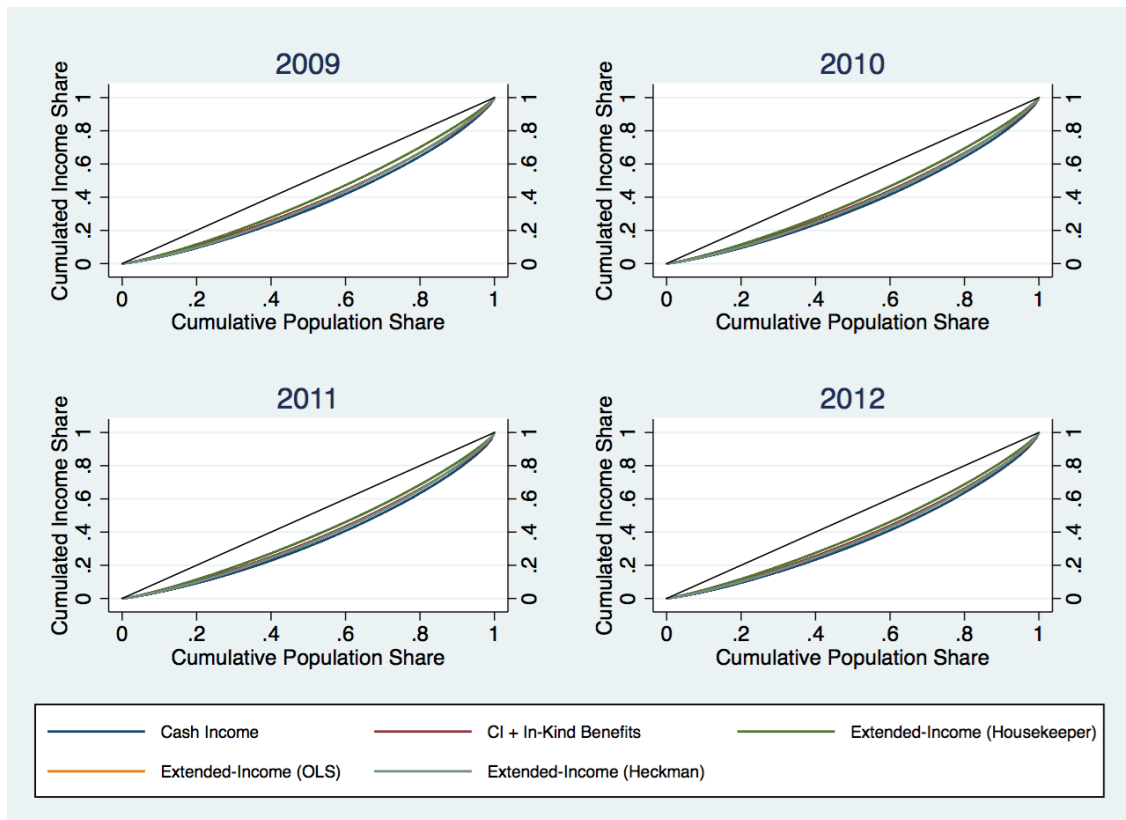
Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

However, comparing inequality coefficients is not sufficient to make reliable social welfare comparisons. Therefore, Figure 4 depicts ordinary Lorenz curves for each year to evaluate and rank the different income distributions on welfare grounds.²⁶ Since all three extended income distributions strictly lie above the cash income dis-

²⁶Ordinary Lorenz curves can only be used if the mean of the dominating distribution is higher or equal compared to the dominated distribution. Whenever the dominating distribution has a lower mean or shows points of intersection with the distribution in comparison, the distributions cannot be clearly ranked anymore (Cowell, 2009). Alternatively, generalized Lorenz curves could be applied. However, all extended income distributions have higher mean values than the initial cash income distribution and there are, at least, no points of intersection between the extended income distributions and the cash income distribution. Thus, ordinary Lorenz curves seem to be sufficient to rank the income distributions on welfare grounds.

tribution showing no points of intersection with it, they are clearly dominating the cash income distribution. Thus, they are welfare superior. Even considering the cash distribution including the value of in-kind benefits only, leads to a higher welfare level compared to the initial cash income distribution. No clear ranking is possible in case of comparing the extended income distributions with each other, since there is an intersection in the upper right part of the figure between the extended income curve from the housekeeper wage approach and the extended income curves from the two opportunity cost approaches.

Figure 4: *Ordinary Lorenz Curves, 2009-2012*



Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

5 Conclusion

This paper is the very first to assess the impact of extending children’s disposable cash income to encompass the monetary value of parental and non-parental childcare time on economic inequality in Germany. Combining survey data from the German Socio-Economic Panel (SOEP) and ”Familien in Deutschland” (FiD) with administrative data from the German Federal Statistical Office covering the years 2009 to 2012, it is shown that extended income inequality is significantly lower than cash income inequality across all years. This major finding is largely in line with previous research by, for instance, [Jenkins and O’Leary \(1996\)](#) for the UK and [Frick et al. \(2012\)](#) for Germany, who investigate the distributional effect of adding the value of home production to disposable cash income.

However, both cash and extended income inequality of children have increased between over time, and the percentage change in extended income inequality was even larger across all evaluation approaches regarding parental childcare time. Nevertheless, the lower levels of inequality are largely due to the expansion of public childcare, since transfers from non-parental childcare add a considerable amount of income to the cash income of children in absolute and relative terms that has even increased over time. Nevertheless, income from parental childcare still adds more to cash income although its share has decreased between 2009 and 2012.

This paper also shows that differences in family structures are a pressing issue: children living together with a single parent profit most by adding transfers from parental and non-parental childcare time to disposable cash income. In particular, children living with single parents profit a lot more from in-kind benefits in relative terms. Nevertheless, whether a child profits from non-parental childcare - but also from parental childcare - also depends on its position in the initial cash income distribution. Children from the lowest quintile gain, by far, more than children from higher quintiles. Nevertheless, even children from high quintiles profit from extending the income definition in absolute terms. These findings provide further evidence on the hypothesis that the provision of public childcare is an appropriate measure for social policy makers to reduce inequalities among children in Germany. At least it shows that the provision of public goods lowers the importance of cash income regarding the present welfare of children.

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A Appendix

Table A.1 depicts the evolution of mean yearly real public expenditures per child on childcare including spendings on cribs, kindergarten, after school care clubs and publicly subsidized child minders. In 2009, Berlin spent most with an average of 7,367 Euro per child followed by Hamburg with 7,189 Euro. In contrast, Mecklenburg Western Pomerania and Saxony Anhalt spent least. Their mean expenditures amounted to 3,416 Euro and 3,950 Euro per child, respectively. In 2012, Berlin was still in the leading position spending an average of 8,594 Euro per child followed by Northrhine-Westphalia (7,885 Euro) and Bremen (7,257 Euro). Saxony Anhalt (3,783 Euro), Mecklenburg Western Pomerania (3,837 Euro), and Saxony (3,995 Euro) spent least on childcare per child in 2012. However, almost all German federal states increased their per capita spendings on childcare over the past years except of Saxony, Saxony Anhalt, and Hamburg. The latter might be the consequence of less demand of childcare provision due to a decreasing number of children in these federal states. At the same time, West German states increased their per capita expenditures by more than the East German states did. Taking all West German federal states together, they spent on average 5,587 Euro in 2009 per child on childcare and increased their spendings to 6,520 Euro in 2012 (+17%). In contrast, all East German federal states increased their mean expenditures from 4,718 Euro in 2009 to 5,087 Euro in 2012 (+8%).

Table A.2 shows the trend in average yearly real public expenditures per child on schooling between 2009 and 2012. In 2009, the highest per capita spendings on schooling are observed in Thuringia and Saxony Anhalt: on average they spent 6,125 Euro and 6,035 Euro per child, respectively. In contrast, Schleswig Holstein and Northrhine-Westphalia spent least with 4,253 Euro and 4,254 Euro, respectively. In 2012, Saxony Anhalt and Thuringia changed position at the top of the ranking: mean per capita spendings on schooling amounted to 6,474 Euro in Saxony Anhalt compared to 6,365 Euro in Thuringia. The lowest mean spendings were undertaken by Schleswig-Holstein with 4,413 Euro, and Saarland and Lower Saxony both with 4,550 Euro. However, all federal states managed to increase their real per capita expenditures on schooling over the past years. At the same time, taking all East German federal states together they spent more on schooling on average than their West German counterparts. East German states increased their mean spendings by eight percent, while West German federal did so by seven percent.

Table A.1: *Mean Yearly Real Public Expenditures Per Child on Childcare Services by Region (in Euro)*

Region	2009	2010	2011	2012
Baden-Württemberg	4,703	5,406	5,342	6,354
Bavaria	4,759	5,152	5,411	5,452
Berlin	7,367	7,944	8,342	8,594
Brandenburg	4,234	4,343	4,567	4,480
Bremen	6,265	6,638	6,718	7,257
Hamburg	7,189	6,991	6,713	7,062
Hesse	5,666	6,198	6,293	6,360
Mecklenburg Western Pomerania	3,416	3,486	3,614	3,837
Lower Saxony	4,880	5,156	5,404	5,471
Northrhine-Westphalia	5,835	6,546	7,016	7,885
Rhineland Palatinate	6,082	6,733	6,970	6,990
Saarland	5,564	7,137	6,622	6,981
Saxony	4,334	4,359	4,041	3,995
Saxony Anhalt	3,950	4,053	3,842	3,783
Schleswig-Holstein	4,926	5,840	5,357	5,392
Thuringia	5,007	5,600	5,960	5,833

Note: All expenditures are in 2010 Euros.

Source: German Federal Statistical Office, Bildungsfinanzbericht (2014), own calculations.

