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The Decomposition of Well-Being Categories – An Application to Germany

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Abstract

In the paper, a combined approach is used to test for inequality differences of several well-being categories for a number of groups of persons. Hereby, total inequality is decomposed into within- and into between-group/category inequality (via a normalised coefficient of variation as the used inequality indicator). The decompositions are categorised into those referring to socio-demographic characteristics (age, sex, nationality, place of residence, household type) and those belonging to different well-being (sub-)categories (several income, wealth, and expenditure categories).

Based on the methodical setting, empirical analyses are performed for Germany using the 2008 German Sample Survey of Income and Expenditure (*Einkommens- und Verbrauchsstichprobe; EVS*) as the database. Out of our numerous findings for both kinds of decomposition, the overwhelming role of within-group/category inequality becomes evident.

By decomposing German (material) well-being inequality in great detail, we shed light on its dimensions, showing that decomposition by income, wealth, and expenditure, as well as by socio-demographic characteristics is important to obtain adequate solutions for socio-political measures. Not considering the fact, from where the real inequality stems from, is like barking up the wrong tree and bears the danger of false political measures regarding social and distributional policy.

JEL Classification: D30, D31, D60

Keywords

Decomposition, Distribution, Inequality, Shift-share analysis, Well-being

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1 Introduction

In principle, from an economic point of view, three main categories regarding material well-being exist: (consumption) expenditures, income, and wealth. In what follows, a combined approach is used in order to test for differences of these alternative measures concerning inequality. This approach consists of decompositions of the inequality with respect to socio-demographic groups on one hand and to well-being categories on the other hand. In this context, we have selected socio-politically important subcategories and characteristics.

The research question is twofold. It is asked whether the inequality of material well-being is dominated by within-group or by between-group inequality. Additionally, it is analysed whether the consideration of the three main dimensions of material well-being will give different results regarding the distribution of inequality.

In detail, the decompositions differ from each other by the unit used: While the decomposition first mentioned divides overall inequality by socio-demographic characteristics of the observation units (households or persons; see, e. g., [Jasso / Kotz (2007)]), the latter decomposition refers to a division into subcategories of the corresponding well-being variable [Chantreuil / Trannoy (2013)]. Thus, in the first case, an inequality indicator I for a variable Y is – for g groups ($g = 1, 2, \dots, G$) – decomposed by $I(Y) = I[I_1(Y), I_2(Y), \dots, I_G(Y)]$, and in the second case, the kind of decomposition is characterised by $I(Y) = I[I(Y_1), I(Y_2), \dots, I(Y_K)]$ for k well-being subcategories ($k = 1, 2, \dots, K$) such that this latter decomposition is a kind of factor analysis.

To measure inequality, the decomposable normalised coefficient of variation (half the squared coefficient of variation; HSCV) out of the class of Generalised Entropy indicators is applied. This way, comparisons between the different well-being categories are possible, which, e.g., help to answer the question concerning the relationship between the dimensions of material well-being [Skopek et al. (2012)]. The analyses include sensitivity calculations, performed as shift-share analyses by varying the population shares.

The paper is set out as follows. First, a short description of the theoretical background regarding the adequate measurement of the distribution of well-being and the relevance of considering socio-demographic groups is given. The next section of the paper describes the database and its merits as well as its shortfalls. After sketching our methodology, we follow with an exhaustive empirical analysis of several well-being dimensions. Finally, we draw some conclusions and offer some proposals for future research.

2 Background

The measurement of the distribution of well-being has a long tradition in economics [Fleurbaey (2008), Juster et al. (1981): 2 ff., Osberg / Sharpe (2005)]. However, up to now, there is no agreement on how to perform it precisely [Attanasio et al. (2006), Eurostat (2010), Osberg / Sharpe (2005), Rendall / Speare (1993)]. Different approaches lead to different results [Attanasio et al. (2006), Brewer / O'Dea (2012), Krueger / Perri (2005), Meyer / Sullivan (2007), Radner (1990), Sabelhaus / Schneider (1997)], and it is still unclear how well-being can be adequately measured [Fisher / Johnson (2006), Hurd / Rohwedder (2006), Smeeding / Thompson (2010)]. If we focus on the economic aspects of well-being, in the literature, it is stated, for using objective measures of well-being that one has to take into account income, wealth, and consumption expenditure¹. For example, the so-called Stiglitz Commission, inter alia, recommends the joint consideration of income, consumption expenditure, and wealth for measuring the material living standard of individuals or households at one point in time [Osberg / Sharpe (2002), Stiglitz et al. (2009): 29 f.].

Hence, material well-being WB can be written as a function of income Y , consumption C , and wealth W at one point in time t :

$$(1) \quad WB_t = U_t(Y_t, C_t, W_t).$$

Nonetheless, although the report of the Stiglitz commission received a lot of attention, until today, there are other opinions on how to obtain appropriate information about the material well-being of people. For example, Eurostat does not take into account wealth or consumption in its proposal for an EU-wide well-being indicator set ([Eurostat (2010)]: Table 4). Similarly, the Organisation for Economic Co-Operation and Development (OECD) does not use consumption or wealth as an indicator for measuring social well-being [Organisation for Economic Co-Operation and Development OECD (2011b)].

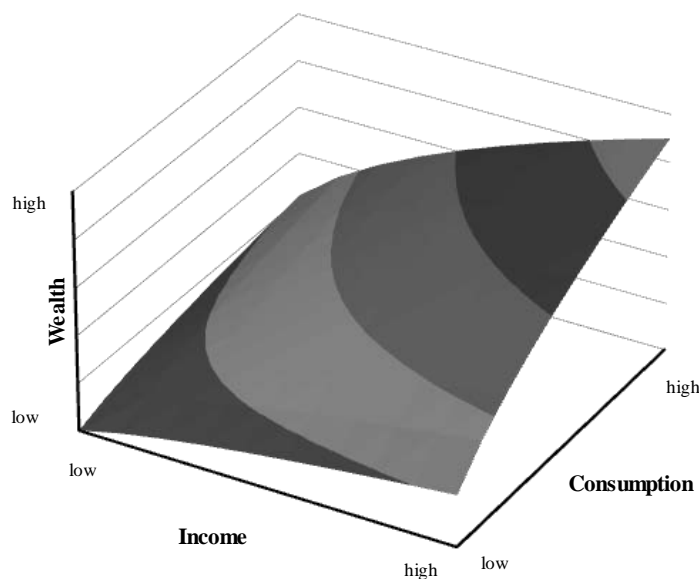
However, if only one or two of the material dimensions are taken into account, one gets an incomplete picture of the material standard of living because each of the dimensions entails information which cannot be obtained otherwise. Income, consumption, and wealth, each of them sheds a different light on the material status of households or individuals.

Income, for example, can be seen as a measure for actual consumption capacity and only as one side of the coin neglecting, inter alia, the needs of people. Expenditures are the back side of the same coin where the measurement focuses on the needs of people without, e.g., considering the income potential for consumption – for instance,

¹ These three aspects only measure the material living standard [Stiglitz et al. (2009): 14] and ignore immaterial dimensions of well-being.

not differentiating between labour income and benefits or transfers – and neglecting the intertemporal decision of people to save money for future consumption. Wealth is the potential for future income and expenditures, albeit also generating income for consumption within the current time period, depending on the structure of wealth. Moreover, the structure of consumption is influenced by wealth as follows: If one lives in a self-owned house or flat, one may not have to pay rent, interest, or for the return of a loan.

Figure 1: *The Three Dimensions of material well-being*



Source: Author`s own illustration

A two-dimensional approach for comparing the well-being of households may be appropriate if one of the arguments of the well-being function: Y , C , or W , can be assumed to be constant over time. However, this may only be the case for wealth over shorter time periods in which the mobility of wealth may be very low. If the initial distribution of wealth is known, the problem of comparing the well-being of people is reduced to two dimensions: income and consumption as well as their interactions. However, wealth is basically not constant over time, and the differences in well-being depending on wealth can easily be seen by comparing a household with low income and no wealth with a household with the same income but high wealth: the former is worse off than the latter. Therefore, drawing conclusions on the overall welfare of people or households regarding, e.g., the usage of a specific social policy measure – as often has been done ([Jappelli / Pistaferri (2010), Meyer / Sullivan (2011), Muellbauer (1974), Pradhan (2009)] to name a few) – is problematic, to say the least.

However, by no means, it is intended to say that it is unnecessary to analyse the relationship between, e.g., income and expenditures or income and wealth, or even to

use only income or expenditures to measure, e.g., poverty at one point in time. Different research questions may need different methods to receive appropriate answers and to obtain adequate measures, e.g., for social policy. Dealing with the material well-being of people, one has to take into account all relevant aspects, and the possibilities for future consumption cannot be left behind [Stiglitz et al. (2009): 105 ff.]. Therefore, beside the analysis of the actual situation regarding income and consumption, future consumption has also to be considered, especially in systems which have to deal with social risks such as longevity, health care, long-term care, unemployment, invalidity, etc. which in modern welfare states are more or less covered by security systems.

In the context of policy recommendations, it is necessary to have appropriate indicators. Otherwise, if income, wealth, or consumption expenditures are not adequately measured and influential factors are not appropriately considered, one could draw wrong conclusions. Making mistakes here – or not being well-informed about the real situation –, might result in misleading recommendations for social or distributional policy. As the Stiglitz commission has stated: “(...) What we measure affects what we do; and if our measurements are flawed, decisions may be distorted (...)” [Stiglitz et al. (2009): 7].

For example, to analyse the development of well-being over time or to compare the situation between regions, one has to take into account the general set up and its differences. For instance, legal regulations change over time and are different between states.² The amendments of a law do not affect all people in the same way. A drastic example is the accession of the New Laender in Germany – the so-called German reunification [Andel (1993), Böhm / Pott (1992), Schmähl (1992)]. Another one has been the successive dismantling of the earnings-related social pension scheme in Germany since 2000 [Börsch-Supan et al. (2008), Ginn et al. (2009), Schmähl (2007), Schmähl (2003), Schmähl (2004)]. As people are at different positions in their life cycle, decisions on saving are made under different circumstances but have long-lasting effects. People are bound to their previous decisions especially regarding old-age provision and, e.g., not able to change a contract or only at high costs. Pensioners are not even able to counteract the reduction of the benefits of the pension system. Therefore, the distributions of income and wealth at one point in time might reflect, at least partly, the legal situation at a previous point in time.

² This leads to serious problems in international comparisons, e. g., between social security systems, and, for instance, the indicators of the so-called open method of coordination are not able to tackle all the relevant differences [de la Porte (2008), Zirra/Buchkremer (2007), Commission of the European Communities (2006), Arrowsmith et al. (2004)].

Other relevant circumstances, which influence the distribution of well-being and have to be taken into account, are the demographic situation and its changes over time. The reason for this is that changes of the age composition of the population will lead to an increase or decrease of the inequality of well-being by itself without any changes in income, consumption expenditure, or wealth. In the light of the upcoming challenges due to changes of the demographic structure of western societies – ageing and shrinking populations –, the effects of those demographic changes on the distribution of well-being become more and more important.

If, for example, income is changing over an individual's life cycle – as would be the case if the income profiles are inversely U-shaped, as is assumed by the human-capital approach or by the life-cycle theory³ –, the changes due to an ageing population will have effects on the distribution of income [Jenkins / O'Higgins (1989), Paglin (1975), Paglin (1977), Paglin (1979), Paglin (1989)].

The same holds true for consumption as the needs of people change over one's life cycle [Aguar / Hurst (2005), Aguiar / Hurst (2008), Aguila et al. (2008), Bick / Choi (2012), Buslei et al. (2007), Fachinger (2001a), Fachinger (2009)]. The expenditures, e.g., for health products are correlated with age.⁴ Thus, the changing needs will affect the structure of consumption and not necessarily the total amount of household spending. Assuming that people maximise their utility over their life cycle and that they have more freedom of choice at which point in time and how much they will spend contrary to their income, one may suppose that households will spend more or less the same amount of money in each time period to reach the same consumption level according to the life-cycle theory [Rendall / Speare (1993): 1 f.]. However, empirical analysis indicates that age-consumption profiles are smoother than age-income profiles but nonetheless not constant over time [Alessie et al. (1997), Attanasio et al. (1999), Attanasio / Browning (1995), Attanasio / Weber (1995), Blundell et al. (1994), Fachinger (2001a): 252 ff., Fachinger (2009): 74 f., Fernandez-Villaverde / Krueger (2004), Fisher et al. (2008), Gourinchas / Parker (2002)].

In principle, the accumulation of wealth will take time – aside from inheritance and winning in lotteries and alike –, and aged people have had more time than younger age groups to become wealthy. As the accumulation of wealth takes part over an individual's life cycle – at least until retirement – and dissaving may dominate during the phase of retirement [Rendall / Speare (1993): 2 f.], demographic changes will influence the distribution of wealth. The implication of the overall effect of an ageing

³ For an empirical analysis for Germany, see [Fachinger/Himmelreicher (2012)] with further literature.

⁴ Calendric age can be seen as a proxy for cognitive or physical changes of individuals over time ([Settersten/Mayer (1997)]; see for detailed information on aspects of ageing [Bengtson et al. (2009)]).

population on the distribution of wealth is not clear [Davies / Shorrocks (2000), Krueger / Ludwig (2006)]. However, as pensioners principally need to dissave for maintaining their standard of living and with less people in a shrinking population who will demand such goods, the asset prices (e. g., concerning real estate), *ceteris paribus*, may decrease [Davies / Shorrocks (2000): 616]. Additionally, the effects of inheritance have to be taken into account [Davies / Shorrocks (2000), Gale / Potter (2003), Wolff / Gittleman (2011), Wolff (2003), Wolff (2002), Modigliani (1988), Oulton (1976)]. *Ceteris paribus*, this may shift wealth to a specific age group which, on average, may be twenty to thirty years younger [Bowles / Gintis (2002)].

