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The Impact of Home Production on Economic Inequality in Germany

Joachim R. Frick
Markus M. Grabka
Olaf Groh-Samberg

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of Labor

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Joachim R. Frick
SOEP at DIW Berlin,
TU Berlin and IZA

Markus M. Grabka
SOEP at DIW Berlin

Olaf Groh-Samberg
SOEP at DIW Berlin

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

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ABSTRACT

The Impact of Home Production on Economic Inequality in Germany*

Using representative income and time use-data from the German Socio-Economic Panel (SOEP), we estimate non-monetary income advantages arising from home production and analyse their impact on economic inequality. As an alternative to existing measures, we propose a *predicted wage* approach based on a bias-adjusted measure of hours spent on home production. Sensitivity analyses comparing results obtained from different approaches provide indications of methodological effects arising from the choice of method. Although the substantive notion of reduced inequality is stable, the degree of variation in our findings underscores the need for a harmonized approach in cross-nationally comparative research.

JEL Classification: D31, D13, I32

Keywords: home production, non-cash incomes, economic inequality, well-being, SOEP

Corresponding author:

Joachim R. Frick
SOEP
DIW Berlin
Mohrenstrasse 58
10117 Berlin
Germany
E-mail: jfrick@diw.de

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1 Introduction

Like other types of private in-kind income, such as imputed rent for owner-occupied housing and fringe benefits, *home production* improves household welfare without being reflected in the household's cash flow, either in disposable household income or in labor income (see Smeeding and Weinberg 2001). In distributional analyses, the omission of private in-kind incomes may lead to substantially biased results on economic inequality and poverty. Considering income from home production appears to be particularly important in a cross-national perspective, e.g., when comparing countries that differ with respect to the existence of subsistence economies or of gender divisions of labor in home production (see Canberra Group 2001).

The aim of this paper is to quantify the value of non-cash income derived from "home production" as well as to analyze its impact on income inequality and poverty in Germany. Extending the scope of home production to include *housework*, *errands*, and *private care* for children and elderly household members, adds a significant share of the overall population as potential beneficiaries of such fictitious income. Estimates for Germany, based on a national time budget survey conducted in 2001/02 among persons aged 10 and over, show that the time spent in unpaid work amounts to as much as 25 hours per normal week, whereas the average number of hours spent in paid work amounts to 17 hours only (BMFSFJ 2003). These figures, of course, vary substantially by sex and age. Roughly estimated, the total time spent on unpaid work equals the amount of time spent for paid work in OECD countries, with the bulk of this amount being provided by women (e.g., Swiebel 1999; OECD 1995). Given that the time spent in home production activities is usually estimated on a lower "wage rate" than paid work, the monetary value of unpaid work in private households typically ranges between

thirty to fifty percent of GDP (Chadeau 1992; OECD 2006: 113). Thus, despite all the methodological and practical problems in deriving a monetary value for household production, one must assume that individuals do draw utility from these activities, which make a significant contribution to their economic wellbeing.

This paper proposes a new "predicted wage" measure for valuing home production and provides first evidence on the distributional impact of home production activities for Germany. Like most of the previous literature on home production, we employ time-use data to estimate the extent and the monetary value of home production, which we do by multiplying the (adjusted) number of hours spent in home production by a fictitious hourly wage. The data come from the 2002 wave of the German Socio-Economic Panel (SOEP), a representative household panel survey of the German population in private households, which contains detailed income information as well as time-use data for all adult household members. We follow and extend the existing literature in applying different approaches to defining fictitious hourly wages, thus allowing for sensitivity analysis and supporting robustness checks on the distributional impact of adding home production.

We compare results obtained from a "housekeeper wage" approach (which assigns a uniform wage to everybody), an "opportunity cost" approach and a "predicted wage" approach. While both latter methods do allow for individual variation, we choose the "predicted wage" approach as a robust measure of the monetary value of home production that avoids some of the strong assumptions underlying the already established approaches. The approach adopted here differs in various important respects from previous research. First, in the predicted wage approach, and in contrast to the standard opportunity cost approach, the predicted hourly wage rate is consistently applied to all adult household members, regardless of their current employment status and wage rate. Thus, the predicted wage measure accounts for

individual differences in characteristics related to productivity and opportunity costs, but it avoids the strong assumption of a completely free choice between paid and unpaid work that underlies the opportunity cost approach. Secondly, we use more detailed time-use data comprising a more comprehensive set of home production activities (including, for example, errands and childcare). Finally, we adjust the reported time measure in order to account for multitasking and, most important, for an assumed diminishing marginal productivity of time spent on a certain type of home production activity.