Table A.2: *Mean Yearly Real Public Expenditures Per Child on Schooling by Region (in Euro)*

Region	2009	2010	2011	2012
Baden-Württemberg	4,708	4,804	4,849	4,935
Bavaria	4,899	5,204	5,240	5,345
Berlin	5,438	5,723	5,833	6,018
Brandenburg	4,786	5,171	5,419	5,370
Bremen	4,594	5,184	5,102	5,093
Hamburg	5,604	5,651	6,003	5,942
Hesse	5,031	5,364	5,219	5,367
Mecklenburg Western Pomerania	5,253	5,755	5,610	5,930
Lower Saxony	4,308	4,479	4,500	4,550
Northrhine-Westphalia	4,254	4,497	4,550	4,641
Rhineland Palatinate	4,691	4,978	5,208	5,192
Saarland	4,361	4,587	4,503	4,550
Saxony	5,709	6,242	6,052	5,982
Saxony Anhalt	6,035	6,553	6,664	6,474
Schleswig-Holstein	4,253	4,444	4,369	4,413
Thuringia	6,125	6,572	6,371	6,365

Note: Expenditures on employees and administrative staff including social contributions for civil servants, aid expenditure (Beihilfeaufwendungen), current operating expenses and capital expenditures. All expenditures are in 2010 Euros.

Source: German Federal Statistical Office, Bildungsfinanzbericht (2014), own calculations.

Table A.3: *Yearly Average Real Per Child and Total Spendings on Childcare and Schooling by Family Type (in Euro, weighted)*

Year	Family Type	Per Child Spendings				Total Household Spendings				Obs.
		Mean	SD	Min	Max	Mean	SD	Min	Max	
All Children										
2009	Single	658	376	0	2,144	1,039	649	0	3,749	246
	Cohabiting	1,020	713	0	3,043	1,546	1,181	0	4,972	238
	Married	885	565	0	3,303	1,595	1,088	0	8,475	1880
	Total	869	568	0	3,303	1,522	1,068	0	8,475	2364
2010	Single	676	329	0	1,915	1,080	600	0	3,584	321
	Cohabiting	987	599	0	2,872	1,278	840	0	4,883	278
	Married	866	586	0	3,185	1,545	1,096	0	6,337	2287
	Total	855	568	0	3,185	1,469	1,042	0	6,337	2886
2011	Single	726	422	0	3,310	1,131	664	0	3,310	355
	Cohabiting	922	639	0	3,505	1,339	919	0	6,021	335
	Married	920	598	0	3,493	1,683	1,149	0	5,849	2262
	Total	898	588	0	3,505	1,583	1,098	0	6,021	2952
2012	Single	648	379	0	2,002	1,019	684	0	3,026	304
	Cohabiting	915	646	0	3,126	1,197	819	0	3,792	304
	Married	910	574	0	3,081	1,686	1,098	0	7,139	1988
	Total	881	569	0	3,126	1,563	1,062	0	7,139	2596
Children 0-5										
2009	Single	722	353	0	2,144	1,225	678	0	3,749	52
	Cohabiting	1,117	772	0	2,909	1,701	1,311	0	4,972	131
	Married	1,152	642	0	3,303	1,998	1,119	0	8,428	652
	Total	1,120	657	0	3,303	1,904	1,145	0	8,428	835
2010	Single	690	405	0	1,546	1,148	771	0	2,758	73
	Cohabiting	1,099	728	0	2,862	1,326	939	0	4,883	146
	Married	1,097	682	0	3,185	1,842	1,110	0	5,908	803
	Total	1,075	682	0	3,185	1,738	1,096	0	5,908	1022
2011	Single	905	546	0	3,310	1,332	752	0	3,310	74
	Cohabiting	1,200	750	0	3,505	1,573	998	0	6,021	156
	Married	1,160	729	0	3,493	1,989	1,229	0	5,657	804
	Total	1,149	723	0	3,505	1,890	1,191	0	6,021	1034
2012	Single	976	386	0	2,002	1,432	650	0	3,026	55
	Cohabiting	1,141	778	0	3,126	1,399	920	0	3,792	146
	Married	1,167	707	0	3,081	1,957	1,141	0	7,139	707
	Total	1,154	705	0	3,126	1,855	1,113	0	7,139	908
Children 6-13										
2009	Single	644	380	0	2,093	999	637	0	3,749	194
	Cohabiting	884	599	0	3,043	1,330	937	0	3,879	107
	Married	741	460	0	3,216	1,378	1,006	0	8,475	1228
	Total	735	460	0	3,216	1,317	964	0	8,475	1529
2010	Single	673	313	0	1,915	1,067	560	0	3,584	248
	Cohabiting	874	404	0	2,872	1,231	726	0	4,209	132
	Married	741	482	0	3,159	1,384	1,054	0	6,337	1484
	Total	740	458	0	3,159	1,328	984	0	6,337	1864
2011	Single	682	374	0	2,347	1,081	633	0	3,093	281
	Cohabiting	707	431	0	1,963	1,159	811	0	3,470	179
	Married	790	465	0	3,143	1,518	1,068	0	5,849	1458
	Total	767	452	0	3,143	1,424	1,011	0	5,849	1918
2012	Single	586	344	0	1,577	940	663	0	3,026	249
	Cohabiting	715	411	0	2,307	1,018	672	0	3,464	158
	Married	768	424	0	2,986	1,537	1,044	0	7,139	1281
	Total	738	417	0	2,986	1,410	1,001	0	7,139	1688

Note: All expenditures are in 2010 Euros.

Source: SOEP (v30) and FiD (v4), own calculations.

Table A.4: *Number of Observed Children (Aged 0-14) by Family Type (Unweighted)*

Year	Single Parent	Cohabiting Parents	Married Parents	Total
2009	296	268	2,182	2,746
2010	323	278	2,321	2,922
2011	355	337	2,290	2,982
2012	304	305	2,012	2,621
Total	1,278	1,188	8,805	11,271

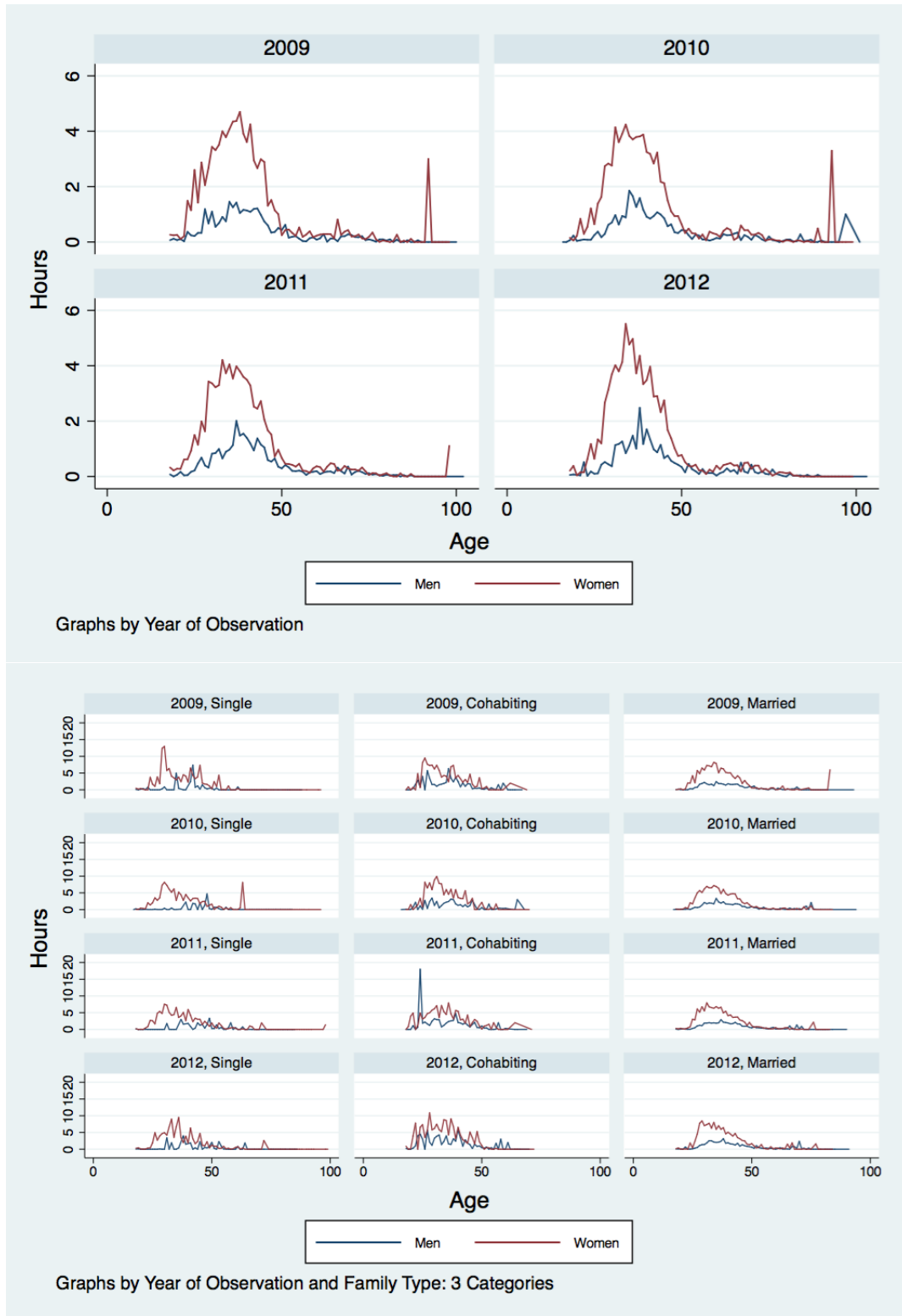
Source: SOEP (v30), own calculations.