Overall, the discussion above illustrates that demographic effects should be considered when analysing the well-being of people for each of the components of material well-being: income, wealth, and expenditure. But there are only a few analyses in which those aspects are considered in toto. The joint consideration of the three components of economic well-being is not often carried out, and only a few analyses exist despite the overall agreement on their relevance.⁵

Furthermore, reports on the economic well-being of people tend to be very comprehensive with very detailed information especially about income and wealth of individuals and households. This means that a great interest in distributional and social policy on information about the distribution of well-being and its development exists (for Germany see, e.g., [Bundesministerium für Familie (2005), Bundesregierung (2012), Bundesregierung (2009), Sachverständigenkommission zur Erstellung des Sechsten Altenberichts der Bundesregierung (2010), Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung (2011)], and for the international situation see, e. g., [International Labour Office (ILO) (2010), Organisation for Economic Co-Operation and Development OECD (2011a), Organisation for Economic Co-Operation and Development OECD (2011b)]). However, in most of those studies the three dimensions of material well-being are not jointly considered, and only a few studies exist, in which decomposition analyses were performed. Burkhauser et al. [Burkhauser et al. (1997)], Radner [Radner (1990)], or Niehues and Schröder [Niehues / Schröder (2012)], for example, use income and wealth as well as different age classes for their decomposition analyses whereas the Expert Committee of Family Budgets [Expert Committee on Family Budgets (1980)],

⁵ Approaches pointing in the sketched direction refer to relatively comprehensive well-being indicators, such as the Levy Institute Measure of Economic Well-being (LIMEW) consisting of base income, income from wealth (including annuity from non-home wealth), net government expenditure, and household production [Sharpe et al. (2011), Wolff et al. (2011)], the Human Development Index (HDI) consisting of life expectancy, education, and per-capita income [United Nations Development Programme (UNDP) (2011): 167 ff.], or the Index of Economic Well-being (IEWB) consisting of per-capita consumption, per-capita wealth, economic inequality, and economic security [Osberg/Sharpe (2009)].

Garner [Garner / Short (2004)], Johnson [Johnson et al. (2005)], Meyer [Meyer / Sullivan (2007)], or Osberg [Osberg / Sharpe (2004)] use income and expenditures. Contrary to that, e. g., Hauser and Becker [Hauser / Becker (1999)] or recently Grabka and Kuhn [Grabka / Kuhn (2013)] only use income for their decomposition of inequality.

The lack of empirical analysis may be due to the restriction of data – e. g., in Germany, the Socio-Economic Panel (SOEP), as the most often used representative database for analysing the well-being of people or households, does not regularly contain information about the wealth and the expenditures of people or private households.

In what follows, the three dimensions are considered together for the decomposition of inequality of private households' material well-being. The decomposition will follow five strands, which, in literature, are seen as the main reasons for the inequality of well-being: age, gender, type of household, place of residence (as a proxy for institutional factors), and differences in socialisation, language, education and alike are proxied by nationality. All those categories are thought of influencing the inequality of well-being according to theory, and there is a great deal of literature which gives theoretical foundation and empirical evidence on those factors [Arrow (1973), Barrett et al. (2000), Becker (1971), Becker (1981), Bishop et al. (1997), Chu / Jiang (1997), Darity Jr. / Mason (1998), Deaton / Paxson (1998), Gerhart (1990), Heckman (1998), Jäntti (1997), Lang (1986), List (2004), Oaxaca (1973), Peichl et al. (2012), Stiglitz (1973), Sung (2010), Weizsäcker (1996)].

Despite the large body of literature, it is not easy to formulate hypotheses about the impact of those factors on the inequality of well-being, as von Weizsäcker stated [Weizsäcker (1996)]; there is no simple answer, and, e. g., just the relation between population ageing and the distribution of well-being is very complex [Barrett et al. (2000), Bishop et al. (1997), Deaton / Paxson (1998), Sung (2010), Weizsäcker (1996)]. From a theoretical point of view, it is not possible to come to a conclusion as there are too many channels by which the factors potentially influence the distribution of well-being. Therefore, empirical analysis must shed light on the corresponding impacts.

Nonetheless, some hypotheses could be drawn out of the extensive literature on some of the above mentioned factors and their effects on the distribution of material well-being. It is well-known, for example, that discrimination takes place and women have sometimes lower incomes than men [Becker (1971), Darity Jr. / Mason (1998), Gerhart (1990), Oaxaca (1973)]. If so, well-being of women should be lower than that of men as lower incomes will have an effect on all well-being dimensions. Another hypothesis can be deduced regarding the place of residence which demonstrates the relevance of the effects of legal regulation and its changes over time on the

distribution of material well-being. It is well documented that in Germany an adverse selection has taken place since 1989 as especially young and well-educated men have switched their abode, migrating from East to West Germany, leaving behind old and poorly trained people. Therefore, it can be assumed that the material well-being in West Germany will be higher than in East Germany [Fuchs-Schündeln (2008), Jäntti (1997), Schwarze (1996)].

However, we are not trying to deduce or to analyse an explanatory model, but we will have a look at differences between and within those groups defined by age, residence, nationality, gender, and type of household regarding the inequality of income, wealth, and consumption.

3 Data

The data used in the paper are from the 2008 German Sample Survey of Income and Expenditure (*Einkommens- und Verbrauchsstichprobe*; hereafter: *EVS*) of private households [Statistische Ämter des Bundes und der Länder (2005), Statistisches Bundesamt (2012a)]. The *EVS* is a (more or less) representative quota sample and has been drawn by the German Statistical Office as a cross-sectional database since 1962 (in intervals of five years). The participation in the survey is voluntary, and the 2008 *EVS* comprises 55,100 households and 125,714 persons.

The survey units are persons living in private households [Statistisches Bundesamt (2005): 3]. This comprises people living by themselves as well as groups of people living together and sharing a common budget. Thus, the survey contains information at the individual and at the household level. As a result, people with no fixed residence, such as homeless persons, and people who are living in public establishments or institutions, like residential care homes, prisons, common housings, community homes, or social housings, are excluded from the survey. Additionally, households with a monthly net income of more than EUR 18,000 are also omitted to guarantee their anonymity.

The *EVS* contains very detailed information about the socio-demography of private households, especially about the income sources, their wealth, and their expenditures [Becker et al. (2002): 56 ff., Bönke et al. (2010): 30 ff., Statistisches Bundesamt (2010b)]. The data are collected in two different ways [Statistisches Bundesamt (2005): 5 f.]:

- by an introductory interview with two questionnaires to gather socio-economic information, information about household equipment, and about financial and tangible assets households have and

- by means of written surveys which include a household and a log book. All households keep the household book for one quarter of a year. In each quarter, about 25 per cent of the respondents have to write down all of their receipts and expenses. Therefore, information about the expenses and receipts of households over one year is available but not for the same household. Additionally, the log book covers the expenditures for food, beverages, and tobacco in great detail for one month [Statistisches Bundesamt (2010c)].

3.1 Socio-demographic information

As mentioned above, the *EVS* contains information both at the household and the individual level. Collected characteristics at the household level, inter alia, include (see Appendix, Table 15):

- place of residence (*Bundesland*) – for our analysis, the data are categorised in West and East Germany,
- type of household – the numerous types are aggregated to singles, single-parent households, two adults, and parents with children (as well as “other household types”),
- number of household members, and
- nationality.

Additionally, the EVS provides personal characteristics up to eight household members. The person, who is used for identifying the household, is the so-called household head, who must be a person of age 20 to 85 and contributing most to the household income. At the individual level, there are several characteristics (see Appendix, Appendix,

Table 16). Out of these characteristics, we refer to sex, year of birth, and place of residence to control for gender-, age-, and spatial-related impacts on well-being.

3.2 Income sources

One main goal of the *EVS* is to obtain detailed information about all income sources; therefore, income is collected in great detail at the individual and at the household level. At the household level, income is recorded in different ways of aggregation: Information is given for household gross income and household net income, disposable household income, and earned income. There are also several subcategories:

- earned income from dependent employment,
- earned income from self-employment (e. g., as a farmer or as a businessman),
- capital income,
- income from public transfers,
- income from private transfers, and
- total returns.

Since we use household net income in our empirical analyses as the main income variable, total returns are excluded. In this context, the two first mentioned income subcategories are aggregated to the category “labour income”, and, furthermore, income from private transfers is added to income from public transfers resulting in the category “transfers”. It should be noted that individual income is even more differentiated as the *EVS* covers all possible income sources (see, for more details, Appendix, Table 18⁶).

To obtain a complete picture of the financial situation of individuals and households, additionally, all taxes and contributions are recorded in the *EVS* (in detail, Appendix,

⁶ For a list of all income sources, see [Statistisches Bundesamt (2010b): 12 ff., Statistisches Bundesamt (2012b): 11 ff.].

Table 19), and they are summarised by “taxes and contributions” in our empirical analyses.

3.3 Consumption expenditure

Consumption expenditure is arranged in twelve categories in the *EVS*⁷ (see, in detail, Appendix,

⁷ [Statistisches Bundesamt (2010b)]; for an English translation, see, e. g., [Bönke et al. (2010): 24 ff.].

Table 17). For reasons of reducing complexity, we have decreased the number of expenditure categories to only seven expenditure groups.

The categories are, to some degree, quite heterogeneous and, e.g., comprise goods with low prices such as bus tickets up to very expensive goods like cars within the category transport. Another problem is the mix of durable and non-durable goods. As durable goods are, on average, expensive, those expenditures may skew their distribution in a quarter but, maybe, they will level out over a year. A further problem is that durables are not consumed over a short period of time, and, thus, consumption may stretch over several years. This, in general, leads to an overestimation of consumption within the period where the corresponding product was purchased and to an underestimation in other periods.

3.4 Wealth

The overall wealth of private households is measured in the *EVS* as the sum of monetary assets, tangibles, and real estate including the estimated value of house property [Hauser / Stein (2003): 24 ff.].⁸ In our empirical analyses, we divide private wealth into monetary assets and real estate. All wealth variables used are defined as net values, i. e., by subtracting debts from gross-wealth values.

However, with respect to the financial accounts of the *Deutsche Bundesbank* [Deutsche Bundesbank (2012)], only around 50 per cent of financial assets are considered [Bartzsch / Stöss (2007): 221, Hauser / Stein (2003), Fachinger (1998), Niehues / Schröder (2012): 5]. The differences are mainly due to the omission of several items in the *EVS*. For example, currency and transferable deposits, claims on insurance corporations, and claims from company-pension commitments are not included in the questionnaire. Also not recorded – as wealth subcategories – are the market values of equities in private businesses (except current values of quoted shares), consumer durables, jewellery, and objet d´art.

Furthermore, in the financial accounts of the *Deutsche Bundesbank*, the wealth of non-profit institutions serving households are also taken into account [Deutsche Bundesbank (2012): 8] but not in the *EVS*. Thus, the wealth of private households is not totally recorded in the *EVS*; however, the most common elements of private households' wealth are covered [Hauser / Stein (2003): 4 f.].

3.5 Limitations

As was partly mentioned above, there are some analytical limitations to the *EVS* regarding the representativeness of the results [Becker / Hauser (2003): 71 ff.]:

⁸ However, it is disputed whether housing wealth can be seen as wealth by itself [Buiter (2008)].

1. Institutionalised and homeless persons are not included in the *EVS*.
2. Households with a non-German head are underrepresented.
3. The *EVS* is not a randomised but a quota sample. Households with a (very) high income of EUR 18,000 per month are excluded, and households with very low incomes are underrepresented. Furthermore, the participation in the survey is voluntary. All of these aspects lead to the so-called “middle-class bias”.
4. The participants are not asked about their expenditures and incomes during a complete year but only – in a procedure of rotation – during a quarter.

Whereas, in our eyes, points 1 to 3 tend to reduce the revealed degree of inequality regarding (material) well-being, point 4 probably has a tendency towards the opposite effect. This is because there are special payments in single quarters like Christmas bonuses. Nevertheless, it may be that such special payments in particular quarters offset each other over a one-year period, so that the assumed bias would not take effect (at least not to a large extent).

4 Method

In order to capture (socio-)demographic and other impacts on the measured inequality of (equivalent) well-being, it makes sense to use a decomposable inequality measure. For such purposes, the usage of a general class of inequality indicators is convenient. A very popular class of indicators is the family of Generalised Entropy (GE) measures. Concerning those measures, groups' population shares serve as weighting factors as well as groups' well-being shares. Hereby, it is possible to investigate within-group and between-group influences of inequality where the assumed groups must be disjoint to each other. The within-group component measures the weighted sum of the analysed indicator for the different groups. Concerning the between-group component, each member of a group is given the average well-being level of his/her group [Rodrigues (1993): 6].

It holds true:

$$(2) \quad GE = \begin{cases} \frac{1}{(\lambda^2 - \lambda) \cdot n} \cdot \sum_{i=1}^n \left[\left(\frac{Y_i}{\mu} \right)^\lambda - 1 \right] & \text{for } \lambda \neq 0 \wedge \lambda \neq 1 \\ \frac{1}{n} \cdot \sum_{i=1}^n \ln \left(\frac{\mu}{Y_i} \right) & \text{for } \lambda = 0 \\ \frac{1}{n} \cdot \sum_{i=1}^n \left[\frac{Y_i}{\mu} \cdot \ln \left(\frac{Y_i}{\mu} \right) \right] & \text{for } \lambda = 1 \end{cases}$$

[GE = Generalised Entropy index, λ = parameter with respect to inequality preferences, n = population size, Y_i = well-being level of person i , μ = mean well-being level].

The parameter λ reflects the social perceptions of inequality. If λ is greater than 0, the upper well-being region receives a relatively high weight with respect to inequality; the opposite is the case if λ is less 0. For $\lambda = 0$, the GE measure represents the mean logarithmic deviation, for $\lambda = 1$, Theil's well-known entropy measure is the result, and for $\lambda = 2$, the GE measure corresponds with the normalised coefficient of variation (:= half the squared coefficient of variation).

GE can be additively decomposed into a within-group and a between-group component of inequality, as mentioned above:

$$(3) \quad GE = \underbrace{\sum_{g=1}^G v_g^\lambda \cdot w_g^{1-\lambda} \cdot GE_g}_{\text{within - group inequality}} + \underbrace{GE_B}_{\text{between - group inequality}}$$

The weighting factors w_g ($= n_g/n$) represent the population shares of the several groups of persons g ($g = 1, 2, \dots, G$), μ_g is the mean of well-being levels within group g , v_g ($= w_g \mu_g / \mu$) denotes the group-specific share of the aggregated well-being level, and GE_g symbolises the within-group GE inequality measure and GE_B the between-group GE well-being indicator.