The paper is structured as follows. Section 2 describes and discusses the various approaches to derive a money measure of home production on the basis of output or consumption information as well as time-use data, and reviews previous literature on their distributional effects. Section 3 is devoted to the empirical implementation using micro data for Germany. Results on the distributional impact of fictitious income from home production on income inequality and poverty are given in Section 4, including factor decomposition of the extended income measure as well as inequality decomposition for socio-demographic characteristics of the households in order to provide more in-depth analysis of how income from home production activities affects economic inequality. Finally, Section 5 concludes.

2 Measuring Home Production and its Distributional Impact – Literature Review

Attempts to estimate the monetary value of home production and to explicitly consider this important contribution to the "wealth of nations" have a long history in national accounting, dating back to 19th century and the pioneering work of Margarete Reid (1934). The main aim of this research strand is to implement money measures of home production into the framework of macroeconomic accounting in order to evaluate the economic contribution of unpaid work, in particular the housework of women (see, e.g., Ironmonger 1996; Blundell et al. 1994;

Gronau 1980). Once such a measure is established, the question arises to what extent income inequality and poverty might be affected by including the economic benefits of home production in the underlying measurement of economic well-being. However, accounting for home production in the analysis of income distribution is a more recent research concern.

Table 1 provides an overview of previous studies analyzing the distributional impact of home production. There is wide variation in the type of data used, the restrictions on the kind of home production activities considered, the populations addressed, and the approaches chosen to derive a monetary value for these activities. Accordingly, the estimated contribution of fictitious income from home production, measured as a percentage of the baseline cash income, varies from some 13% to more than 200% (last column in Table 1). Notwithstanding this variation, however, most of the studies (except the earliest ones) find a significant reduction in income inequality once non-cash income from home production is added to cash household income. In the following, we briefly review this literature, focusing on the various approaches used to estimate the money value of home production activities.

Expenditure data: In principle, several approaches are possible to derive a monetary measure for home production. First, *expenditure or consumption data* may provide a straightforward way to define the monetary value of products and services provided by the household for its own consumption ("output" approach). The rationale behind this approach is that the income advantage of home production equals the price of similar products and services that one would have to pay for on the market. However, detailed information on the quantity and quality of the products and services produced by the household is required to accurately calculate the market value of home production output. Such data are, however, almost entirely unavailable. In fact, there is—to the best of our knowledge—only one study that effectively employs the output approach to estimate the distributional effect of home production. Kout-

sambelas and Tsakloglou (2008) make use of the Greek Budget Household Survey, which contains self-reported information on the income from own farm production and own non-farm production.[1] Most of the reported income from own production stems from the rural subsistence economy of small agrarian production. Indeed, the monetary value of own production derived from the Greek Budget Survey amounts to less than 2% of the baseline disposable cash income. The distributional effects are similarly small.

Time budget or time-use data: In the absence of expenditure data, the most common way of imputing a value for home production is to multiply the time spent on home production activities by a fictitious hourly wage ("input" approach). This approach requires data on time use and earnings of all household members, as well as household income. Concerning information on time use, time budget surveys are usually considered more accurate and superior to time-use data (Bryant et al. 2004). Time budget data typically record the type of activities performed at small time intervals (e.g., every 15 minutes); whereas time use information collected in population surveys typically is based on the average hours spent on a certain activity on a normal week day. Hence, time budget data make it possible to identify periods of multi-tasking (e.g., cleaning the house while watching the children) and the lengths of specific periods (e.g., doing housework two hours in the morning and again one hour in the evening) and cover 24 hours a day. In contrast, time-use data on various activities may well add up to more than 24 hours a day without providing information on multi-tasking, or add up to substantially less than 24 hours without providing information on what was done the rest of the

[1] It is of course possible to ask survey respondents to give a subjective estimate of the money value of ones' own home production activities, including housework and childcare. Such a subjective approach, which is also common in the case of deriving measures for the imputed rental value of owner-occupied housing (see Frick et al. 2007), might be considered accurate in particular for a more narrow notion of home production activities like subsistence production and do-it-yourself, i.e. for activities that substitute purchasing products from well established markets with well known prices. In case of housework, errands and care activities, such markets and corresponding price levels for service activities might not be that much established, hence, respondents will likely produce invalid estimates or - most likely selectively - fail to respond to such questions.

day. Thus, time-use data are considered less reliable—and generally upwardly biased—due to the reported subjective estimate of average hours of time use.