Table A.5: *Average Hours of Parental and Non-parental Childcare Time on an Average Week Day by Family Type (Weighted)*

Year	Family Type	Parental Time				Parental Time Per Child				Non-parental Time			
		Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
2009	Single	6.6	4.6	0	18	4	3	0	18	5.4	2.3	0	14.1
	Cohabiting	6.4	4.3	0	26	4.3	3.5	0	20	4.9	3.3	0	12.5
	Married	7.2	4.8	0	24	3.8	3	0	24	4.6	2.5	0	12.5
	Total	7.1	4.8	0	26	3.8	3	0	24	4.7	2.6	0	14.1
2010	Single	6.1	3.9	0	18	3.7	2.9	0	18	5.8	2.2	0	12.5
	Cohabiting	7.2	4.8	0	24	5.3	3.7	0	24	5.2	3.1	0	11.5
	Married	7.2	4.8	0	33	3.9	3.3	0	33	4.6	2.5	0	14.6
	Total	7.1	4.7	0	33	4	3.3	0	33	4.8	2.5	0	14.6
2011	Single	5.8	3.9	0	18	3.5	3	0	18	5.7	2.3	0	14.5
	Cohabiting	6.5	4.4	0	20	4.4	3.3	0	18	5.2	3.1	0	14.2
	Married	6.9	4.7	0	36	3.7	3.2	0	27	4.7	2.5	0	13.5
	Total	6.8	4.6	0	36	3.7	3.2	0	27	4.9	2.6	0	14.5
2012	Single	6.3	4.6	0	18	3.8	3.2	0	18	5.6	2.7	0	12.7
	Cohabiting	7.3	4.9	0	26	5.4	4.2	0	26	5.1	3.2	0	12.6
	Married	7.1	4.8	0	32	3.8	3.4	0	20	4.7	2.4	0	12.4
	Total	7.1	4.8	0	32	3.9	3.5	0	26	4.8	2.5	0	12.7

Source: Own calculations, SOEP (v30).

Figure A.1: *Time Spent on Childcare Activities on an Average Week Day by Age, Gender, and Family Type*



Source: SOEP (v30), own calculations.

Table A.6: *FID: Total Yearly Real Educational Expenditures (Weighted)*

Year	Mean	Median	SD	Skewness	Kurtosis	Min	Max	P10	P25	P50	P75	P90	P99
2009	1,779	1,153	2,277	6.87	93.36	12	43,680	364	655	1,153	2,063	3,640	10,920
2010	1,799	1,176	1,916	3.36	20.30	12	18,480	360	672	1,176	2,256	3,780	9,612
2011	1,820	1,269	1,801	3.80	34.99	12	31,393	400	752	1,269	2,292	3,843	8,568
2012	1,861	1,268	1,943	4.29	43.45	12	33,199	346	646	1,268	2,421	3,919	8,646

Note: Only positive spendings are considered.

Source: FiD v4, own calculations.

Table A.7: *SOEP: Total Yearly Real Educational Expenditures (Weighted)*

Year	Mean	Median	SD	Skewness	Kurtosis	Min	Max	P10	P25	P50	P75	P90	P99
2009	1,700	1,487	986	1.90	9.30	353	8,475	717	994	1,487	2,136	2,912	5,080
2010	1,680	1,498	942	1.26	4.89	299	6,337	688	989	1,498	2,111	3,026	4,883
2011	1,825	1,655	974	1.04	4.23	312	6,021	750	1,091	1,655	2,344	3,162	4,983
2012	1,762	1,610	959	1.49	7.14	309	7,139	717	1,081	1,610	2,258	2,991	5,382

Note: Only positive spendings are considered.

Source: SOEP v30, own calculations.

Table A.8: *OLS Regression of Logged Gross Hourly Wages (2009)*

	Male			Female		
	Coeff.	t	p-value	Coeff.	t	p-value
Age	0.009	0.8	0.427	0.019	2.3	0.021
Age Squared	-0.000	-2.2	0.030	-0.000	-3.8	0.000
Part-Time Working Experience	-0.035	-3.8	0.000	0.003	0.8	0.400
Part-Time Working Experience Squared	0.003	3.7	0.000	0.001	3.7	0.000
Full-Time Working Experience	0.043	7.3	0.000	0.036	10.5	0.000
Full-Time Working Experience Squared	-0.000	-3.8	0.000	-0.000	-4.0	0.000
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.123	6.3	0.000	0.150	6.4	0.000
College	0.291	10.2	0.000	0.308	11.1	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.076	2.3	0.021	0.099	2.9	0.004
Higher Vocational	0.168	4.8	0.000	0.160	4.3	0.000
Tertiary	0.446	11.1	0.000	0.408	10.2	0.000
<i>Marital Status</i> (Ref.: Married)						
Single	-0.096	-4.2	0.000	-0.042	-1.7	0.082
Divorced	-0.115	-3.6	0.000	0.021	0.9	0.388
Widowed	-0.156	-1.5	0.139	0.028	0.5	0.602
<i>No. of Children < 6 in HH</i> (Ref.: None)						
One Child < 6	-0.018	-0.7	0.456	0.055	1.7	0.085
Two or More Children < 6	0.015	0.4	0.721	0.047	0.5	0.619
<i>Self-Rated Health</i> (Ref.: Very Good)						
Good	-0.020	-0.7	0.477	-0.062	-2.4	0.017
Satisfactory	-0.068	-2.2	0.025	-0.089	-3.2	0.001
Bad	-0.104	-2.7	0.007	-0.131	-3.9	0.000
Very Bad	-0.256	-3.0	0.003	-0.013	-0.2	0.869
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	-0.060	-1.5	0.141	-0.025	-0.6	0.579
2nd Generation Immigrant	-0.021	-0.7	0.488	0.036	1.3	0.209
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.203	5.5	0.000	0.116	3.9	0.000
Abroad	0.176	2.1	0.032	0.011	0.1	0.887
Constant	1.874	8.1	0.000	1.671	9.3	0.000
Federal State	Yes			Yes		
<i>Adj. R-Square</i>	0.363			0.254		
<i>Number of Observations</i>	3467			3507		

* p<0.05, ** p<0.01, *** p<0.001

Source: SOEP (v30), own calculations.

Table A.9: *Heckman Regression of Logged Gross Hourly Wages (2009)*

	Male Coeff.	t	p-value	Female Coeff.	t	p-value
Wage Regression						
Age	0.008	0.7	0.490	0.020	2.7	0.007
Age Squared	-0.000	-0.7	0.507	-0.000	-4.4	0.000
Part-Time Working Experience	-0.038	-4.4	0.000	0.009	1.8	0.069
Part-Time Working Experience Squared	0.002	3.2	0.001	0.000	3.0	0.002
Full-Time Working Experience	0.028	4.6	0.000	0.038	9.9	0.000
Full-Time Working Experience Squared	-0.000	-4.2	0.000	-0.000	-4.3	0.000
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.103	4.6	0.000	0.162	7.1	0.000
College	0.219	6.9	0.000	0.332	11.7	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.068	2.0	0.045	0.094	3.1	0.002
Higher Vocational	0.139	3.6	0.000	0.155	4.7	0.000
Tertiary	0.409	10.0	0.000	0.404	11.0	0.000
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.210	5.9	0.000	0.118	3.8	0.000
Abroad	0.200	2.4	0.014	0.000	0.0	0.996
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	-0.003	-0.1	0.943	-0.019	-0.4	0.662
2nd Generation Immigrant	-0.017	-0.6	0.568	0.047	1.6	0.115
Constant	1.874	8.7	0.000	1.569	10.1	0.000
Selection Regression						
Age	0.076	1.8	0.066	0.009	0.3	0.747
Age Squared	-0.003	-6.2	0.000	-0.001	-4.2	0.000
Part-Time Working Experience	0.104	2.3	0.022	0.222	17.1	0.000
Part-Time Working Experience Squared	0.004	1.0	0.334	-0.004	-7.3	0.000
Full-Time Working Experience	0.226	9.6	0.000	0.132	12.1	0.000
Full-Time Working Experience Squared	-0.001	-1.5	0.129	-0.000	-1.6	0.111
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.176	1.6	0.109	0.250	3.3	0.001
College	0.851	5.4	0.000	0.429	4.4	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.104	0.7	0.460	0.247	2.7	0.007
Higher Vocational	0.546	2.9	0.004	0.294	2.8	0.005
Tertiary	0.613	3.2	0.002	0.557	4.5	0.000
<i>Location in 1989</i> (Ref.: GDR)						
FRG	-0.123	-0.6	0.528	-0.065	-0.5	0.587
Abroad	0.268	0.7	0.465	-0.227	-0.9	0.379
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	-0.579	-2.9	0.004	0.188	1.3	0.189
2nd Generation Immigrant	0.169	1.1	0.282	-0.073	-0.7	0.473
<i>Marital Status</i> (Ref.: Married)						
Single	-0.098	-0.8	0.448	0.291	3.0	0.002
Divorced	-0.358	-2.5	0.013	0.192	2.0	0.050
Widowed	0.203	0.4	0.724	0.080	0.4	0.685
<i>No. of Children < 6 in HH</i> (Ref.: None)						
One Child < 6	0.312	1.7	0.087	-0.971	-11.3	0.000
Two or More Children < 6	-0.511	-2.1	0.038	-1.803	-11.3	0.000
<i>Self-Rated Health</i> (Ref.: Very Good)						
Good	0.083	0.5	0.592	0.048	0.5	0.641
Satisfactory	-0.006	-0.0	0.973	-0.057	-0.5	0.594
Bad	-0.557	-3.1	0.002	-0.108	-0.9	0.383
Very Bad	-1.200	-4.9	0.000	-0.887	-4.3	0.000
Constant	0.242	0.3	0.775	0.653	1.1	0.262
Mills						
Lambda	-0.482	-7.2	0.000	0.092	1.8	0.066
Federal State	Yes			Yes		
Number of Observations	3660			4185		

* p<0.05, ** p<0.01, *** p<0.001

Source: *SOEP (v30)*, own calculations.