At this, GE_B is defined in the following way (see also [Faik (1995): 326 ff.] which is primarily based on [Cowell (1980), Shorrocks (1980), Mookherjee / Shorrocks (1982), Jenkins (1991)]]:

$$(4) \quad GE_B = \begin{cases} \frac{1}{(\lambda^2 - \lambda)} \cdot \left\{ \left[\sum_{g=1}^G w_g \cdot \left(\frac{\mu_g}{\mu} \right)^\lambda \right] - 1 \right\} & \text{for } \lambda \neq 0 \wedge \lambda \neq 1 \\ \sum_{g=1}^G w_g \cdot \ln \left(\frac{\mu}{\mu_g} \right) & \text{for } \lambda = 0 \\ \sum_{g=1}^G v_g \cdot \ln \left(\frac{\mu_g}{\mu} \right) & \text{for } \lambda = 1 \end{cases}$$

The normalised coefficient of variation as half the squared coefficient of variation (HSCV) is decomposable as follows [Faik (2010): 13 f.]:

$$(5) \quad HSCV = \underbrace{\sum_{g=1}^G v_g^2 \cdot w_g^{-1} \cdot HSCV_g}_{\text{within - group inequality}} + \frac{1}{2} \cdot \underbrace{\left\{ \left[\sum_{g=1}^G w_g \cdot \left(\frac{\mu_g}{\mu} \right)^2 \right] - 1 \right\}}_{\text{between - group inequality}}$$

where $v_g^2 w_g^{-1}$ corresponds with $w_g (\mu_g/\mu)^2$.

Using the squared coefficient of variation (SCV; i. e., twice HSCV and, thus, using a simple transformation of HSCV), von Weizsäcker [Weizsäcker (1993): 38 ff.] illustrates some impacts of demography on income inequality within the framework of differential analysis. The squared coefficient of variation is differentiated with respect to the population share of the gainfully employed persons x (and, thus, implicitly with respect to the quotient between the elderly and the young people). As a total differential, von Weizsäcker obtains (under some simplifying assumptions, inter alia, by dismissing capital gains):

$$(6) \quad \frac{dSCV_{GG}}{dx} = \frac{\partial SCV}{\partial x} + \frac{\partial SCV}{\partial tx_{GG}} \cdot \frac{dtx_{GG}}{dx} + \frac{\partial SCV}{\partial c_{GG}} \cdot \frac{dc_{GG}}{dx} =$$

$$(1 - tx_{GG}) \cdot (1 - c_{GG}) \cdot \left[2 \cdot \frac{\mu_p}{\mu_A} - x \cdot (1 - tx_{GG}) \cdot (1 - c_{GG}) \right] \cdot \sigma_A^2$$

$$- (2 - x) \cdot \sigma_p^2 + (\mu_{Y,GG} - \mu_p) \cdot [(3 - 2 \cdot x) \cdot \mu_p - x \cdot \mu_A]$$

[SCV_{GG} = squared coefficient of variation within economic equilibrium, x = population share of the gainfully employed persons, tx_{GG} = tax rate within economic equilibrium, c_{GG} = contribution rate of the German statutory pension system within economic equilibrium, μ = average pension, μ_A = average gross labour income, σ_A^2 = variance of gross labour income, σ_p^2 = variance of pensions, $\mu_{Y,GG}$ = average total gross income within economic equilibrium with total income := labour income plus pensions].

The first term in the first row of Equation (6) reflects the direct influence of population – in the sense of “ageing” – on the squared coefficient of variation. Within von Weizsäcker’s (equilibrium) model, this effect is negative since von Weizsäcker assumes a lower inequality level within the group of the elderly compared to the young people. Concerning the second term in the first row of Equation (6), it is assumed that an increase of the quotient between the elderly and the young people leads to a rise of the tax rate, and this causes a diminishment of the measured inequality. The latter is also true for the third term in the first row of Equation (6) where an increasing quotient between the elderly and the young people generates an increase of the contribution rate of the German statutory pension system and, in a

next step, a reduction of total inequality. Thus, within von Weizsäcker's simple model, the mentioned terms indicate that an increase of the quotient "elderly/young people" causes a diminishment of total income inequality. This example illustrates the possible applications for analysing the relationships between (socio-)demography and economy (or distribution).

In this context, a further issue is relevant: the role of the different income components since they are of different importance during the individual life cycle. Labour income, for instance, plays an outstanding role during the individual working life while it is before and after working life (childhood or old age) of less importance compared with other kinds of income. Amidst the backdrop of demographic changes, shifts concerning the societal importance of different kinds of income are realistic (with corresponding changes regarding income/well-being distribution and income/well-being inequality).

Methodically, the inequality of equivalent household net income can be decomposed as follows (for HSCV; alternate decomposition rules may be found, e. g., in [Sastre / Trannoy (2002)]):

$$(7) \quad HSCV_{Y_n} = HSCV_L \cdot s_L^2 + HSCV_{Tr} \cdot s_{Tr}^2 + HSCV_{CG} \cdot s_{CG}^2 + \frac{1}{2} \cdot \frac{Inter}{\mu_n^2}$$

where:

$$s_L = \frac{\mu_L}{\mu_{Y_n}}, \quad s_{Tr} = \frac{\mu_{Tr}}{\mu_{Y_n}}, \quad s_{CG} = \frac{\mu_{CG}}{\mu_{Y_n}}, \quad Inter = 2 \cdot cov(L, Tr) + 2 \cdot cov(L + Tr, CG)$$

[HSCV = normalised coefficient of variation, s = share of the corresponding kind of income concerning total income, Y_n = equivalent household net income, L = equivalent household labour income, TR = equivalent household net transfers (i. e., transfers minus taxes), CG = equivalent household capital gains, cov = covariance, μ = arithmetic mean].⁹

In general, for considering well-being relatively comprehensive, an approach is needed that exceeds a pure income-based analysis. A possibility to reach this aim is

⁹ Equation (7) is applied to the well-being category "net income". However, this equation may be easily generalised to other well-being categories and their subcategories. By the way, an alternative decomposition proposal, for the Gini coefficient, is from [Lerman/Yitzhaki (1985): 152 f.]: $G = \sum_{k=1}^K s_k \cdot G_k \cdot R_k$ [G = overall Gini coefficient; s_k = share of well-being component k on the total well-being value; G_k = Gini coefficient of well-being component k; R_k = value of the correlation between well-being component k and total well-being; $k = 1, 2, \dots, K$]. This formula demonstrates that the Gini coefficient is very clearly decomposable by subcategories (i. e., without any interacting term between the several subcategories). But contrary to that, the Gini coefficient cannot be decomposed by population groups simply into a within-group and into a between-group inequality component like a GE indicator (see, regarding this disadvantage of the Gini coefficient, e. g., [Shorrocks (2013): 116 f.]).

the construction of a well-being indicator covering the multidimensionality of well-being in a single variable [Atkinson), Kakwani / Silber (2008a), Kakwani / Silber (2008b)]. Theoretically, both material and immaterial aspects could be considered in such an indicator, but this would raise many problems, e.g., the evaluation of differently scaled aspects. Thus, a less ambitious procedure seems indicated. In concrete terms, we follow a proposal made by Weisbrod and Hansen [Weisbrod / Hansen (1968)] to “simply” combining both income and wealth information (i. e., a restriction of analysis on material aspects of well-being). Within this approach, wealth values are discounted to a certain (base) year, and afterwards these discounted values are added to the (net) income values; concretely, we choose as the discount rate a value of 5 per cent, and the calculations of the (ordinary) annuities are based on an official German mortality table from 2007/09 [Eisenmenger / Emmerling (2011)]. This well-being variable is a combination of income and wealth values in the sense of a flow variable normalised by equivalence scale values in order to compare households of different size and different composition. Previous German analyses in this direction are from Thiele [Thiele (1998)] and from Hauser et al. [Hauser et al. (2007)].

All used variables are defined as *equivalent* household well-being variables (including economies of scales within a household) with the exception of net wealth and its components. Net wealth and its components are calculated as *per-capita* variables because needs do not play an important role in this context. All other well-being categories are, in concrete terms, calculated as equivalent variables by normalising the corresponding well-being levels for all households via the “new OECD equivalence scale” [Hagenaars et al. (1994), Organisation for Economic Co-Operation and Development (OECD) (2009)]¹⁰. In a next step, the equivalent household well-being levels are assigned to each household member. This is since the individuals and not the households are the ultimate units of well-being (see, in this context, e.g., [Hauser / Becker (1997): 201]; regarding the corresponding conceptual issues, see [Atkinson (1983): 52 f.]).

In many cases, comparative-static analyses of incidence concerning the influence of socio-demography on income inequality are accomplished (for Germany: [Hülkamp / Schröder (2009), Faik (2011), Peichl et al. (2012)]). At this, over-time changes of the population structure are analysed under the assumption of constant economic conditions. This simplified, so-called “shift-share approach” [Dinwiddy / Reed (1977):

¹⁰ Alternatively to this, one might use variable, i. e., (reference) income-dependent equivalence scales but, as Faik [Faik (2012b)] has illustrated, primarily, this would only have effects on the level and not on the structure (and time course) of inequality. By the way, only for linguistic simplification, we do not everywhere write “per-capita wealth” or “equivalent household net income”, etc.

115-120] implies that changes in the population structure do not affect the degree of inequality within the subgroups and also not the differences in mean incomes between the several subgroups. However, shift-share analyses are also possible in another way: variability of economic parameters and constancy of population shares [Faik (2011)]. But – for illustrative purposes – we restrict our empirical analyses that follow (in Section 5.4) to pure demographic shift-share calculations (with varying population shares and constant economic parameters).

5 Results

5.1 Preliminary remarks

To get a first impression of the distribution of well-being in Germany, the following matrix reveals the results of a cross tabulation between equivalent household net income and per-capita household net wealth for Germany. These well-being indicators are classified by shares of multiples of the medians, i. e., EUR 20,049 for the income variable and EUR 33,153 for wealth, both means for Germany as a whole (moreover, West Germany: EUR 20,856 and EUR 38,144; East Germany: EUR 16,893 and EUR 16,910 – in both cases, income median first and wealth median last mentioned).¹¹ The corresponding shares/multiples resulting in seven income/wealth classes are (where the classes are separately constructed for each spatial unit on the basis of its own median values):

- class 1: < 0.6 median,
- class 2: ≥ 0.6 median and < 1.0 median,
- class 3: ≥ 1.0 median and < 1.5 median,
- class 4: ≥ 1.5 median and < 2.0 median,
- class 5: ≥ 2.0 median and < 2.5 median,
- class 6: ≥ 2.5 median and < 3.0 median, and
- class 7: ≥ 3.0 median.

Roughly speaking, class 1 reflects relative poverty, class 7 represents relative richness, and classes 2 to 6 correspond to the social conceptuality of the “middle-class” with class 2 forming the lower middle-class and class 6 representing the upper middle-class. In the German Federal Government's Reports on Poverty and Wealth, households are seen as rich if their income is double or three times the amount of median income [Arndt et al. (2010): 51, Bundesregierung (2012): 457, Bundesregierung (2009): 185, Merz et al. (2005), Statistisches Bundesamt (2012b): 24].

¹¹ Obviously, in this context, we refer to median and not to average values. The reason for this is that averages are, typically, biased by outliers.

As is illustrated by Table 1, 15.8 per cent of the German population can be called as relatively poor concerning income, and 40.5 per cent of the persons living in Germany are relatively poor with respect to wealth. Taken together, 13.2 per cent of the German population are poor concerning both income and wealth. On the opposite side, i. e., related to richness, 2.0 per cent are rich concerning income while 21.2 per cent – in our median-based context – are classified as wealthy; rich in the joint sense of income and wealth are 1.4 per cent. However, if one determines the limit of richness with two times more than the medians of income and wealth, 6.0 per cent can be characterised as rich in both well-being dimensions.

Table 1 *Cross tabulation between equivalent household net income*

Income class	Wealth class							Total
	1	2	3	4	5	6	7	
1	13.2	0.8	0.5	0.3	(0.3)	(0.2)	0.6	15.8
2	17.5	3.9	3.6	2.5	1.7	1.3	3.7	34.2
3	7.4	3.4	3.9	3.2	2.6	2.0	7.4	29.8
4	1.7	0.9	1.3	1.3	1.1	1.0	4.5	11.8
5	0.4	0.3	0.3	0.3	0.4	0.3	2.4	4.6
6	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	1.1	1.8
7	(0.1)	((0.1))	(0.1)	((0.1))	(0.1)	(0.1)	1.4	2.0
Total	40.5	9.5	9.9	7.8	6.2	4.9	21.2	100.0

(): < 100 cases but ≥ 30 cases, (()): < 30 cases

Source: Authors' own calculations

Table 2 and Table 3 reveal the afore-mentioned cross tabulations between net income and net wealth for West and East Germany in 2008. The tables demonstrate the variety of material well-being, ranging from households with both low income and wealth towards households with high income and high wealth.