Housekeeper wage: Given the time spent on home production activities, there exist two alternatives for determining the hourly wage rate to be multiplied by the amount of time. On the one hand, an hourly wage can be derived from the *typical wage* of employees in those economic sectors that typically offer the goods and services produced at home ("housekeeper wage"). It is also possible to apply different wages for each of the various activities that can be distinguished in the data, e.g., wages of nannies for child-care activities, wages of gardeners for gardening work, etc. However, there will always be the question of whether the wages of skilled workers in the pertinent fields ("specialist approach") or, by contrast, the wage rate of an unskilled worker in the service economy for private households ("generalist approach") provides the adequate reference point (Schaffer and Stahmer 2006: 320f.; Jenkins and O'Leary 1996, Chadeau 1992).

In principle, this approach results in applying a flat hourly wage to every person engaged in (a specific type of) home production activity. Thus, the rationale behind this approach is largely comparable to the market value approach, which is based on expenditure and consumption data. The imputed monetary value is thought of as a market price, but instead of detailed information on the goods or services being produced, the numerical product of the time used to produce these goods and services, and a certain (pseudo-)market wage rate is used to determine this value. As such, the housekeeper wage approach directly mirrors Reid's (1934) initial definition of housework as the production of goods and services that could have been purchased on the market ("third-person criterion").

However, above and beyond ignoring the quality of the product, this approach imposes the strong assumption that there is no variation in individual productivity, so that the time

spent on home production by a professional or specialist is equal to the time spent by an amateur. That is, two hours spent repairing a washing machine will produce an outcome of the same monetary value, no matter whether it was fixed by a professional mechanic or a pensioner—or whether an ambitious home handyman spent two hours on it in vain and bought a new one

Opportunity cost: In contrast to the "market value" or "housekeeper rate" approach, in the *opportunity cost* approach the hourly wage is determined by the forgone individual earnings that a person would have obtained if he had done paid work on the labor market instead of home production activities. The rationale behind this method clearly differs from the previous approaches. In the standard opportunity cost approach, it is assumed that, in order to satisfy a given set of needs for home production activities, people have a choice between (a) buying these products and services on the market in exchange for the individual labor earnings from paid work, and (b) providing these goods and services on their own. If the amount of time in paid work that is required to earn the market price of home-produced goods and services is less than the amount of time needed to provide these goods and services on one's own, then option (a) "earn & buy" is more profitable than option (b) "do it yourself". Thus, the main advantage of this approach is that it refers to the *individual's* capacity for labor earnings as well as the *individual's* productivity in home production. Contrary to the housekeeper wage approach, this implies that one hour spent by a professional to repair the washing machine is worth less than one hour spent by a home handyman—because the handyman is assumed to repair his washing machine himself only if he would otherwise earn less than the price of hiring the professional to repair it.

However, the standard opportunity cost approach imposes two very strong assumptions: (a) paid time for employment and unpaid time for home production are perfect substi-

tutes; thus, individuals are similarly productive in housework as in the job they were trained for, and (b) individuals have a free choice of working unlimited hours in their paid job (see Zick et al. 2008: 5f.; Kooreman and Wunderink 1997: 113ff.). In general, this not the case, since workers cannot usually extend their paid working hours at will.[2] Moreover, for the population beyond working age, as well as for the unemployed and otherwise non working individuals, there are no *stricto sensu* opportunity costs, because they do not have the option to "work & buy" instead of "do it yourself" (Zick and Bryant 1990: 147). This is why predicted wages, typically derived from Heckman-type selection correction regressions, are used to estimate the opportunity costs of home production activities for non-working adults. But even for individuals of working age, and even ignoring the unrealistic assumption of unlimited access to paid work, the choices between paid and unpaid work are highly interdependent in the household context and also depend on preferences, tax regulations, and other complex constraints. For example, families with children below the age of three are often confronted with the decision of whether the mother should seek (part-time) employment and find some kind of childcare arrangement or household help, or stay at home and care for the child herself. This decision depends not only on the virtually incalculable *net* monetary advantage of paid work (given a certain job opportunity), but also on individual attitudes, preferences, and social norms concerning motherhood and child-rearing,[3] as well as the availability of childcare arrangements (see, e.g., Wrohlich 2007 for a complex modeling approach to this decision).[4] Thus, given the complexity of the decisions that would have to be modeled, and the unrealistic assumptions involved in the simple "free choice" framework, it is rather unlikely

[2] One indictor of this restriction is the fact that overtime work in many firms is compensated for by leisure time, rather than by being paid, and there is a general trend towards unpaid overtime in Germany (Anger 2006).