Table A.10: *OLS Regression of Logged Gross Hourly Wages (2010)*

	Male			Female		
	Coeff.	t	p-value	Coeff.	t	p-value
Age	0.013	1.2	0.245	0.020	2.6	0.009
Age Squared	-0.000	-2.5	0.014	-0.000	-4.2	0.000
Part-Time Working Experience	-0.024	-3.2	0.001	0.007	2.0	0.044
Part-Time Working Experience Squared	0.002	3.8	0.000	0.000	3.3	0.001
Full-Time Working Experience	0.038	7.3	0.000	0.032	10.8	0.000
Full-Time Working Experience Squared	-0.000	-2.9	0.004	-0.000	-3.5	0.000
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.157	8.8	0.000	0.144	6.9	0.000
College	0.336	13.0	0.000	0.314	12.6	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.111	3.5	0.000	0.086	2.9	0.004
Higher Vocational	0.197	5.9	0.000	0.166	5.0	0.000
Tertiary	0.460	12.0	0.000	0.385	11.0	0.000
<i>Marital Status</i> (Ref.: Married)						
Single	-0.081	-4.0	0.000	-0.015	-0.7	0.474
Divorced	-0.108	-3.7	0.000	0.037	1.6	0.107
Widowed	-0.217	-1.5	0.145	-0.027	-0.5	0.607
<i>No. of Children < 6 in HH</i> (Ref.: None)						
One Child < 6	-0.004	-0.2	0.856	0.080	2.6	0.011
Two or More Children < 6	-0.006	-0.1	0.885	-0.101	-1.2	0.236
<i>Self-Rated Health</i> (Ref.: Very Good)						
Good	-0.003	-0.1	0.913	-0.036	-1.5	0.133
Satisfactory	-0.055	-2.1	0.036	-0.061	-2.4	0.016
Bad	-0.106	-3.2	0.001	-0.056	-1.8	0.074
Very Bad	-0.193	-2.5	0.013	-0.106	-1.7	0.094
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	0.016	0.4	0.664	0.005	0.1	0.892
2nd Generation Immigrant	0.009	0.4	0.725	0.003	0.1	0.910
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.121	4.1	0.000	0.112	4.3	0.000
Abroad	0.092	1.2	0.242	-0.038	-0.6	0.554
Constant	1.861	8.8	0.000	1.686	10.7	0.000
Federal State	Yes			Yes		
<i>Adj. R-Square</i>	0.376			0.251		
<i>Number of Observations</i>	3744			3891		

* p<0.05, ** p<0.01, *** p<0.001

Source: SOEP (v30), own calculations.

Table A.11: *Heckman Regression of Logged Gross Hourly Wages (2010)*

	Male Coeff.	t	p-value	Female Coeff.	t	p-value
Wage Regression						
Age	0.031	3.0	0.002	0.020	2.8	0.004
Age Squared	-0.000	-3.3	0.001	-0.000	-4.7	0.000
Part-Time Working Experience	-0.033	-4.5	0.000	0.009	2.1	0.033
Part-Time Working Experience Squared	0.001	3.1	0.002	0.000	2.7	0.006
Full-Time Working Experience	0.016	2.9	0.003	0.032	9.0	0.000
Full-Time Working Experience Squared	-0.000	-1.5	0.126	-0.000	-3.2	0.001
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.118	5.9	0.000	0.156	7.3	0.000
College	0.280	10.4	0.000	0.329	12.4	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.095	3.3	0.001	0.105	3.7	0.000
Higher Vocational	0.166	5.1	0.000	0.181	5.8	0.000
Tertiary	0.404	11.3	0.000	0.410	12.0	0.000
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.099	3.2	0.001	0.121	4.3	0.000
Abroad	0.106	1.5	0.144	-0.041	-0.6	0.556
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	0.038	0.9	0.342	-0.000	-0.0	0.991
2nd Generation Immigrant	0.001	0.0	0.970	0.011	0.4	0.663
Constant	1.607	8.4	0.000	1.614	10.9	0.000
Selection Regression						
Age	-0.045	-1.1	0.278	-0.010	-0.4	0.687
Age Squared	-0.001	-2.8	0.005	-0.001	-3.7	0.000
Part-Time Working Experience	0.110	3.0	0.003	0.215	17.6	0.000
Part-Time Working Experience Squared	0.001	0.2	0.823	-0.003	-6.8	0.000
Full-Time Working Experience	0.227	11.1	0.000	0.133	12.8	0.000
Full-Time Working Experience Squared	-0.001	-3.3	0.001	-0.001	-1.8	0.080
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.526	4.8	0.000	0.217	3.0	0.003
College	0.606	4.4	0.000	0.401	4.3	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.153	1.2	0.239	0.308	3.6	0.000
Higher Vocational	0.464	2.7	0.008	0.305	3.1	0.002
Tertiary	0.787	4.5	0.000	0.620	5.3	0.000
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.226	1.3	0.210	-0.058	-0.5	0.593
Abroad	0.287	0.8	0.445	0.108	0.4	0.660
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	-0.188	-0.8	0.408	0.127	0.9	0.355
2nd Generation Immigrant	0.101	0.7	0.484	0.069	0.7	0.483
<i>Marital Status</i> (Ref.: Married)						
Single	-0.366	-3.2	0.001	0.160	1.8	0.067
Divorced	-0.321	-2.3	0.022	0.208	2.2	0.026
Widowed	-0.198	-0.2	0.808	-0.011	-0.1	0.949
<i>No. of Children < 6 in HH</i> (Ref.: None)						
One Child < 6	0.036	0.2	0.825	-0.965	-11.5	0.000
Two or More Children < 6	0.034	0.1	0.900	-1.791	-12.1	0.000
<i>Self-Rated Health</i> (Ref.: Very Good)						
Good	-0.180	-1.1	0.254	0.043	0.4	0.662
Satisfactory	-0.217	-1.3	0.195	-0.093	-0.9	0.370
Bad	-0.711	-3.8	0.000	-0.162	-1.3	0.179
Very Bad	-1.562	-6.4	0.000	-0.587	-3.0	0.002
Constant	2.475	2.9	0.004	0.884	1.6	0.114
Mills						
Lambda	-0.425	-7.0	0.000	0.044	0.9	0.376
Federal State	Yes			Yes		
<i>Number of Observations</i>	3934			4595		

* p<0.05, ** p<0.01, *** p<0.001

Source: SOEP (v30), own calculations.

Table A.12: *OLS Regression of Logged Gross Hourly Wages (2011)*

	Male			Female		
	Coeff.	t	p-value	Coeff.	t	p-value
Age	0.004	0.4	0.713	0.006	0.7	0.463
Age Squared	-0.000	-1.6	0.105	-0.000	-2.2	0.029
Part-Time Working Experience	-0.026	-3.5	0.001	0.009	2.6	0.009
Part-Time Working Experience Squared	0.002	2.9	0.004	0.000	2.8	0.006
Full-Time Working Experience	0.042	7.4	0.000	0.037	12.0	0.000
Full-Time Working Experience Squared	-0.000	-4.2	0.000	-0.000	-4.9	0.000
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.120	6.4	0.000	0.164	7.4	0.000
College	0.331	12.3	0.000	0.327	12.2	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.065	2.0	0.043	0.059	1.9	0.052
Higher Vocational	0.167	4.8	0.000	0.126	3.8	0.000
Tertiary	0.409	10.2	0.000	0.369	10.3	0.000
<i>Marital Status</i> (Ref.: Married)						
Single	-0.067	-3.3	0.001	-0.018	-0.8	0.424
Divorced	-0.074	-2.7	0.008	0.023	0.9	0.345
Widowed	-0.308	-2.2	0.025	-0.022	-0.4	0.674
<i>No. of Children < 6 in HH</i> (Ref.: None)						
One Child < 6	0.023	1.0	0.331	0.041	1.3	0.178
Two or More Children < 6	-0.003	-0.1	0.942	0.054	0.7	0.455
<i>Self-Rated Health</i> (Ref.: Very Good)						
Good	-0.014	-0.5	0.612	-0.011	-0.4	0.703
Satisfactory	-0.042	-1.5	0.139	-0.041	-1.3	0.195
Bad	-0.069	-1.9	0.056	-0.066	-1.8	0.075
Very Bad	0.052	0.7	0.478	-0.095	-1.1	0.258
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	0.030	0.8	0.396	0.019	0.5	0.645
2nd Generation Immigrant	-0.004	-0.2	0.863	0.002	0.1	0.932
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.116	3.9	0.000	0.066	2.3	0.020
Abroad	0.069	1.0	0.331	-0.053	-0.8	0.438
Constant	2.072	9.4	0.000	1.910	10.8	0.000
Federal State	Yes			Yes		
<i>Adj. R-Square</i>	0.368			0.255		
<i>Number of Observations</i>	3515			3515		

* p<0.05, ** p<0.01, *** p<0.001

Source: SOEP (v30), own calculations.