Table 2: *Cross tabulation between equivalent household net income and per-capita household net wealth for West Germany, 2008*

Income class	Wealth class							Total
	1	2	3	4	5	6	7	
1	13.3	0.8	0.5	(0.3)	(0.3)	(0.2)	0.6	15.9
2	17.0	4.0	3.8	2.7	1.8	1.3	3.6	34.1
3	7.2	3.7	4.1	3.2	2.6	1.9	7.1	29.8
4	1.8	1.1	1.4	1.4	1.2	1.0	4.1	12.0
5	0.4	(0.3)	0.3	0.4	0.4	0.4	2.2	4.4
6	(0.2)	(0.1)	(0.2)	(0.2)	(0.2)	(0.2)	1.0	1.9
7	(0.1)	((0.0))	((0.1))	((0.1))	(0.1)	((0.1))	1.4	1.9
Total	40.0	10.0	10.2	8.2	6.4	5.0	20.2	100.0

(): < 100 cases but ≥ 30 cases, (()): < 30 cases

Source: Authors' own calculations

Table 3: *Cross tabulation between equivalent household net income and per-capita household net wealth for East Germany, 2008*

Income class	Wealth class							Total
	1	2	3	4	5	6	7	
1	11.4	(0.8)	(0.5)	((0.3))	((0.3))	((0.1))	(0.5)	13.8
2	18.8	3.9	3.1	2.8	1.7	1.3	4.5	36.1
3	8.4	3.3	3.3	3.5	2.6	2.4	9.1	32.7
4	1.6	0.9	0.8	1.1	0.9	1.0	4.8	11.2
5	(0.4)	((0.2))	(0.2)	(0.2)	(0.3)	(0.2)	2.2	3.6
6	((0.1))	((0.1))	((0.0))	((0.1))	((0.1))	((0.1))	0.8	1.3
7	((0.1))	((0.0))	((0.0))	((0.0))	((0.1))	((0.1))	0.9	1.3
Total	40.8	9.2	8.1	7.9	5.9	5.2	22.9	100.0

(): < 100 cases but ≥ 30 cases, (()): < 30 cases

Source: Authors' own calculations

In order to capture well-being inequality within a single inequality measure, we calculate HSCV values for different sub-indicators of material well-being. In Table 4, the corresponding results are shown. These results are quite familiar and match, in general, well-known results of previous analyses of the distribution of income, wealth, and consumption expenditure for Germany [Hauser et al. (2007), Sabelhaus / Schneider (1997)]: Wealth is distributed more unequally than income, the HSCV of real estate is higher than that for money assets, gross income is distributed more unevenly than net income, etc. In detail, the following results occur:

- Since wealth inequality (and derived from this annualised-wealth inequality) is much higher than (net) income inequality, the well-being inequality on the basis of the Weisbrod & Hansen concept is 1.8 to 2.4 times higher than (net) income inequality.
- Overall wealth is similarly distributed both in East and in West Germany. While real estate is distributed more unequally in East Germany, the opposite is the case for money assets – the other component of wealth.
- Compared with gross income inequality, net income inequality is markedly lower for the whole of Germany and in West Germany (by slightly more than - 15 per cent) as well as in East Germany (by around -25 per cent).
- The differentiation into different kinds of income shows the highest inequality level for capital income, in West Germany followed by transfers and labour income and in East Germany followed by the reverse ordering.

- The inequality levels for net income versus consumption expenditure are at a similar level, in West Germany with a slightly higher value for net income compared to consumption expenditure (et vice versa in East Germany).
- While East Germany has lower inequality levels than West Germany concerning the categories well-being (Weisbrod & Hansen concept), wealth, money assets, annualised wealth, gross income, transfers, taxes & contributions, net income, and consumption expenditure, the opposite is the case concerning real estate, labour income, and capital income, but the corresponding differences are, typically, rather small.

Table 4: *Inequality results for the whole of Germany, West Germany, and East Germany on the basis of the half of the squared coefficient of variation concerning different well-being categories, 2008*

Category	Germany	West Germany	East Germany
Well-being (Weisbrod & Hansen concept)	0.3922	0.3892	0.2320
Wealth	1.9561	1.8377	1.8287
Real estate	3.1876	2.9102	4.0387
Money assets	2.7029	2.6365	2.4585
Annualised wealth	1.9251	1.7983	1.7033
Gross income	0.1988	0.1958	0.1730
Labour income	0.5009	0.4853	0.5398
Capital income	1.1364	1.0753	1.1058
Transfers	0.6976	0.7408	0.4623
Taxes & contributions	0.5390	0.5273	0.5161
Net income	0.1633	0.1627	0.1294
Consumption expenditure	0.1589	0.1587	0.1380

Source: Authors' own calculations

5.2 Subcategory-specific decompositions

5.2.1 Decomposition of well-being (Weisbrod & Hansen concept)

Decomposing the well-being index of Weisbrod & Hansen into its (net) income and its annualised wealth component yields for Germany on one hand a positive interaction term (covariance) between these two components, and on the other hand – referring to Equation (7) – the within-subcategory inequality element of both components is much stronger than the inequality aspect of interaction between the subcategories (77.2 versus 22.8 per cent). In Table 5, the correlation matrix is shown.

Figure 2 illustrates that around 77 per cent of within-subcategory inequality of well-being (Weisbrod & Hansen concept) is determined by annualised wealth. In other words: About 59 per cent ($= 77.2 \cdot 77.1$ per cent) of overall well-being inequality are directly influenced by annualising wealth which demonstrates the dominant role of this variable. The latter is a reflection of the relatively high inequality degree of the distribution of personal wealth in Germany. In this context, the high inequality level of wealth is mainly driven by inequality within the wealth categories real estate and money assets (about 82 per cent) and less by inequality between these wealth components (approximately 18 per cent; Pearson's correlation coefficient between real estate and money assets amounts to +0.251 which is significant at a significance level of 99 per cent).

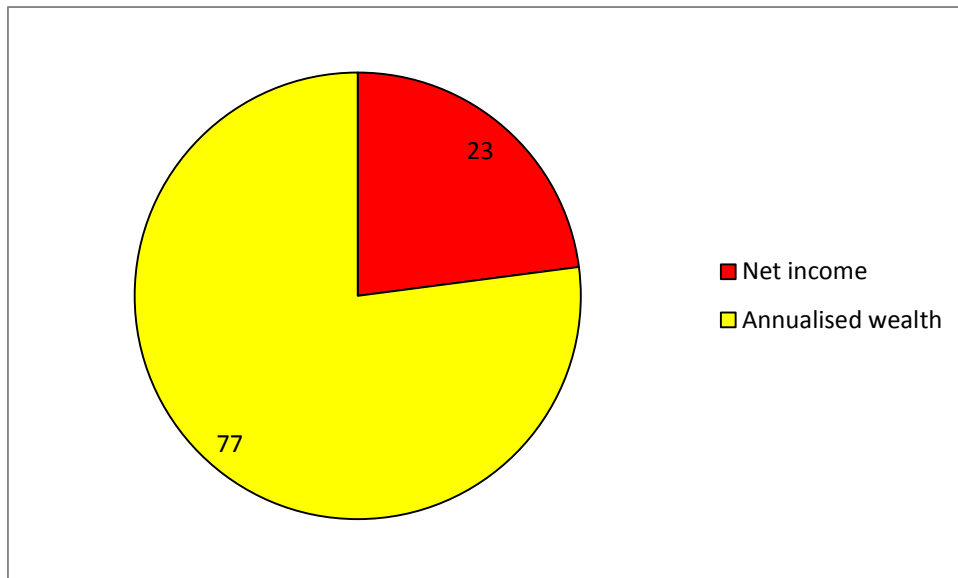
Table 5: *Pearson's correlation coefficients for well-being categories, Germany, 2008*

Well-being category	Well-being (Weisbrod & Hansen concept)	Net income	Wealth	Expenditures	Annualised wealth
Well-being (Weisbrod & Hansen concept)	+1.000***	+0.692***	+0.834***	+0.445***	+0.919***
Net income	+0.692***	+1.000***	+0.384***	+0.576***	+0.352***
Wealth	+0.834***	+0.384***	+1.000***	+0.287***	+0.872***
Expenditures	+0.445***	+0.576***	+0.287***	+1.000***	+0.263***
Annualised wealth	+0.919***	+0.352***	+0.872***	+0.263***	+1.000***

***: significant at a significance level of 99 per cent (two-sided)

Source: Authors' own calculations

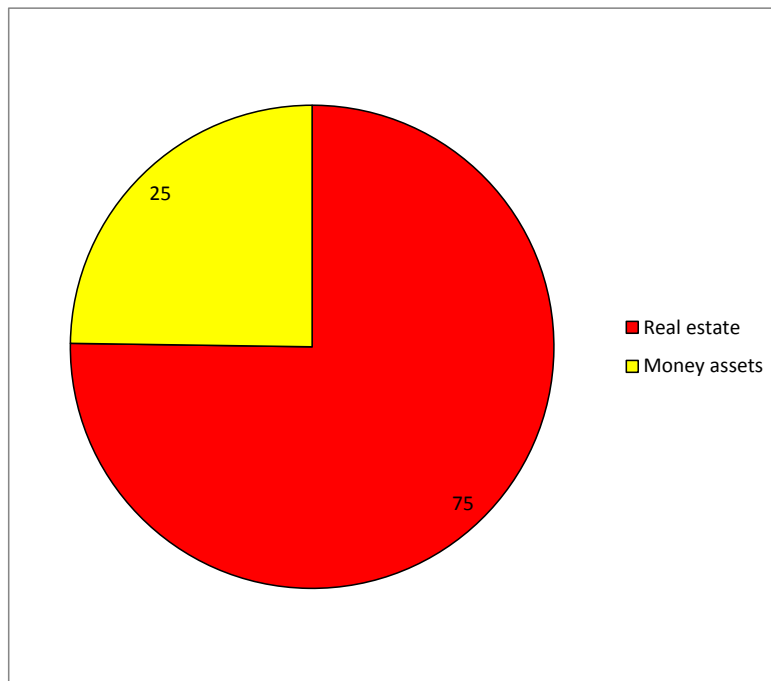
Figure 2: *Shares of the well-being components net income and annualised wealth on within-subcategory inequality of well-being (Weisbrod & Hansen concept; HSCV), Germany, 2008 (in per cent)*



Source: Authors' own calculations

The share of real estate is 75 per cent of total within-subcategory inequality and, accordingly, the one of money assets is only 25 per cent (see Figure 3). This demonstrates the high importance the distribution of personal real estate has for the inequality of wealth and, thus, for the inequality of the well-being indicator used. However, as the measurement of real estate is by no means easy and often estimated by data from self-assessment of the households on the basis of incomplete and sometimes incorrect information, the dominance of this wealth category may lead to misinterpretations about the total wealth situation. It is a naive belief that information about real estate provides objective evidence. The high dependence of the inequality of the wealth distribution on information about real estate shows how problematic and sometimes even arbitrary the evidence about wealth of households may be. With good reason, Buiter suggests to exclude real estate from the analysis of people's wealth or, at least, to analyse it separated from other wealth subcategories [Buiter (2008)].

Figure 3: *Shares of the wealth components real estate and money assets on within-subcategory inequality of wealth (HSCV), Germany, 2008 (in per cent)*



Source: Authors' own calculations

5.2.2 Decomposition of income

On the basis of Table 4 and with additional information on specific covariances, it is possible to decompose the HSCV values for gross and net income (see Equation (7)). In the following, exemplarily, this will be done for Germany as a whole. The decompositions lead to negative influences of the covariance terms which means that the HSCV value for gross income, *ceteris paribus*, is diminished by 0.0628 and the one for net income even by 0.4079 through the interacting terms. In other words: Only considering the effects of labour income, capital income, and transfers (or transfers minus taxes) without the interacting terms would have resulted in HSCV values in the amount of 0.2617 (gross income) and of 0.5713 (net income) which are much higher than the ones stated in Table 4. The correlation matrix is shown in Table 6.

Table 6: *Pearson's correlation coefficients for different kinds of incomes, Germany, 2008*

Kind of income	Labour income	Capital income	Transfers	Taxes	Transfers – Taxes
Labour income	+1.000***	+0.136***	-0.434***	+0.896***	-0.835***
Capital income	+0.136***	+1.000***	+0.165***	+0.215***	-0.016***
Transfers	-0.434***	+0.165***	+1.000***	-0.206***	+0.810***
Taxes	+0.896***	+0.215***	-0.206***	+1.000***	-0.741***
Transfers – Taxes	-0.835***	-0.016***	+0.810***	-0.741***	+1.000***

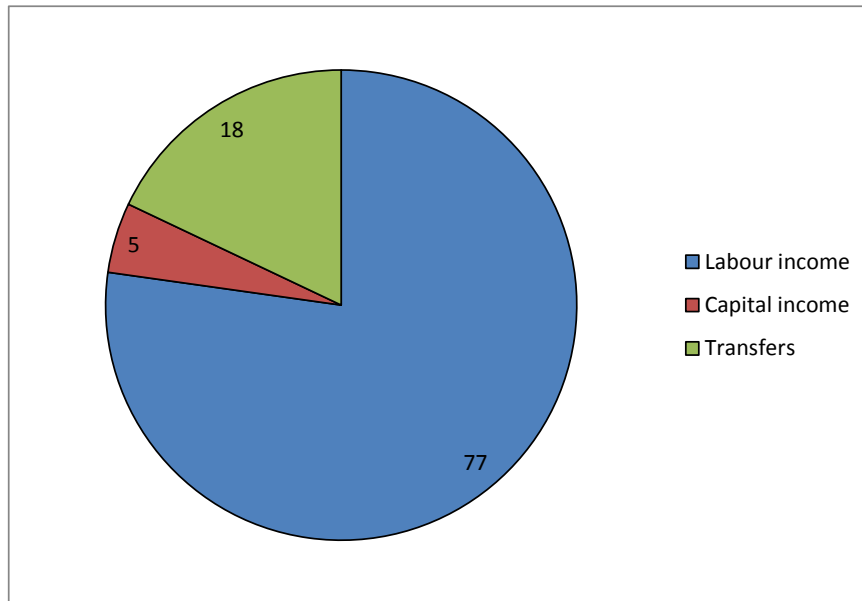
***: significant at a significance level of 99 per cent (two-sided)

Source: Authors' own calculations

The signs of the correlation coefficients are pointing into the expected directions. For example, as taxes are paid out of labour income and with progressive taxation in Germany, the correlation should be positive and very high which it is. However, it seems a bit astonishing that the correlation between capital income and taxes is quite low, though it is positive. The sign of the correlation between income and transfers is also “correct”: It should be negative as transfers should compensate for missing income, and the higher the income, the lower the transfers should be. This also corresponds to the correlation between transfers and taxes as it should not be the case that a household who receives high transfers should pay high taxes. If the correlation would be positive, this would be a serious indication for the inefficiency of the tax-transfer system and would counteract social policy measures.

Within-subcategory inequality of (gross) income is dominated by labour income (see Figure 4). The corresponding share amounts to 77 per cent. While transfers have a share of at least 18 per cent, capital income with 5 per cent only plays a minor role. One reason for the dominance of labour income may be that the majority of households receive labour income but no transfers and only a small amount of capital income. The last-mentioned result may be due to the fact that households with a monthly income of more than EUR 18,000 are excluded from the survey, and, with that, very high capital incomes are also excluded. Therefore, the inequality of (gross) income can be seen as an (at least slightly) distorted image of the inequality of labour income.

Figure 4: *Shares of the income components on within-subcategory inequality of gross income, Germany, 2008 (in per cent)*



Source: Authors' own calculations

5.2.3 Decomposition of expenditures

In the following, consumption expenditure is decomposed into the categories food, non-alcoholic and alcoholic beverages, and tobacco,

- clothing and shoes,
- housing rent, water, electricity, gas, and other fuels,
- health care,
- transport and communication,
- education and leisure,
- entertainment and culture, and
- other goods and services.

This decomposition generates, in the context of inequality, results which are shown in Table 7. Overall, the results are in line with those of previous research [Fachinger (2001a): 166, Fachinger (2006), Fachinger (2002): 127 ff., Fachinger (2001b): 232 ff.].

Table 7: *Inequality results for the whole of Germany, West Germany, East Germany, 2008, on the basis of the half of the squared coefficient of variation concerning consumption expenditure*

Expenditure category	The whole of Germany	West Germany	East Germany
Food and the like	0.0820	0.0824	0.0727
Clothing and shoes	0.4962	0.4930	0.4645
Housing rent, water, electricity, gas, and other fuels	0.1158	0.1149	0.0892
Health care	3.7829	3.8041	2.3200
Transport and communication	1.7859	1.8112	1.5908
Education and leisure, entertainment, and culture	0.6944	0.7019	0.6334
Other goods and services	0.7090	0.7084	0.6689
Consumption expenditure	0.1589	0.1587	0.1380

Source: Authors' own calculations

Based on the afore-mentioned inequality results and based on the following (weak, continuously positive) correlations between the several expenditure categories (Table 8), we have calculated that – for the whole of Germany – 64.1 per cent of the overall inequality of consumption expenditure can be ascribed to the within-subcategory inequality levels of the several expenditure categories.

Table 8: Pearson's correlation coefficients for different expenditure categories, Germany, 2008

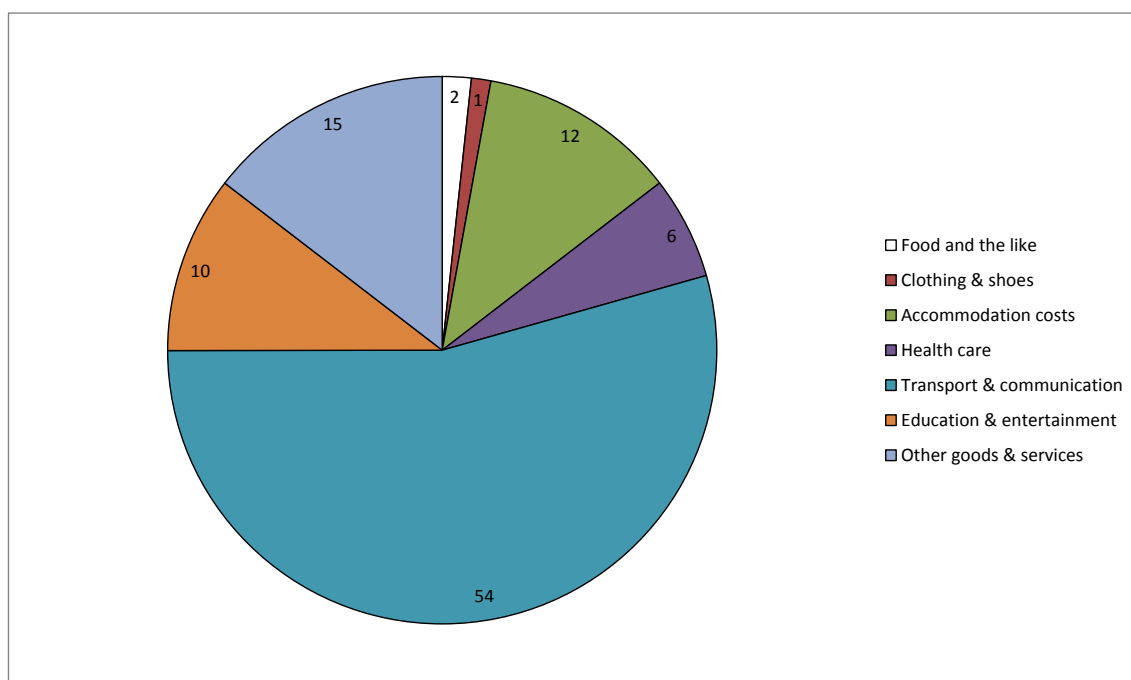
Expenditure category	Food and the like	Clothing and shoes	Housing rent, water, electricity, gas, and other fuels	Health care	Transport and communication	Education and leisure, entertainment, and culture	Other goods and services
Food and the like	+1.000***	+0.278***	+0.173***	+0.102***	+0.071***	+0.166***	+0.218***
Clothing and shoes	+0.278***	+1.000***	+0.163***	+0.117***	+0.114***	+0.277***	+0.330***
Housing rent, water, electricity, gas, and other fuels	+0.173***	+0.163***	+1.000***	+0.156***	+0.086***	+0.182***	+0.241***
Health care	+0.102***	+0.117***	+0.156***	+1.000***	+0.035***	+0.120***	+0.144***
Transport and communication	+0.071***	+0.114***	+0.086***	+0.035***	+1.000***	+0.093***	+0.108***
Education and leisure, entertainment, and culture	+0.166***	+0.277***	+0.182***	+0.120***	+0.093***	+1.000***	+0.243***
Other goods and services	+0.218***	+0.330***	+0.241***	+0.144***	+0.108***	+0.243***	+1.000***

***: significant at a significance level of 99 per cent (two-sided)

Source: Authors' own calculations

In this context, as Figure 5 illustrates, the most important inequality influences on consumption expenditure arise from the category “Transport and communication”, followed by “Other goods and services” as well as “Housing rent, water, electricity, gas, and other fuels”. Altogether, these three categories amount to 81 per cent of the corresponding within-subcategory inequality. One reason for this – especially the high shares for the categories “Transport and communication” and “Other goods and services” – may lie in the character of such goods and services. The two aforementioned categories are very heterogeneous including products with very low market prices for daily living which only cost a few cents but also luxury goods, such as very expensive cars or power cruisers.

Figure 5: *Shares of expenditure categories on within-inequality of consumption expenditure (HSCV), Germany, 2008 (in per cent)*



Source: Authors' own calculations

5.3 Group-specific decompositions

5.3.1 Spatial-differentiated well-being decompositions

For our spatial-differentiated decomposition, we distinguish between West and East Germany. In the 2008 EVS, the population shares are 82.5 per cent (West Germany) and 17.5 per cent (East Germany). The HSCV values both for West and East Germany have been already presented in Table 4. Additionally, Table 9 contains the relative positions in West and East Germany where in all cases the relative positions for East Germany are (most often markedly) lower than the ones for West Germany reflecting the lower (average) material well-being level in eastern Germany. The corresponding relative positions are defined as the relation between group-specific and overall means.

Despite the differences between West and East Germany regarding the HSCV values and the relative positions, the overall inequality levels are clearly dominated by within-group inequality compared to between-group inequality (Equation (5)). This demonstrates Figure 6. The results, therefore, give no evidence to the hypothesis that the inequality of well-being is due to differences between West and East Germany but, on the contrary, we find an indication that the inequality within each part of Germany is the main “driving” factor for total inequality. Therefore, we receive similar results twenty years after Schwarze stated that “inequality was clearly dominated by income inequality within the western states” [Schwarze (1996): 6]

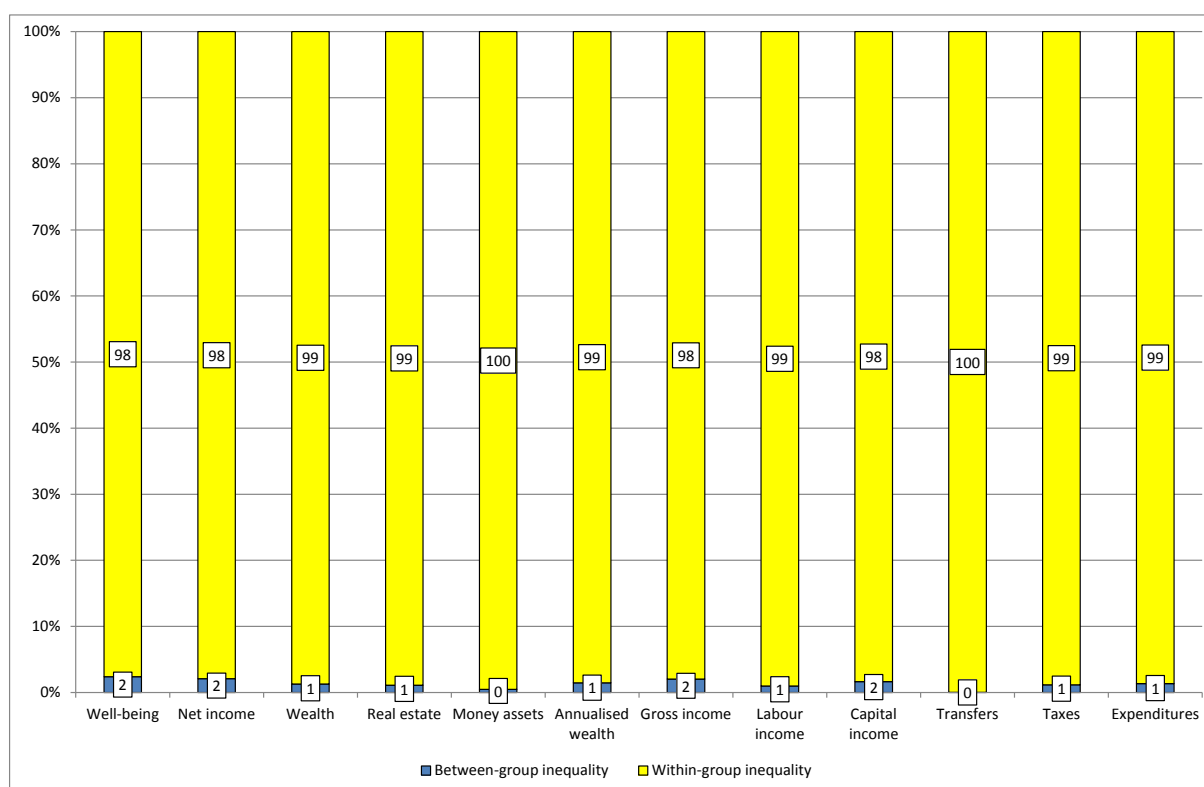
where income redistribution from West to East Germany by political measures was seen as the main influencing source. Those measures were undertaken to cushion the impact of the accession of the New Laender in Germany on the well-being of households in East Germany.

Table 9: *Group-specific relative positions for West and East Germany and for different well-being variables in Germany, 2008*

Category	West Germany	East Germany
Well-being (Weisbrod & Hansen concept)	1.0630	0.7028
Wealth	1.1038	0.5102
Real Estate	1.1228	0.4208
Money assets	1.0734	0.6536
Annualised Wealth	1.1098	0.4822
Gross Income	1.0414	0.8045
Labour Income	1.0460	0.7830
Capital Income	1.0894	0.5783
Transfers	1.0108	0.9489
Taxes & Contributions	1.0513	0.7579
Net Income	1.0380	0.8206
Consumption expenditure	1.0302	0.8573

Source: Authors' own calculations

Figure 6: *Share of between- and within-group inequality for West and East Germany and for different well-being variables in Germany, 2008*

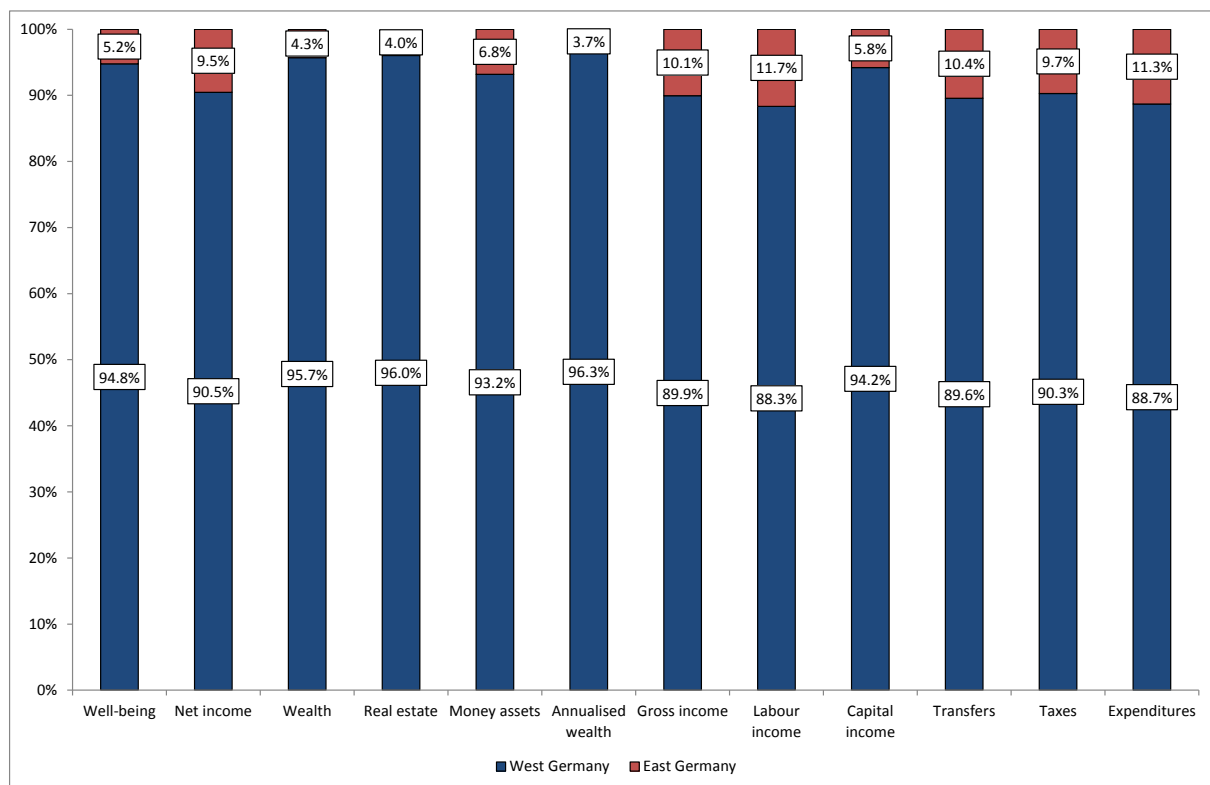


Source: Authors' own calculations

Regarding the within-group components, it becomes evident that those are clearly dominated by the within-group inequality in West Germany with shares ranging from 88.3 per cent (labour income) to 96.3 per cent (annualised wealth), as is shown by

Figure 7.