Table A.13: *Heckman Regression of Logged Gross Hourly Wages (2011)*

	Male Coeff.	t	p-value	Female Coeff.	t	p-value
Wage Regression						
Age	0.015	1.5	0.146	0.010	1.2	0.212
Age Squared	-0.000	-1.9	0.060	-0.000	-3.1	0.002
Part-Time Working Experience	-0.032	-4.5	0.000	0.013	2.8	0.005
Part-Time Working Experience Squared	0.002	3.6	0.000	0.000	2.2	0.030
Full-Time Working Experience	0.029	5.3	0.000	0.039	10.3	0.000
Full-Time Working Experience Squared	-0.000	-3.8	0.000	-0.000	-4.6	0.000
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.102	5.1	0.000	0.169	7.5	0.000
College	0.294	10.7	0.000	0.338	12.0	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.050	1.6	0.099	0.068	2.2	0.026
Higher Vocational	0.147	4.3	0.000	0.139	4.2	0.000
Tertiary	0.375	10.2	0.000	0.384	10.4	0.000
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.102	3.3	0.001	0.078	2.6	0.008
Abroad	0.079	1.1	0.277	-0.007	-0.1	0.923
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	0.038	0.9	0.343	0.017	0.4	0.698
2nd Generation Immigrant	-0.006	-0.2	0.812	0.000	0.0	0.989
Constant	1.865	9.4	0.000	1.787	11.0	0.000
Selection Regression						
Age	0.022	0.5	0.622	0.000	0.0	0.992
Age Squared	-0.002	-4.1	0.000	-0.001	-3.5	0.000
Part-Time Working Experience	0.138	4.1	0.000	0.219	16.8	0.000
Part-Time Working Experience Squared	-0.001	-0.8	0.434	-0.003	-7.3	0.000
Full-Time Working Experience	0.204	10.1	0.000	0.130	11.1	0.000
Full-Time Working Experience Squared	-0.001	-2.1	0.036	-0.000	-0.4	0.676
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.281	2.6	0.009	0.236	3.0	0.003
College	0.632	4.3	0.000	0.460	4.5	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.240	1.8	0.079	0.219	2.3	0.021
Higher Vocational	0.484	2.7	0.006	0.385	3.4	0.001
Tertiary	0.793	4.4	0.000	0.618	4.8	0.000
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.128	0.7	0.460	0.124	1.0	0.295
Abroad	-0.130	-0.4	0.714	-0.002	-0.0	0.993
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	0.086	0.3	0.748	0.167	1.0	0.304
2nd Generation Immigrant	0.070	0.5	0.635	-0.031	-0.3	0.769
<i>Marital Status</i> (Ref.: Married)						
Single	-0.299	-2.5	0.011	0.313	3.4	0.001
Divorced	-0.268	-1.9	0.061	0.201	2.0	0.043
Widowed	-0.700	-1.3	0.200	0.517	2.4	0.015
<i>No. of Children < 6 in HH</i> (Ref.: None)						
One Child < 6	-0.029	-0.2	0.858	-0.799	-8.7	0.000
Two or More Children < 6	-0.277	-1.1	0.282	-1.890	-11.1	0.000
<i>Self-Rated Health</i> (Ref.: Very Good)						
Good	-0.066	-0.4	0.699	-0.083	-0.7	0.479
Satisfactory	-0.295	-1.7	0.095	-0.238	-2.0	0.051
Bad	-0.722	-3.7	0.000	-0.352	-2.5	0.012
Very Bad	-1.679	-6.8	0.000	-0.560	-2.8	0.006
Constant	1.469	1.6	0.110	1.083	1.6	0.103
Mills						
Lambda	-0.287	-4.5	0.000	0.079	1.5	0.129
Federal State	Yes			Yes		
Number of Observations	3709			4110		

* p<0.05, ** p<0.01, *** p<0.001

Source: SOEP (v30), own calculations.

Table A.14: *OLS Regression of Logged Gross Hourly Wages (2012)*

	Male			Female		
	Coeff.	t	p-value	Coeff.	t	p-value
Age	0.005	0.4	0.698	0.018	2.0	0.047
Age Squared	-0.000	-2.0	0.049	-0.000	-3.6	0.000
Part-Time Working Experience	-0.018	-2.6	0.009	0.009	2.3	0.019
Part-Time Working Experience Squared	0.001	3.2	0.001	0.000	3.3	0.001
Full-Time Working Experience	0.046	8.7	0.000	0.033	10.2	0.000
Full-Time Working Experience Squared	-0.000	-4.2	0.000	-0.000	-2.4	0.017
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.143	7.4	0.000	0.154	6.7	0.000
College	0.329	12.4	0.000	0.345	12.4	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.044	1.4	0.163	0.050	1.5	0.135
Higher Vocational	0.152	4.4	0.000	0.131	3.6	0.000
Tertiary	0.401	10.6	0.000	0.343	8.8	0.000
<i>Marital Status</i> (Ref.: Married)						
Single	-0.067	-3.3	0.001	-0.022	-1.0	0.333
Divorced	-0.105	-3.5	0.000	-0.000	-0.0	0.996
Widowed	-0.200	-1.8	0.069	-0.072	-1.4	0.152
<i>No. of Children < 6 in HH</i> (Ref.: None)						
One Child < 6	0.011	0.5	0.651	0.038	1.3	0.195
Two or More Children < 6	0.002	0.0	0.971	-0.128	-1.7	0.086
<i>Self-Rated Health</i> (Ref.: Very Good)						
Good	0.032	1.2	0.244	-0.025	-0.8	0.399
Satisfactory	-0.005	-0.2	0.874	-0.062	-2.0	0.044
Bad	-0.030	-0.8	0.424	-0.087	-2.4	0.014
Very Bad	-0.074	-1.0	0.330	-0.080	-1.1	0.260
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	-0.015	-0.5	0.653	-0.030	-0.7	0.460
2nd Generation Immigrant	0.008	0.3	0.757	-0.001	-0.0	0.977
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.147	4.5	0.000	0.107	3.8	0.000
Abroad	0.294	4.5	0.000	-0.041	-0.6	0.574
Constant	2.115	9.4	0.000	1.710	8.9	0.000
Federal State	Yes			Yes		
<i>Adj. R-Square</i>	0.375			0.267		
<i>Number of Observations</i>	3168			3273		

* p<0.05, ** p<0.01, *** p<0.001

Source: SOEP (v30), own calculations.

Table A.15: *Heckman Regression of Logged Gross Hourly Wages (2012)*

	Male Coeff.	t	p-value	Female Coeff.	t	p-value
Wage Regression						
Age	0.013	1.2	0.235	0.021	2.6	0.009
Age Squared	-0.000	-2.0	0.044	-0.000	-4.1	0.000
Part-Time Working Experience	-0.025	-3.8	0.000	0.005	1.0	0.319
Part-Time Working Experience Squared	0.001	3.1	0.002	0.000	3.2	0.001
Full-Time Working Experience	0.033	6.2	0.000	0.031	8.2	0.000
Full-Time Working Experience Squared	-0.000	-4.0	0.000	-0.000	-2.6	0.008
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.117	5.6	0.000	0.156	6.8	0.000
College	0.277	9.7	0.000	0.341	11.9	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.031	1.0	0.337	0.043	1.4	0.173
Higher Vocational	0.132	3.7	0.000	0.124	3.6	0.000
Tertiary	0.367	9.9	0.000	0.333	9.1	0.000
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.146	4.8	0.000	0.105	3.6	0.000
Abroad	0.278	3.7	0.000	-0.025	-0.3	0.733
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	-0.019	-0.5	0.634	-0.023	-0.5	0.607
2nd Generation Immigrant	0.004	0.1	0.889	-0.005	-0.2	0.846
Constant	2.006	9.5	0.000	1.595	9.2	0.000
Selection Regression						
Age	0.052	1.0	0.307	-0.045	-1.4	0.173
Age Squared	-0.002	-3.9	0.000	-0.001	-1.6	0.103
Part-Time Working Experience	0.117	1.9	0.060	0.220	15.9	0.000
Part-Time Working Experience Squared	0.007	1.0	0.337	-0.004	-7.2	0.000
Full-Time Working Experience	0.196	8.8	0.000	0.122	10.2	0.000
Full-Time Working Experience Squared	-0.001	-1.7	0.090	-0.000	-0.8	0.421
<i>Schooling</i> (Ref.: Lower Secondary)						
Intermediate	0.375	3.2	0.001	0.177	2.1	0.034
College	0.844	5.1	0.000	0.434	4.0	0.000
<i>Vocational Education</i> (Ref.: None)						
Basic Vocational	0.220	1.4	0.164	0.217	2.1	0.034
Higher Vocational	0.563	2.7	0.006	0.252	2.1	0.033
Tertiary	0.658	3.2	0.002	0.540	4.0	0.000
<i>Location in 1989</i> (Ref.: GDR)						
FRG	0.002	0.0	0.992	-0.216	-1.7	0.093
Abroad	0.039	0.1	0.945	-0.573	-2.2	0.026
<i>Migration</i> (Ref.: No)						
1st Generation Immigrant	0.760	1.9	0.057	0.206	1.3	0.201
2nd Generation Immigrant	0.058	0.3	0.728	-0.009	-0.1	0.933
<i>Marital Status</i> (Ref.: Married)						
Single	-0.122	-0.9	0.345	0.215	2.3	0.024
Divorced	-0.298	-1.9	0.053	0.229	2.2	0.030
Widowed	-0.564	-1.0	0.315	0.075	0.4	0.673
<i>No. of Children < 6 in HH</i> (Ref.: None)						
One Child < 6	0.029	0.2	0.870	-0.695	-7.0	0.000
Two or More Children < 6	0.595	1.2	0.241	-1.478	-9.3	0.000
<i>Self-Rated Health</i> (Ref.: Very Good)						
Good	0.144	0.8	0.441	0.004	0.0	0.971
Satisfactory	-0.070	-0.4	0.719	-0.171	-1.3	0.187
Bad	-0.695	-3.3	0.001	-0.253	-1.8	0.080
Very Bad	-1.170	-4.6	0.000	-0.972	-4.8	0.000
Constant	0.044	0.0	0.966	2.385	3.2	0.001
Mills						
Lambda	-0.315	-4.8	0.000	-0.067	-1.1	0.254
Federal State	Yes			Yes		
<i>Number of Observations</i>	3328			3772		

* p<0.05, ** p<0.01, *** p<0.001

Source: SOEP (v30), own calculations.

Table A.16: *Imputed Average Gross Wage Rates (Weighted)*

Year	Observed		Housekeeper		OLS		Heckman	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2009	14.54	8.22	9.24	0.00	12.73	7.38	13.59	7.94
2010	14.68	8.18	9.83	0.00	12.82	7.42	13.54	7.90
2011	14.93	8.46	9.98	0.00	13.37	7.59	13.70	7.79
2012	15.25	8.51	8.93	0.00	13.42	7.79	14.18	7.91

Note: Observed gross wage rates are just weighted sample means of the working age population.
Source: SOEP (v30), own calculations.

Table A.17: *Imputed Average Gross Wage Rates by Sex (Weighted)*

Men								
Year	Observed		Housekeeper		OLS		Heckman	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2009	16.15	8.94	9.24	0.00	14.43	8.05	16.57	8.37
2010	16.04	8.64	9.83	0.00	14.44	7.86	16.10	8.30
2011	16.34	8.99	9.98	0.00	14.97	8.09	15.97	8.09
2012	16.82	9.03	8.93	0.00	15.11	8.26	16.37	8.34
Women								
Year	Observed		Housekeeper		OLS		Heckman	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2009	12.86	7.01	9.24	0.00	11.11	6.27	10.80	6.35
2010	13.22	7.38	9.83	0.00	11.25	6.60	11.11	6.65
2011	13.40	7.55	9.98	0.00	11.79	6.69	11.48	6.78
2012	13.63	7.60	8.93	0.00	11.78	6.93	12.09	6.85

Note: Observed gross wage rates are just weighted sample means of the working age population.
Source: SOEP (v30), own calculations.

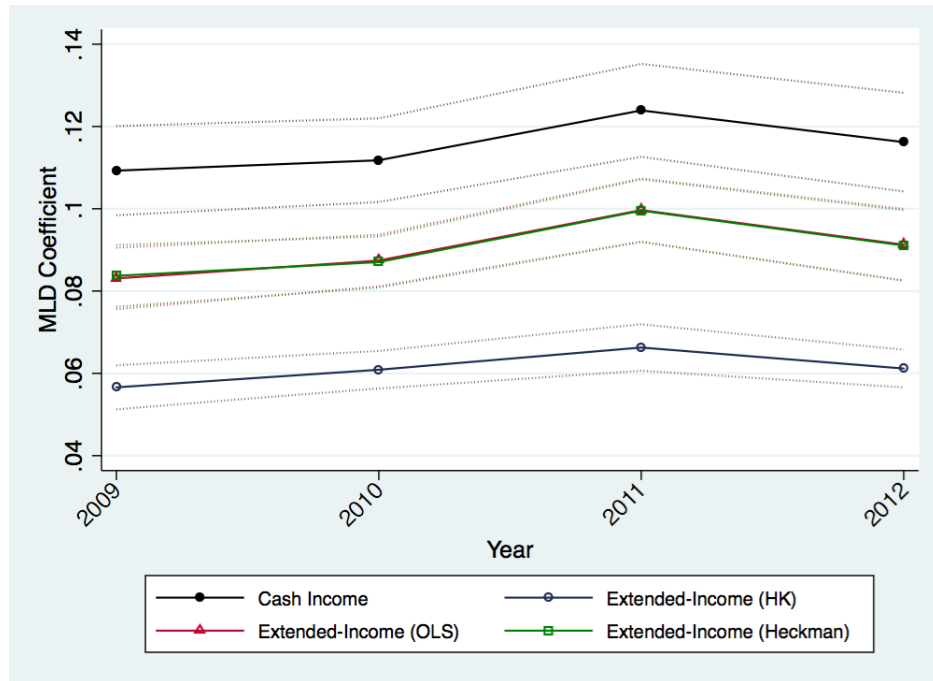
Table A.18: *Imputed Average Gross Wage Rates by Family Type (Weighted)*

Singles								
Year	Observed		Housekeeper		OLS		Heckman	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2009	11.54	6.73	9.24	0.00	10.92	6.18	11.18	6.60
2010	11.87	7.22	9.83	0.00	11.18	6.67	11.38	6.87
2011	11.89	7.41	9.98	0.00	11.27	6.79	11.42	6.96
2012	12.35	7.47	8.93	0.00	11.68	6.94	12.13	7.16
Cohabiting								
Year	Observed		Housekeeper		OLS		Heckman	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2009	13.23	8.60	9.24	0.00	12.55	7.95	12.65	8.11
2010	13.27	7.41	9.83	0.00	12.85	6.98	12.96	7.08
2011	13.41	7.31	9.98	0.00	13.09	7.00	13.15	7.06
2012	13.65	7.62	8.93	0.00	13.22	7.22	13.38	7.24
Married								
Year	Observed		Housekeeper		OLS		Heckman	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
2009	14.43	8.75	9.24	0.00	13.87	8.12	14.14	8.38
2010	14.76	8.54	9.83	0.00	14.13	8.04	14.38	8.23
2011	15.02	8.90	9.98	0.00	14.52	8.38	14.60	8.48
2012	15.42	8.80	8.93	0.00	14.94	8.39	15.22	8.50

Note: Observed gross wage rates are just weighted sample means of the working age population.

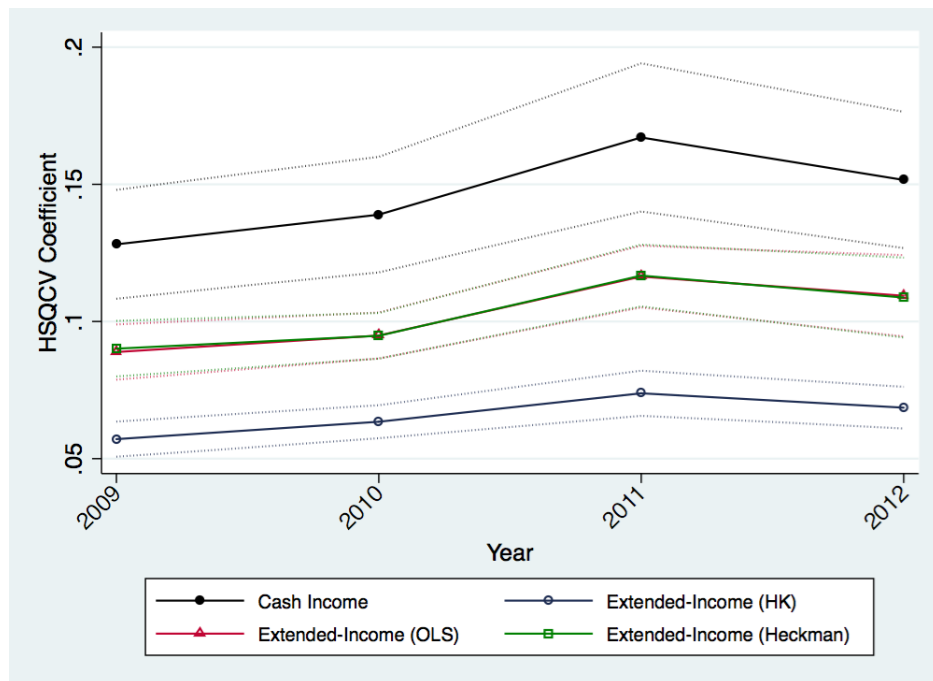
Source: SOEP (v30), own calculations.

Figure A.2: *Trend in Extended Income Inequality, 2009-2012*



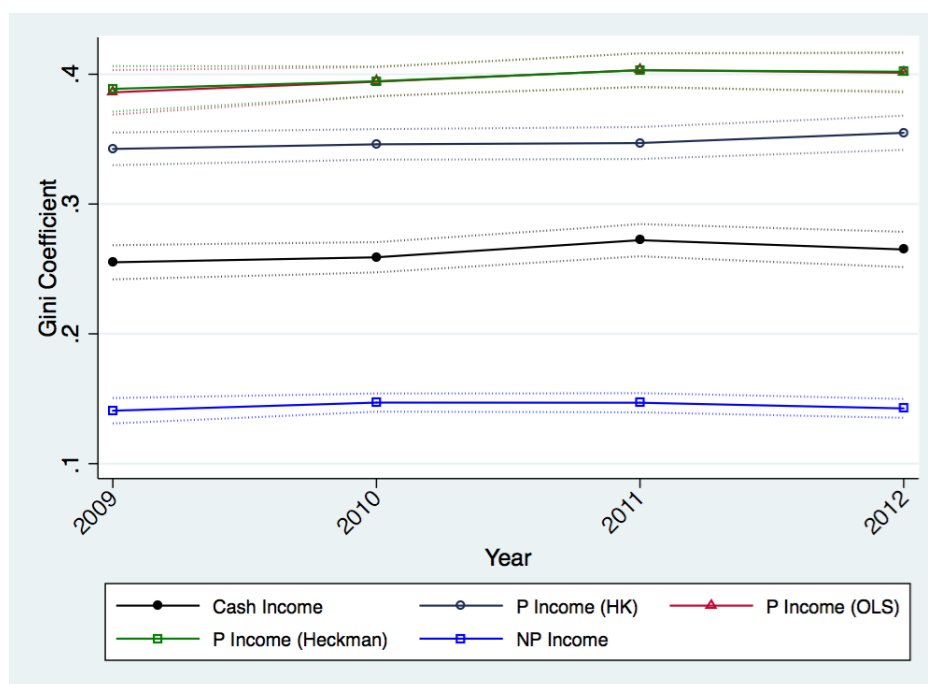
Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.
Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Figure A.3: *Trend in Extended Income Inequality, 2009-2012*



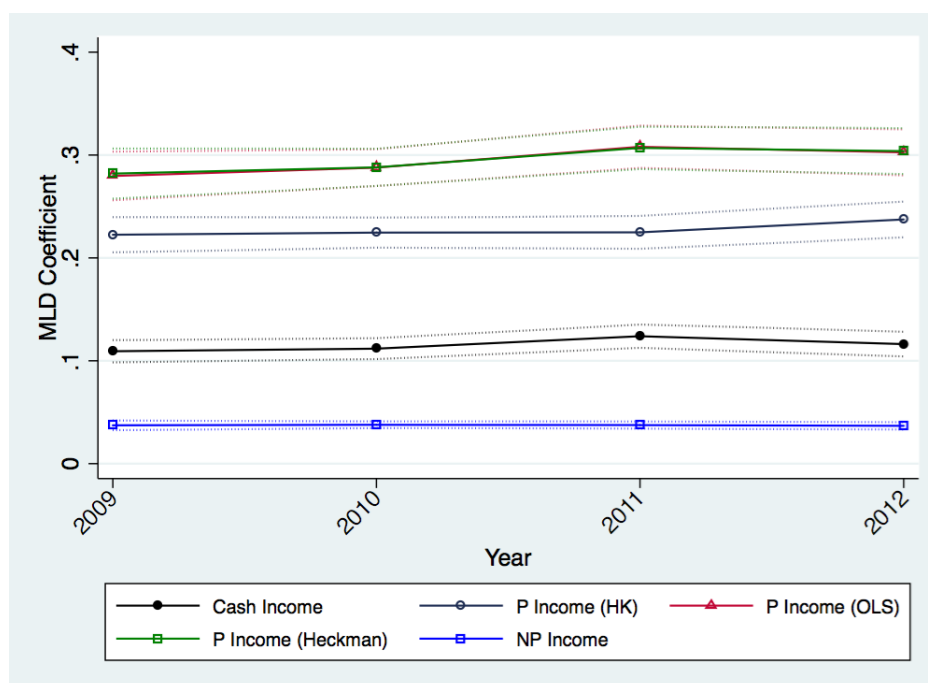
Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.
Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Figure A.4: *Inequality by Income Component, 2009-2012*