Figure 7: *Share of West and East German within-group inequalities on total within-group inequality for different well-being categories in Germany, 2008*



Source: Authors' own calculations

5.3.2 Age-differentiated well-being decompositions

We differentiate the population into three age groups ("generations"): up to 29 years, 30 until 59 years, and 60 years and older. Their population shares in the *EVS* are: 30.9 per cent (up to 29 years), 44.6 per cent (30 until 59 years), and 24.5 per cent (60 years and older). In order to calculate HSCV values in an age-differentiated way, additionally, for these age groups, we need information on group-specific HSCV values and on group-specific relative positions. Table 10 provides an overview of these values.

Referring to the most prominent well-being indicators, i. e., net income, wealth, and consumption expenditure as well as Weisbrod & Hansen's well-being indicator points to the fact that the oldest generation has, on average, in three of four cases (with the exception of net income) the highest economic status indicated by the relative positions. But this is, typically, accompanied by relatively high group-specific inequality levels the oldest age group has, at least concerning well-being (Weisbrod & Hansen concept), net income, and expenditures (by the way, regarding corresponding empirical age-related evidence for Germany, based on 1995-2009 SOEP, see [Faik (2012a)]).

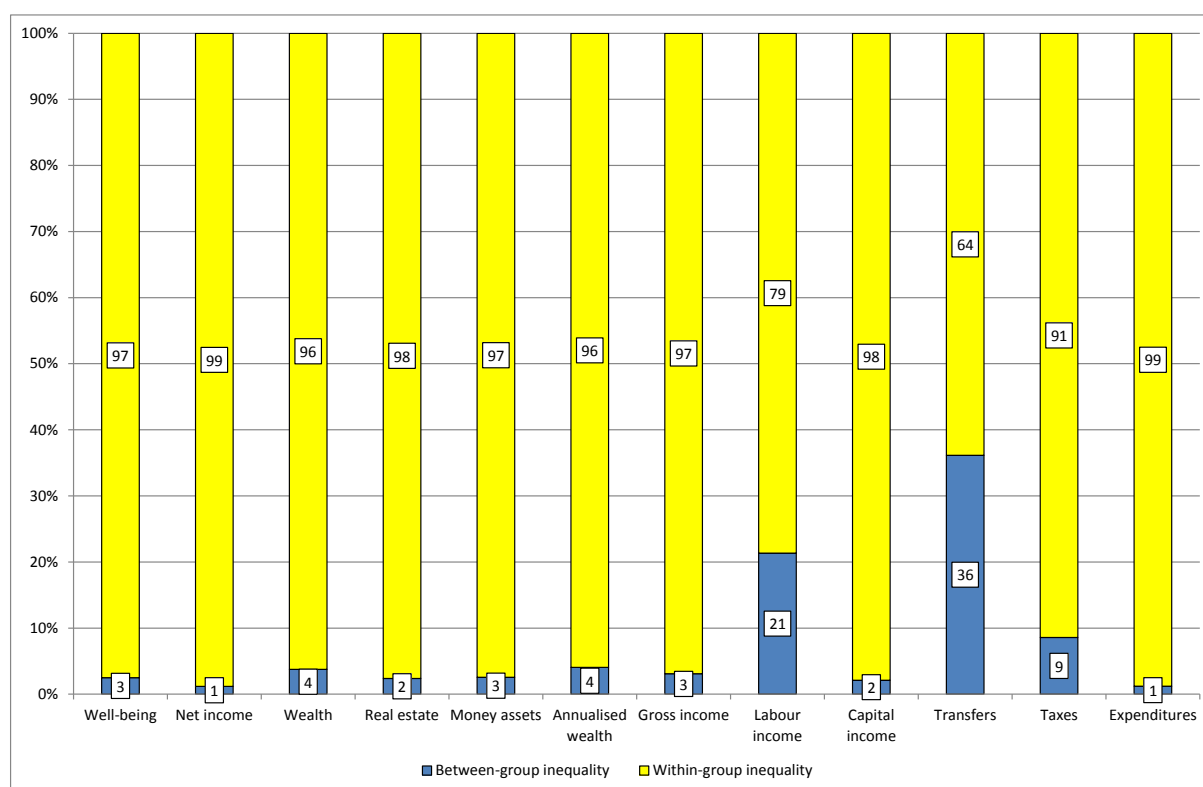
For all categories, the within-group inequality clearly dominates between-group inequality (Figure 9). This points out that the economic heterogeneity within the three age groups is relatively large. Hereby, the percentage relations for labour income and transfers are somewhat out of band (with “only” 79:21 and 64:36 relations). However, this is not really astonishing since remarkable differences regarding labour market participation rates and the receipts of transfers exist between the several age groups.

Table 10: *Group-specific inequality (HSCV) and group-specific relative positions for three age groups and for different well-being categories in Germany, 2008*

Category	Group-specific HSCV values			Group-specific relative positions		
	Until 29 years	39-59 years	60 years and older	Until 29 years	39-59 years	60 years and older
Well-being (Weisbrod & Hansen concept)	0.3007	0.2851	0.5242	0.8523	0.9775	1.2275
Wealth	1.5586	1.7217	1.6081	0.6024	0.9320	1.6258
Real estate	3.0148	2.9450	2.5056	0.6018	0.9240	1.6412
Money assets	1.4038	2.3990	2.4221	0.6034	0.9450	1.6010
Annualised wealth	1.9312	1.5301	1.5506	0.7215	0.8145	1.6892
Gross income	0.1570	0.2019	0.2046	0.9376	1.1198	0.8608
Labour income	0.2573	0.3055	3.9966	1.0974	1.3648	0.2132
Capital income	0.8986	0.9842	1.1988	0.7632	0.9705	1.3526
Transfers	0.5781	0.8806	0.1982	0.6172	0.5807	2.2464
Taxes & contributions	0.4026	0.4446	0.7464	0.9820	1.2789	0.5152
Net income	0.1277	0.1675	0.1835	0.9221	1.0645	0.9810
Consumption expenditure	0.1311	0.1602	0.1730	0.9118	1.0226	1.0702

Source: Authors' own calculations

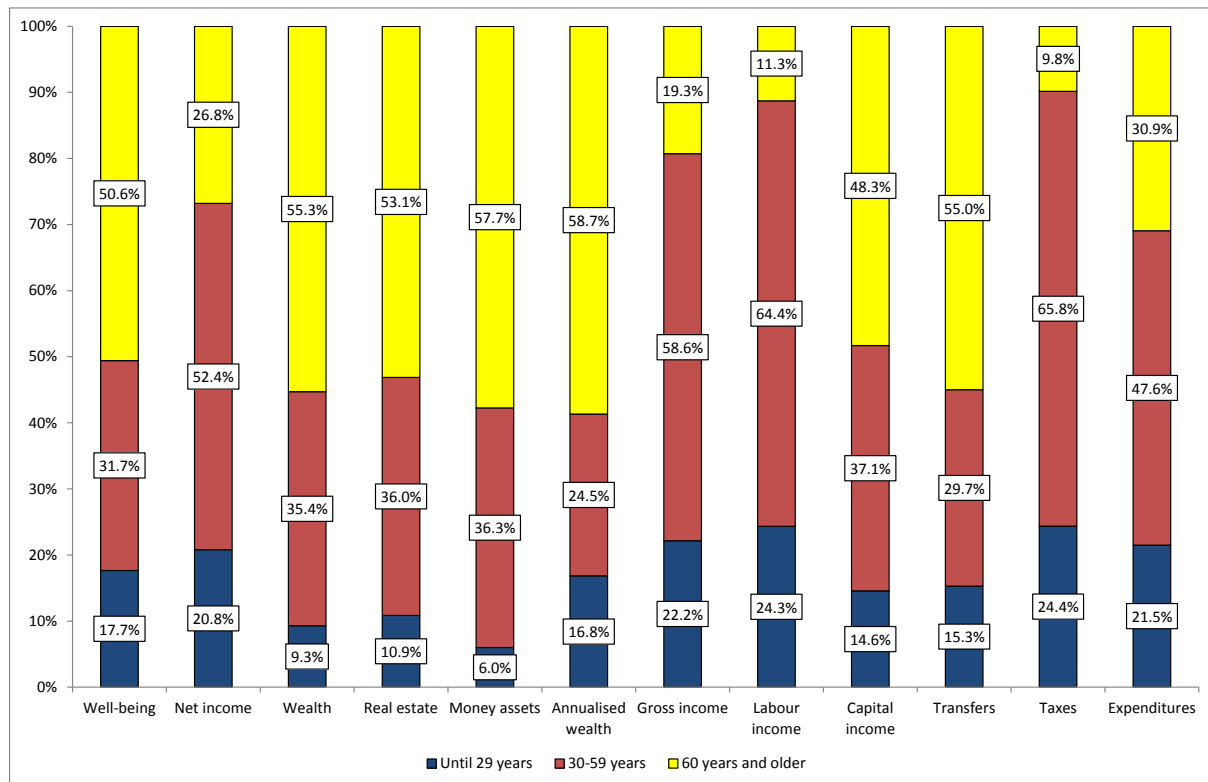
Figure 8: *Share of between- and within-group inequality for three age groups and for different well-being variables in Germany, 2008*



Source: Authors' own calculations

Figure 9 clarifies that in most of the cases, the within-group inequality of the youngest age group (up to 29 years) is lowest in relation to overall within-group inequality levels. Regarding wealth and its components as well as regarding annualised wealth, Weisbrod & Hansen's well-being indicator, capital income, and transfers, the share of within-group inequality of the oldest age group (60 years and older) on overall within-group inequality is highest. In contrast, the corresponding shares of the middle age group are highest regarding net, gross, and labour income, and regarding expenditures (as well as regarding taxes).

Figure 9: *Share of age groups' within-group inequalities on total within-group inequality for different well-being categories in Germany, 2008*



Source: Authors' own calculations

5.3.3 Sex-differentiated well-being decompositions

In the 2008 EVS, the gender relation between men and women amounts to 46.6 per cent versus 53.4 per cent. Furthermore, in Table 11, the group-specific differences between all male and all female household members regarding group-specific HSCV values and regarding group-specific relative positions are stated.

It becomes obvious that no large HSCV differences between both sexes exist with respect to the indicators net income, gross income, and consumption expenditure. Regarding the Weisbrod & Hansen well-being indicator and regarding wealth (and its components), women's HSCV value is markedly higher. With respect to group-specific relative positions, the values women have are typically lower than those of male household members (with the exception of transfers). As a consequence of the values regarding population shares, HSCV values, relative positions, and their combination, in all cases, the within-group inequality component amounts to almost 100 per cent.

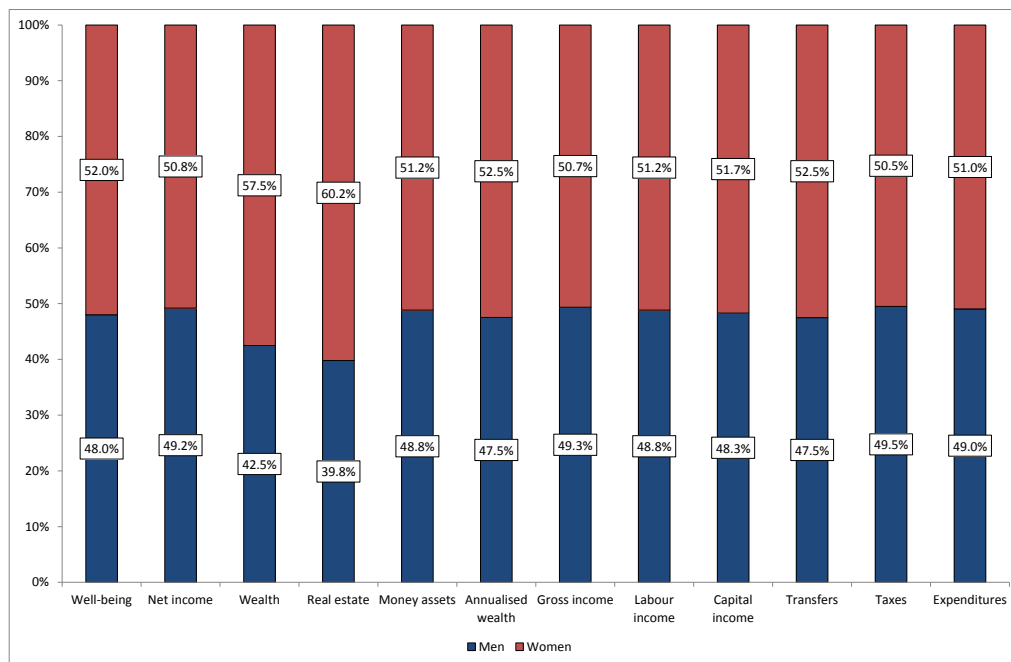
Table 11: *Group-specific inequality (HSCV) and group-specific relative positions for male versus female household members and for different well-being categories in Germany, 2008*

Category	Group-specific HSCV values		Group-specific relative positions	
	Male household member	Female household member	Male household member	Female household member
Well-being (Weisbrod & Hansen concept)	0.3738	0.4084	1.0391	0.9659
Wealth	1.6790	2.2232	1.0308	0.9732
Real estate	2.5848	3.7632	1.0264	0.9770
Money assets	2.6306	2.7675	1.0379	0.9670
Annualised wealth	1.7557	2.0935	1.0572	0.9501
Gross income	0.1961	0.2001	1.0352	0.9693
Labour income	0.4668	0.5317	1.0591	0.9484
Capital income	1.0673	1.2018	1.0503	0.9562
Transfers	0.7552	0.6510	0.9704	1.0258
Taxes & contributions	0.5167	0.5575	1.0518	0.9549
Net income	0.1625	0.1632	1.0294	0.9744
Consumption expenditure	0.1626	0.1552	1.0139	0.9879

Source: Authors' own calculations

Women's shares on total within-group inequality are (more or less) higher than men's corresponding shares for all categories, as is shown in Figure 10. But nearly all of these gender-related differences are not very marked which is not astonishing since – due to our conceptualisation – the equivalent household resources are assigned to all household members independent of sex. Thus, gender-related differences may primarily occur for single-person households (as is confirmed by the results stated in the bottom part of Table 13 below).