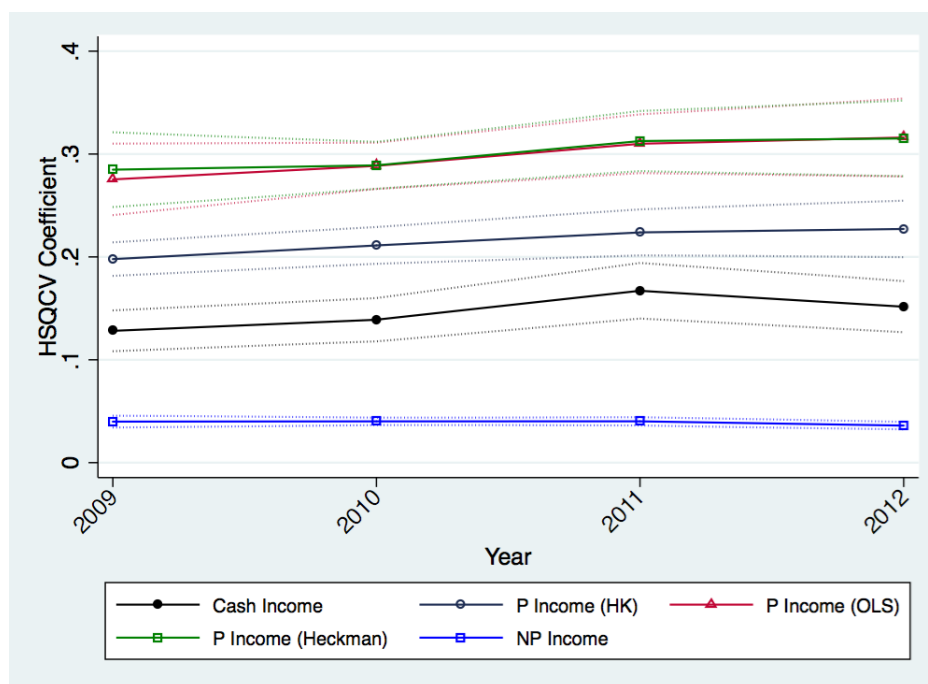
Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.
Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Figure A.5: *Inequality by Income Component, 2009-2012*



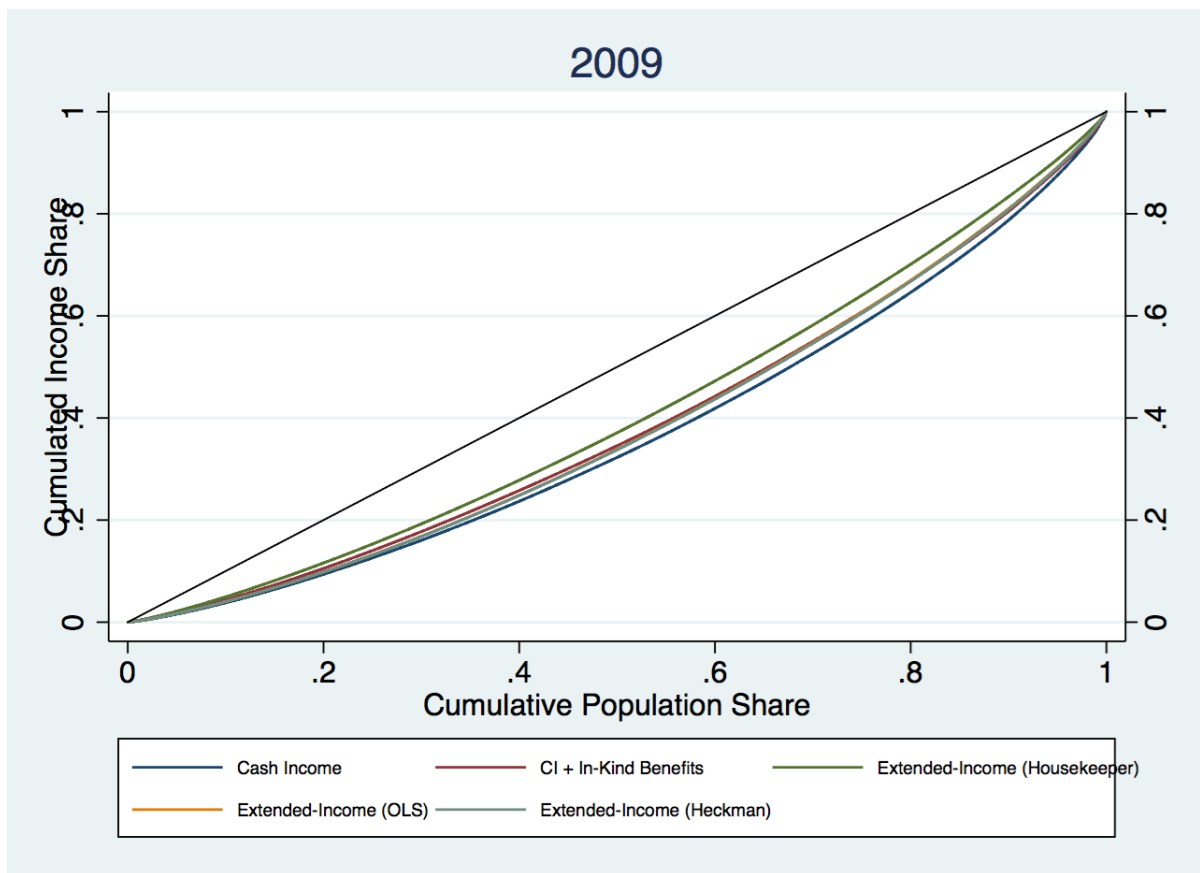
Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.
Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Figure A.6: *Inequality by Income Component, 2009-2012*



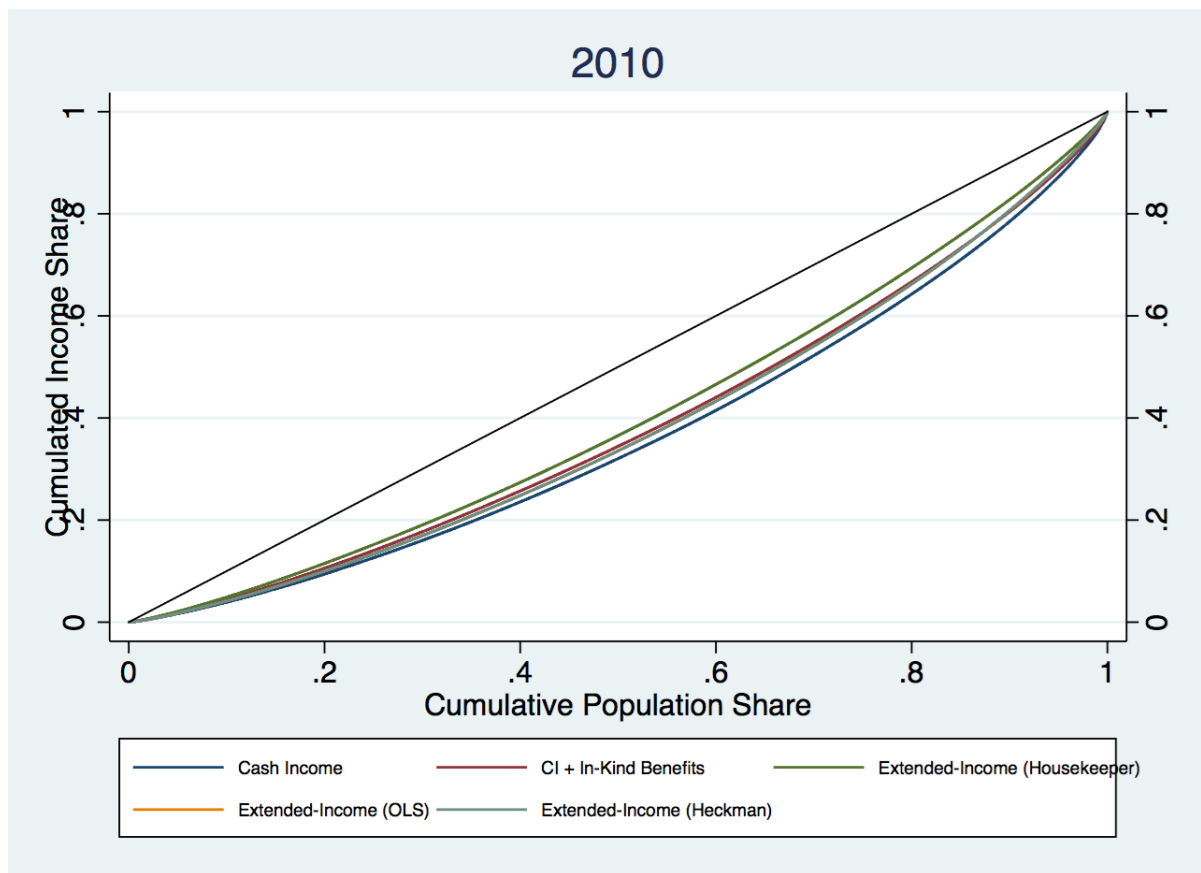
Note: Significance at the five percent level is calculated using bootstrap standard errors with 100 replications.
Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Figure A.7: *Ordinary Lorenz Curve, 2009*



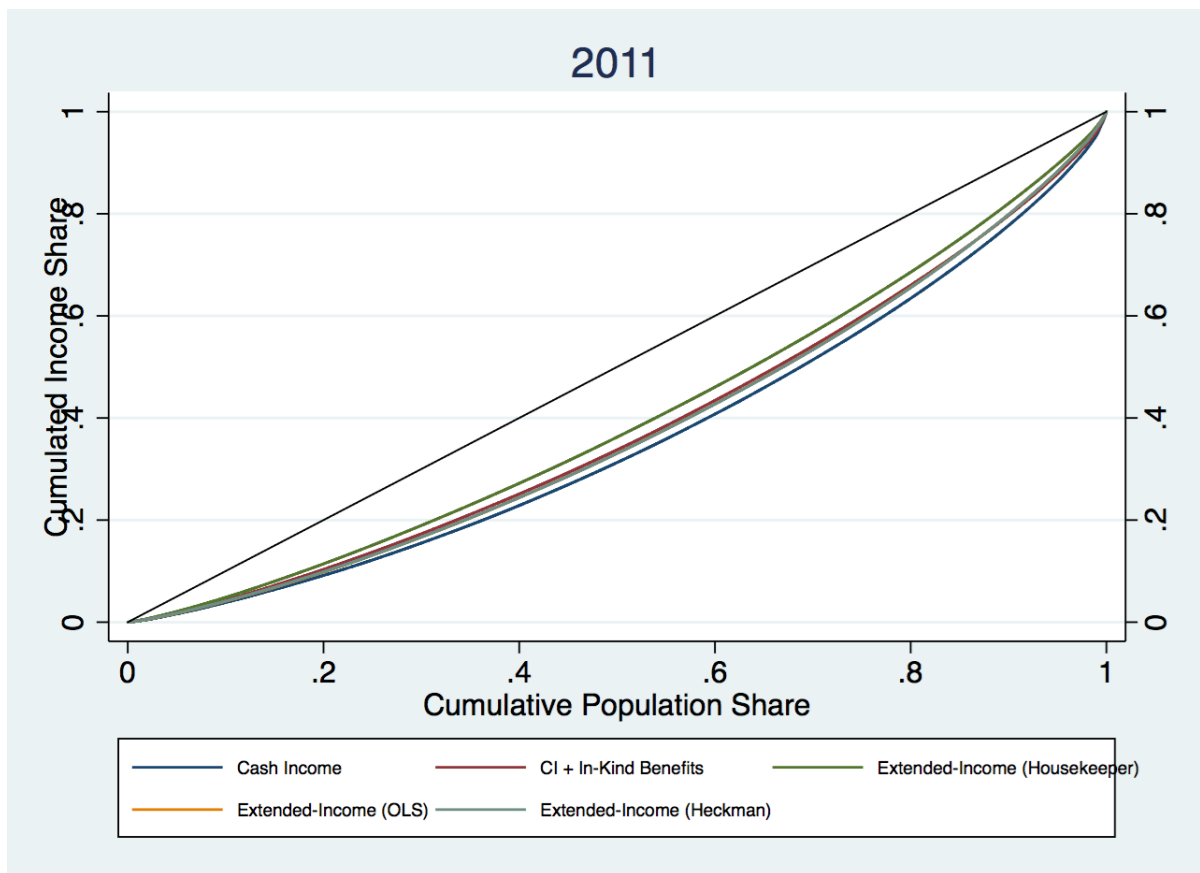
Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Figure A.8: *Ordinary Lorenz Curve, 2010*



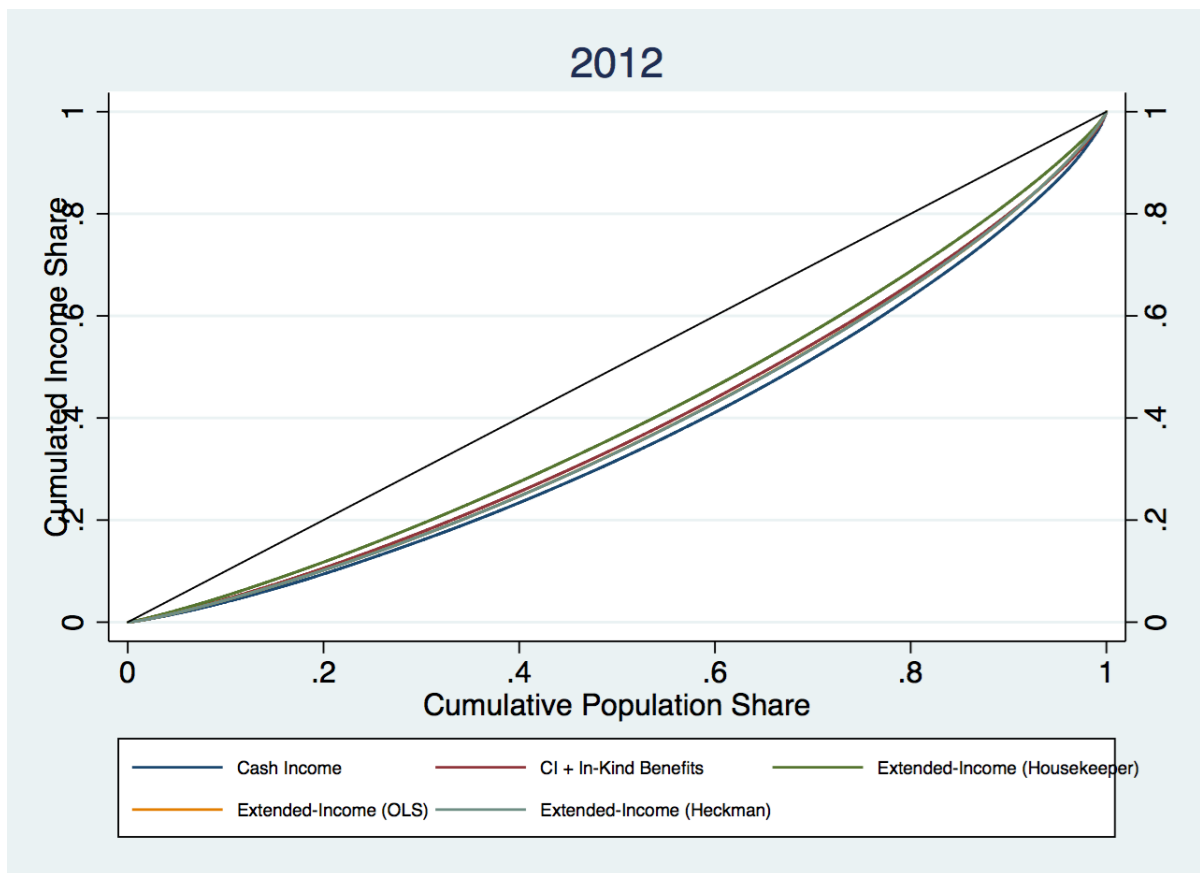
Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Figure A.9: *Ordinary Lorenz Curve, 2011*



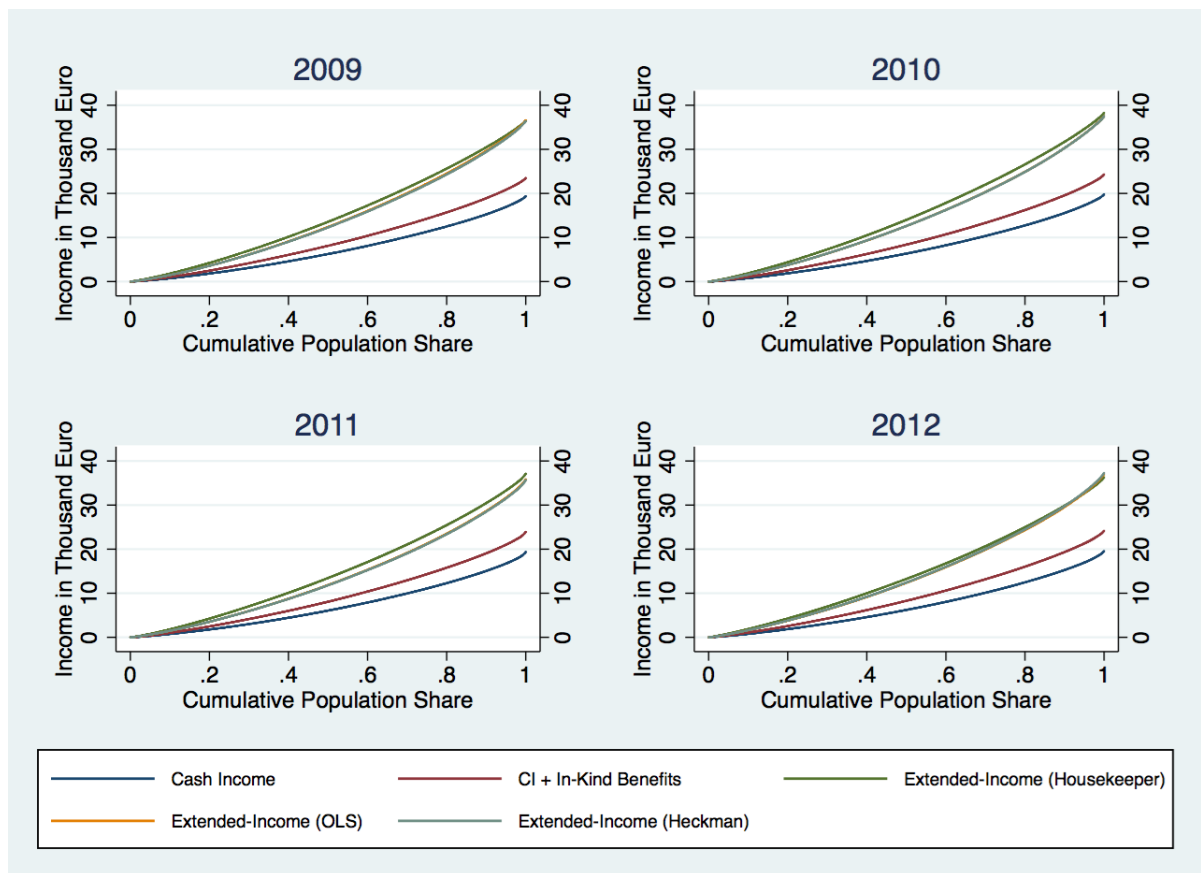
Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Figure A.10: *Ordinary Lorenz Curve, 2012*



Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.

Figure A.11: *Generalized Lorenz Curves, 2009-2012*



Source: SOEP (v30), FiD (v4), and Federal Statistical Office, own calculations.