Figure 10: *Share of male and female household members' within-group inequalities on total within-group inequality for different well-being categories in Germany, 2008*



Source: Authors' own calculations

5.3.4 Nationality-differentiated well-being decompositions

In the following, we differentiate between household members with German nationality and with non-German nationality. The corresponding population shares in the 2008 *EVS* are: 98.0 per cent (Germans) and 2.0 per cent (non-Germans) which indicates that the *EVS* database is not very representative with respect to nationality, as was already stressed above. This must be considered in the context of the following interpretations in this section.

The group-specific HSCV values, presented in Table 12, are for non-Germans – with the exception for money assets – continuously higher than for Germans indicating that the non-Germans are a more heterogeneous group than the Germans are. Moreover, for all well-being categories, the relative positions of the non-German household members are lower than those for the Germans. All in all, due to the extremely low population share of the non-Germans (in the 2008 *EVS*), in all cases, the overall inequality is dominated by the within-group inequality component with a share in the amount of almost 100 per cent.

In this context, not surprising, total within-group inequality is clearly dominated by within-group inequality of German household members. The share of German and non-German household members' within-group inequalities on total within-group inequality for the well-being categories is approximately 100 per cent.

Table 12: *Group-specific inequality (HSCV) and group-specific relative positions for German versus non-German household members and for different well-being variables in Germany, 2008*

Variable	Group-specific HSCV values		Group-specific relative positions	
	German household member	Non-German household member	German household member	Non-German household member
Well-being (Weisbrod & Hansen concept)	0.3896	0.5396	1.0043	0.7873
Wealth	1.9437	2.7243	1.0068	0.6687
Real estate	3.1691	4.3946	1.0054	0.7340
Money assets	2.6912	2.5839	1.0089	0.5639
Annualised wealth	1.9097	3.0248	1.0067	0.6719
Gross income	0.1970	0.3011	1.0031	0.8486
Labour income	0.4983	0.6492	1.0020	0.9028
Capital income	1.1256	1.8960	1.0080	0.6090
Transfers	0.6966	0.7055	1.0038	0.8131
Taxes & contributions	0.5333	0.8895	1.0031	0.8475
Net income	0.1620	0.2319	1.0031	0.8489
Consumption expenditure	0.1583	0.1772	1.0030	0.8529

Source: Authors' own calculations

5.3.5 Household type-differentiated well-being decompositions

We differentiate six household types from each other (in parentheses the corresponding population shares; in per cent)¹²:

- female singles (12.3),
- male singles (7.0),
- single-parent households (3.9),
- couples without children (28.5),
- couples with children (27.8), and
- other household types (20.6).

¹² Children are defined up to an age of 18 years.

Table 13 illustrates that the HSCV values of single-parent households are relatively low with respect to net and gross income as well as regarding consumption expenditure, but the opposite is the case concerning wealth. Across all well-being categories, couples with children exhibit a low within-group inequality; thus, this group appears relatively homogeneously structured regarding economic well-being.

Concerning relative positions (

Table 13), the highest well-being levels are assigned to couples without children in nearly all cases. In contrast, single-parent households have the lowest relative positions.

Table 13: *Group-specific inequality (HSCV) and group-specific relative positions for different household types and for different well-being categories in Germany, 2008*

	Single, female	Single, male	Single- parent household	Couple without children	Couple with children	Other type
Category	HSCV values:					
Well-being (Weisbrod & Hansen concept)	0.5129	0.5121	0.2926	0.4137	0.2090	0.3484
Wealth	4.1916	2.4608	5.7088	1.3262	1.0915	1.1684
Real estate	8.2280	4.1195	9.3227	2.1221	2.0190	1.9305
Money assets	4.3471	3.8527	10.4320	1.8411	1.0283	1.1869
Annualised wealth	4.6853	3.0598	5.8697	1.6147	1.1241	1.5153
Gross income	0.2642	0.3343	0.1697	0.2214	0.1390	0.1374
Labour income	1.0886	0.8445	0.5660	0.8832	0.2070	0.2583
Capital income	2.9036	2.7147	2.1041	1.1233	0.5310	0.7244
Transfers	0.5274	0.9331	0.1948	0.5065	0.5177	0.7093
Taxes & contributions	0.8916	0.8516	0.8033	0.6496	0.3553	0.3431
Net income	0.2011	0.2761	0.1175	0.1802	0.1148	0.1160
Consumption expenditure	0.1697	0.2484	0.1563	0.1708	0.1140	0.1313

(Table 13 continued:)

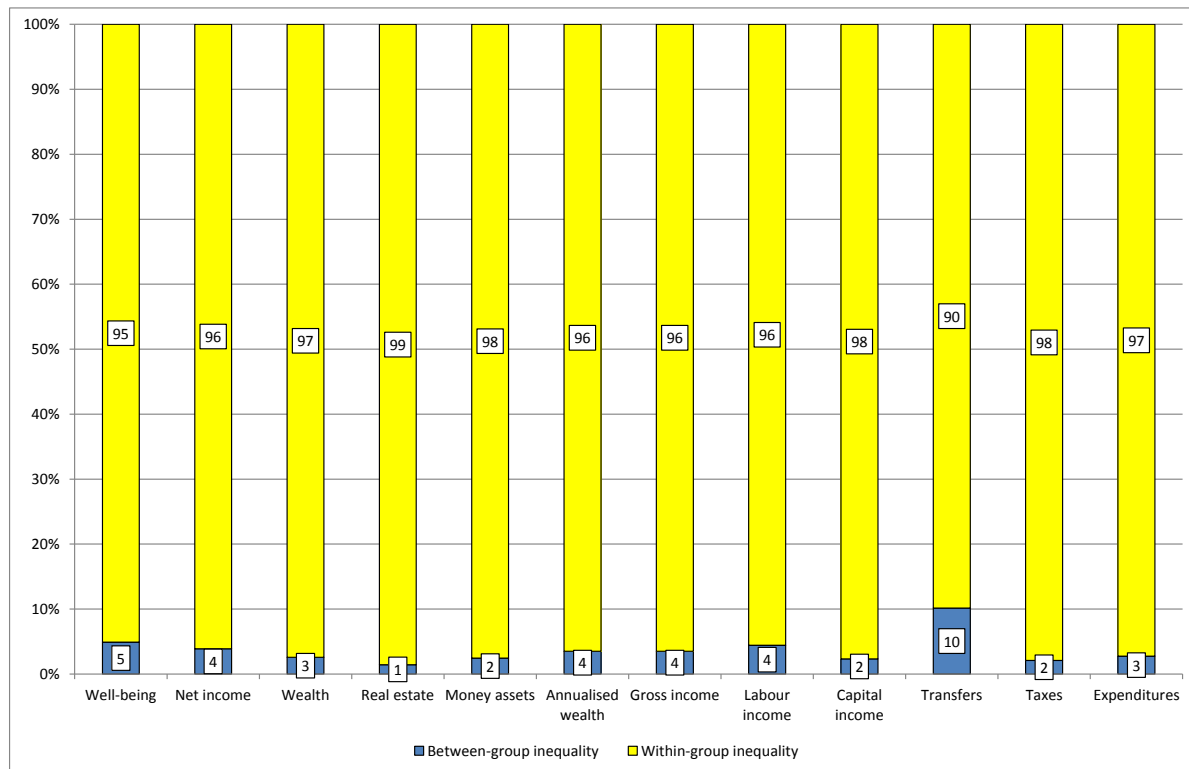
	Single, female	Single, male	Single- parent househol d	Couple without children	Couple with children	Other type
Category	Relative positions:					
Well-being (Weisbrod & Hansen concept)	0.7075	0.8297	0.5250	1.2242	0.9380	1.096 0
Wealth	1.0241	1.2206	0.2995	1.3984	0.6565	0.955 6
Real estate	0.9677	1.0449	0.2985	1.3883	0.6783	1.033 8
Money assets	1.1147	1.5024	0.3012	1.4146	0.6215	0.830 1
Annualised wealth	0.5054	0.6251	0.2350	1.4152	0.8066	1.254 7
Gross income	0.7951	0.9586	0.6287	1.1027	1.0262	1.029 0
Labour income	0.6377	0.9388	0.5331	0.9151	1.2138	1.153 6
Capital income	0.6620	0.8162	0.3536	1.2644	0.9774	1.051 0
Transfers	1.2346	1.0648	0.9744	1.4964	0.5865	0.715 0
Taxes & contributions	0.7370	1.0152	0.4816	1.0464	1.0778	1.080 1
Net income	0.8153	0.9389	0.6798	1.1223	1.0082	1.011 2
Consumption expenditure	0.9130	0.9467	0.7995	1.1366	0.9500	0.986 5

Source: Authors' own calculations

The differentiation by household types reveals relations between within-group inequality and between-group inequality ranging from 90:10 (transfers) to 99:1 (real estate) indicating a relatively high degree of heterogeneity within the several groups. This is shown by

Figure 11.

Figure 11: *Share of between- and within-group inequality for different household types and for different well-being variables in Germany, 2008*



Source: Authors' own calculations

As is illustrated by

Table 14, total within-group inequality is predominated by within-group inequality of couples without children (across all well-being categories).

Table 14: *Share of household types' within-group inequalities on total within-group inequality for different well-being categories in Germany, 2008*

Category	Household type					
	Female single	Male single	Single-parent household	Couple without children	Couple with children	Other household type
Well-being (Weisbrod & Hansen concept)	8.5	6.6	0.8	47.3	13.7	23.1
Net income	10.5	10.8	1.3	41.1	20.7	15.5
Wealth	28.4	13.4	1.0	38.7	6.9	11.5
Real estate	30.2	10.0	1.0	37.0	8.2	13.5
Money assets	25.2	23.0	1.4	39.8	4.2	6.4
Annualised wealth	7.9	4.5	0.7	49.5	11.0	26.4
Gross income	10.7	11.2	1.3	39.9	21.2	15.6
Labour income	11.4	10.9	1.3	44.0	17.7	14.8
Capital income	14.1	11.4	0.9	46.0	12.7	14.8
Transfers	15.8	11.8	1.1	51.5	7.9	11.9
Taxes	11.3	11.6	1.4	38.3	21.8	15.6
Expenditures	11.3	10.1	2.5	40.6	18.5	17.0

Source: Authors' own calculations

5.4 Shift-share analyses

In order to illustrate the scope of decomposable inequality indicators, in the following, pure demographic shift-share analyses are applied (for a similar analysis for Germany, on the basis of 1995-2009 SOEP, see [Faik (2012a): 31 ff.]). These analyses are based on forecasts of the German Statistical Office on the basis of the 12th coordinated population's forecast which give – due to the chosen variant – evidence to a more or less distinct reduction of the German population size in the future [Statistisches Bundesamt (2009)]. We do not take into account all scenarios but concentrate on two variants which are distinctly different, one with a relatively young population and another one with a relatively old population, to give some hints about the range in which the data may vary:

- relatively young population (variant 3-W2): increasing birth frequency, on average, up to 1.6 children per woman in 2025 and subsequently constancy of this level until 2060; increasing life expectancy at birth to 89.2 years for girls and to 85.0 years for boys in 2060; life expectancy at the age of 60 years: 30.1

further years for women and 26.6 further years for men; migration at balance: +200,000 persons p. a.;

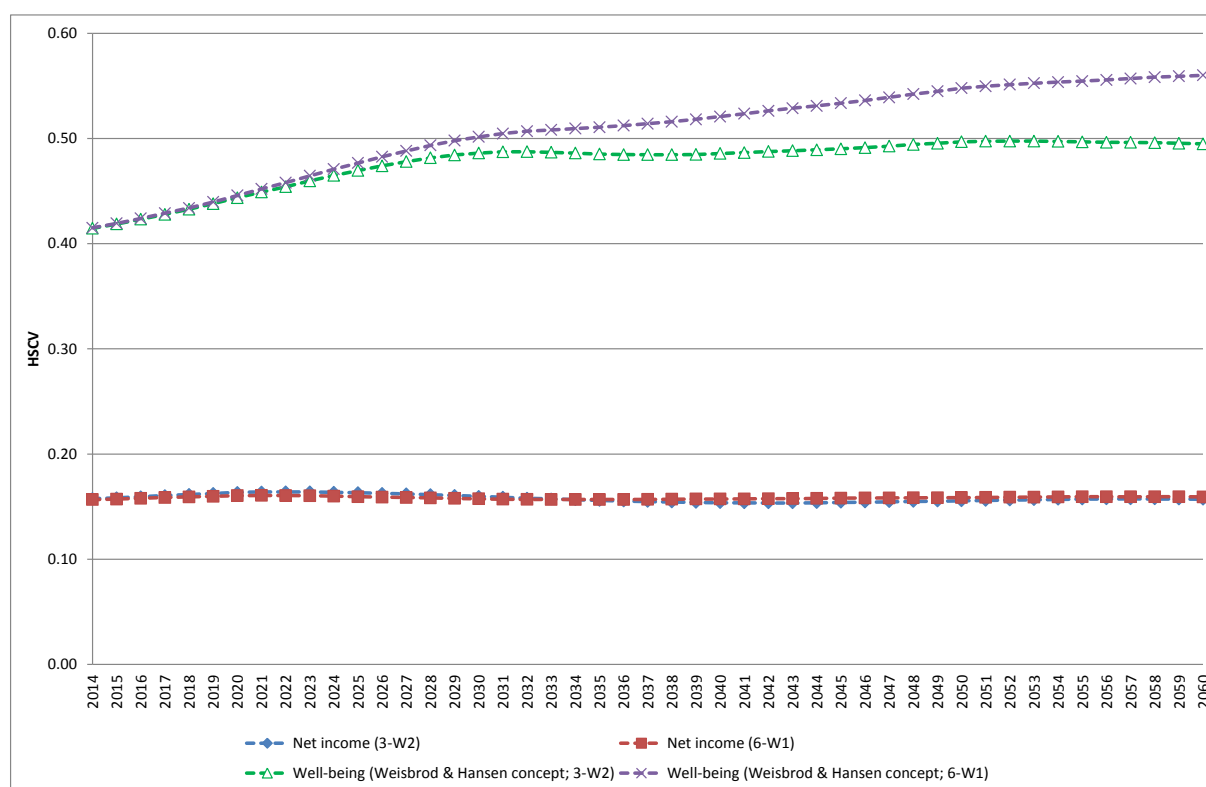
- relatively old population (variant 6-W1): decreasing birth frequency, on average, up to 1.2 children in 2060; increasing life expectancy at birth to 91.2 years for girls and to 87.7 years for boys in 2060; life expectancy at the age of 60 years: 32.1 further years for women and 29.2 further years for men; migration at balance: +100,000 persons p. a.

As

Figure 12 exposes – regarding Weisbrod & Hansen’s well-being indicator –, in both population variants (“relatively young population; 3-W2” and “relatively old population; 6-W1”), an inequality increase is expected. In this context, the following holds true: The more pronounced ageing in variant 6-W1 results in higher inequality at every point of time. This is primarily due to the higher relative well-being positions as well as to the higher group-specific HSCV values of the elderly (which both are held constant in our shift-share analyses; see, in this context, Table 10 above, first row).

Contrary to that, the time-related projection of income inequality remains more or less unchanged. For 2014, in the variant “3-W2”, a net income inequality level in the amount of 0.1576 is calculated, whereas the calculated inequality level amounts to 0.1569 in 2060. Regarding variant “6-W1”, the corresponding income inequality levels are 0.1568 (2014) and 0.1592 (2060). The discrepancy between the projections for Weisbrod & Hansen’s well-being indicator on one hand and those for net income on the other hand arise from relatively small age-related differences concerning group-specific HSCV values and concerning group-specific relative positions in the case of net income compared to the clear-cut dominance of the elderly’s HSCV value and relative position in the context of Weisbrod & Hansen’s well-being indicator (see the corresponding values in the above Table 10).

Figure 12: *Projections of well-being (Weisbrod & Hansen concept) and net income inequality for Germany, 2014-2060*



Source: Authors' own calculations

6 Conclusions

The paper primarily deals with the decomposition of material well-being inequality in Germany on the database of the 2008 *EVS*. In this context, a “nested” approach is used insofar as the overall inequality levels are decomposed at first by well-being categories and then by socio-demographic characteristics.

The analysed well-being categories are: equivalent household well-being following a proposal made by Weisbrod and Hansen [Weisbrod / Hansen (1968)], equivalent household net income, equivalent annualised per-capita household net wealth, per-capita household net wealth, per-capita household net real estate, per-capita household net money assets, equivalent household gross income, equivalent household labour income, equivalent household capital gains, equivalent household transfers, equivalent household taxes, equivalent household net transfers, and equivalent household consumption expenditure. As socio-demographic characteristics, we use: a spatial differentiation between West and East Germany (referring to residence), three age groups (up to 29 years, 30-59 years, and 60 years and older), sex (male versus female household members), nationality (German versus non-German household members), and six household types (female single, male single, single-parent household, couple without children, couple with children, and other household types).

As main results due to the categorial decompositions, we obtain:

- The inequality level of Weisbrod & Hansen’s well-being indicator is strikingly driven by annualised wealth which in turn is mainly influenced by the within-category inequality of (net) real estate (which, therefore, also influences wealth inequality most).
- Regarding income inequality, labour income’s within-category inequality plays the major role, followed by transfers and capital income (for which its relatively high inequality level is broadly balanced by the quite low share of capital income on total income).
- Approximately two third of expenditure inequality can be accounted for within-subcategory inequality with the largest importance of the expenditure subcategories “Transport & communication”, “Other goods and services”, and “Housing rent, water, electricity, gas, & other fuels”.

All in all, the analysis illustrates that it is necessary to consider all three dimensions for making statements about the material well-being of private households or individuals.

With respect to the socio-demographic characteristics used in this paper, the following decomposition results occur:

- As a general finding, all decompositions reveal the overwhelming role within-group inequality plays.
- The decomposition between West and East Germany reveals that within-group inequality in West Germany clearly predominates (over all well-being categories).
- Referring to age-related decompositions, typically, the within-group inequality levels of the elderly are the most important components of overall inequality across most of well-being categories (i. e., regarding Weisbrod & Hansen's well-being indicator, wealth, and expenditures).
- The impact of sex on inequality is rather small.
- Within-group inequality of German household members distinctly dominates the impact of within-group inequality of non-German household members on total inequality (regarding all well-being categories).
- Furthermore, total inequality (of all well-being categories) is predominated by within-group inequality of the household type "couples without children".

Overall, by decomposing (material) well-being inequality in great detail for Germany, we shed light on its dimensions – showing that decomposition by income, wealth, and expenditure, as well as by socio-demographic characteristics is important to obtain adequate solutions for socio-political measures. Not considering the fact, from where the real inequality stems from, is like barking up the wrong tree and bears the danger of false political measures regarding social and distributional policy.

7 Appendix

Table 15: *Household characteristics (selection) [Statistisches Bundesamt (2010a): 2]*

Place of residence	<ul style="list-style-type: none"> • Schleswig-Holstein • Hamburg • Lower Saxony • Bremen • North Rhine-Westphalia • Hesse • Rhineland-Palatinate • Baden-Württemberg • Bavaria • Saarland • Berlin-West • Brandenburg • Mecklenburg-Western Pomerania • Saxony • Saxony-Anhalt • Thuringia • Berlin-East
Household type - with unmarried children up to 27 years	<ul style="list-style-type: none"> • alone living female • alone living male • lone parents with children • lone parents with 1 child • lone parents with 2 children • lone parents with 3 or more children • couple without child • spouse not employed • spouse employed • couple with 1 child • spouse not employed • spouse employed • couple with 2 children • spouse not employed • spouse employed • ...

	<ul style="list-style-type: none"> • couple with 4 children or more • spouse not employed • spouse employed • common-law marriage without child • partner not employed • partner employed • common-law marriage with 1 child • partner not employed • partner employed
Household type - with unmarried children up to 27 years	<ul style="list-style-type: none"> • common-law marriage with 2 children • partner not employed • partner employed • common-law marriage with 3 children or more • partner not employed • partner employed • other household
Number of persons in household	<ul style="list-style-type: none"> • 1 – 8 = number • 8 = 8 persons or more
Size of household	<ul style="list-style-type: none"> • single-person household • two-person household • three-person household • four-person household • household with 5 persons or more
...	<ul style="list-style-type: none"> • ...

Table 16: Individual characteristics (selection) [Statistisches Bundesamt (2010a): 2 ff.]

Position in the household	<ul style="list-style-type: none"> • main income earner, yes / no
Sex	<ul style="list-style-type: none"> • men • women
Year of birth	<ul style="list-style-type: none"> • 1988 = 18 up to 20 years • 1987 = 21 years • 1986 = 22 years • ... and so forth ... • 1923 = 85 years and older
Marital status	<ul style="list-style-type: none"> • unmarried • married • widowed • divorced • permanent living apart • same-sex union • civil partnership annul / civil partner deceased
Nationality	<ul style="list-style-type: none"> • German • rest of European Union • other nationality
Status of employment	<ul style="list-style-type: none"> • self-employed farmer • self-employed businessman/ craftsman , liberal profession • civil servant, judge, regular soldier, conscript • white-collar worker • blue-collar worker • unemployed person • not working
Status regarding the statutory pension system	<ul style="list-style-type: none"> • compulsory insured employee • compulsory insured self-employed person or farmer • voluntarily insured • not insured
Status regarding health insurance	<ul style="list-style-type: none"> • compulsory insured in statutory health insurance • compulsory co-insured in statutory health insurance • voluntarily insured in private system • voluntarily co-insured in statutory health insurance

	<ul style="list-style-type: none"> • private health insurance • entitlement to health care • not insured
Status regarding long-term care insurance	<ul style="list-style-type: none"> • compulsory insured in public system • compulsory insured in public system via partner • compulsory insured in private system • compulsory insured in private system via partner • not insured
Weakly working hours	<ul style="list-style-type: none"> • 0 = n.a. • = less than 10 hours • = 10 hours • = 11 hours • ... and so forth ... • 60 = 60 hours and more
...	<ul style="list-style-type: none"> • ...

Table 17: Consumption expenditure (selection) [Statistisches Bundesamt (2010a): 36 ff.]

Food, beverages, tobacco	<ul style="list-style-type: none"> • food • non-alcoholic beverages • alcoholic beverages • tobacco • drugs
Clothing and shoes	<ul style="list-style-type: none"> • fabric • clothing for men (14 years or older without hosiery) • clothing for women (14 years or older without hosiery) • clothing for children (up to 14 years without hosiery) • shoes for men (14 years or older) • shoes for women (14 years or older) • shoes for children (up to 14 years) • repair of clothes • repair of shoes • hosiery for men, women, and children • dry cleaning, iron, launder, dye • ...
Housing rent, water, electricity, gas and other fuels	<ul style="list-style-type: none"> • rent for main flat • sublease • permanent rent for hotels, guesthouses, pension • electricity • gas • heating oil • coal, wood, and the like • ...
Furniture and related items for the household and its maintenance	<ul style="list-style-type: none"> • furniture and fixtures • repair of furniture, fixtures, and floor covering

	<ul style="list-style-type: none"> • textiles • refrigerator, chest and upright freezer • washing machine, tumble drier, dishwasher, ironer • small electrical household appliances • repair of household appliances • glassware, crockery, other household objects • ...
Health care	<ul style="list-style-type: none"> • pharmaceuticals • with prescription • without prescription • other medical products • with prescription • without prescription • orthopaedic shoes • dental prosthesis • therapeutic means and devices • rent of therapeutic devices • services of hospitals • ...
Transport	<ul style="list-style-type: none"> • purchase of new cars • purchase of used cars • purchase of bicycles • accessories, components, replacement parts of bicycles • ...
Communication	<ul style="list-style-type: none"> • post and courier services, private post and parcel delivery services, forwarding expenses • purchase of telephones, telefax devices, mobil phones. Answering machine • communication services • ...
Leisure, entertainment and culture	<ul style="list-style-type: none"> • television, video recorder, tv

	<ul style="list-style-type: none"> antenna • data processing device and software • durable goods and equipment for culture, sports, camping, recreation • toys • sports articles • indoor plants and cut flowers • domestic animals inclusive expenses for veterinary surgeon and other services • radio and tv licence • gambling • books and pamphlets • newspapers and periodicals • package tour: home • package tour: abroad • ...
Education	<ul style="list-style-type: none"> • kindergarten • nursery school • private lessons • charge for courses • ...
Accommodation and related services	<ul style="list-style-type: none"> • dishes and beverages • restaurants, café, snack booth • canteen, refectory • overnight stay
Other goods and services	<ul style="list-style-type: none"> • services of hairdresser • other services for personal hygiene • services of prostitution • hair-care and shaving products, • jewelleryes and watches (inclusive repair) • services of insurance agencies • ...

Table 18: *Income sources (selection) [Statistisches Bundesamt (2010a): 17 ff.]*

<ul style="list-style-type: none"> • Earned income from dependent employment 	<ul style="list-style-type: none"> • basic salary / basic wage • single payment, • holiday pay • christmas bonus • redundancy payment • employer's contribution(s) to tax-deductible (employee) savings scheme • profit sharing • etc.
<ul style="list-style-type: none"> • Earned income from self-employment 	<ul style="list-style-type: none"> • earned income from self-employment • personal drawing of farmers • personal drawing of self-employed • miscellaneous receipts
<ul style="list-style-type: none"> • Sublease 	
<ul style="list-style-type: none"> • Royalties 	
<ul style="list-style-type: none"> • Rent values of condo 	
<ul style="list-style-type: none"> • Revenues from sale of goods 	
<ul style="list-style-type: none"> • Pensions from pensions systems 	<ul style="list-style-type: none"> • public pensions from the statutory pension system • pensions from pension schemes of the liberal professions • pensions for civil servants
<ul style="list-style-type: none"> • Sickness benefits 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • Unemployment benefits 	<ul style="list-style-type: none"> • unemployment benefits I (SGB II) • unemployment benefits II (Means-tested social assistance)
<ul style="list-style-type: none"> • Bad-weather allowances 	<ul style="list-style-type: none"> •
<ul style="list-style-type: none"> • Income from non-public transfers 	<ul style="list-style-type: none"> • inter-household cash transfers
<ul style="list-style-type: none"> • ... 	

Table 19: *Taxes and contributions*

• Payroll taxes	
• Church taxes	
• Obligatory contributions to the social security system	<ul style="list-style-type: none"> • statutory pension schemes • unemployment insurance • statutory health insurance • statutory long-term care insurance
• Voluntary contributions	<ul style="list-style-type: none"> • statutory pension schemes • private pension schemes • statutory health insurance, • private health insurance, • private long-term care insurance, • etc.
• land tax	
• Road tax	
• Solidarity tax	
• Dog licence	
• Social compensation levy	
• Capital transfer tax	

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