[3] For instance, Belbo (1999: 67ff.) shows that time allocation between German couples is not only determined by factors captured in the opportunity cost approach, but also by gender-specific relations of dominance, as indicated by the age difference between husbands and wives.

that we will arrive at proper estimates of the monetary value of home production based on this approach.

Predicted wage: Still, the main feature of the opportunity cost approach is that it can overcome the assumption of constant productivity across individuals, and instead accounts for individual variation in productivity as well as—to a certain extent—in opportunities. In order to incorporate this idea into our measure of home production, we derive a rather simple estimate of the individual earnings capacity based on age, health, household constraints, skills and qualifications. This "predicted wage" can be calculated for every person independent of employment status, and shows much less variation than the observed hourly wages for those who are employed. Thus, the predicted wage approach assumes that a given individual exhibits an "average" productivity in any type of activity, be it home production or paid work.

Review of Results: Reviewing the previous literature documented in Table 1, most of these studies find an inequality-reducing effect of home production. The only exceptions to this finding are the first three studies, which, while employing the opportunity cost approach, also apply rigid sample restrictions by excluding non-working households. Comparing the two main approaches, the opportunity cost approach yields larger incomes from home production, but a less pronounced leveling effect as compared to the housekeeper wage approach (with the only exception being Zick et al. 2008). Gottschalk and Mayer (2002) even included leisure time in one of their extended measures of economic well-being. This, of course, yields a fictitious income from home production more than twice as high as the baseline cash income.

[4] Moreover, this approach also assumes that individuals are perfectly informed about market prices and are able to precisely estimate the time they would need for certain kinds of home production tasks.

The main result of a leveling effect of home production on economic inequality can be expected from standard economic theory, assuming that households with lower overall working hours will spend more time in unpaid work, to partly compensate for lower incomes (Kooreman and Wunderink 1997). Thus, extended income (i.e., disposable monetary household income plus income from home production activities) is assumed to be more equally distributed than monetary household incomes. While this is the case in most of the studies addressing this question, the main reason for the leveling effect of home production lies in the more equal distribution of the included income component itself.

Obviously, all of the approaches discussed here are based on some set of rigid assumptions, and unless there is an otherwise convincing argument for either of them, it is probably best to apply the "housekeeper wage" and the "opportunity cost" as well as the "predicted wage" approach and to compare the respective results by means of a sensitivity check.

3 Deriving a Monetary Value of Home Production Based on Time Use Data

For our analysis we use microdata from the German Socio-Economic Panel (SOEP) for the survey year 2002. The SOEP is a wide-ranging representative longitudinal study of private households that provides yearly information on all household members, consisting of Germans living in the old and new German federal states, foreigners, and recent immigrants to Germany. The panel was started in 1984, extended to East Germany after the fall of the Berlin Wall, and by 2002, after further additions, the survey sample consisted of about 12,000 households and roughly 30,000 persons (see http://www.diw.de/gsoep; Wagner et al. 2007).

Time-use information

To derive a monetary measure for home production, we use the rather simple question of the average number of hours an individual spends on certain activities on a normal weekday. For our measure of home production, we consider the five categories *errands*, *housework*, *child-care*, *elderly care* (including care and support to non-elderly persons) and *repairs & gardening*. By questionnaire design, our measure does not include either hobbies and leisure activities or paid work or activities strictly related to paid work. We only look at a normal working week, thus ignoring any such activities performed on weekends.

As discussed above, the type of time *use* information included in the SOEP may be inferior to that obtained by time *budget* surveys. This is why various correction procedures will be applied to the time-use information, aiming to account for the particular weaknesses of time-use information, but also to account for general problems of deriving a money measure for home production activities based on the time spent for these activities. The general problem of any such approach is that time spent on home production activities might not be strictly comparable with paid working time due to the different time regimes of paid work vs. home production. For example, caring for children, repairing ones' motorcycle, or spending long hours doing gardening work in summer often means mixing economic with recreational activities. Thus, the amount of time spent on home production activities (as recorded in population surveys) might be *stretched* to some extent through breaks and relaxation. As a result, it might overstate the pure time spent on productive work (see Gørtz 2007; Aslaksen and Koren 1996: 68). On the other hand, the utility derived from home production activities might well exceed its pure market value, e.g., due to the intrinsic value of enjoying the fruits of one's own labor, rather than purchasing something "anonymous" on the market.

Furthermore, one has to account for three problems in time-use data: (a) Multi-tasking or overlapping, i.e., the fact that several activities may be performed simultaneously. In contrast to time budget data, we are not able to identify such multi-tasking activities. *Ceteris paribus*, this yields an overestimation of the total time spent on home production and hence of the imputed monetary value. (b) Diminishing marginal utility of home production activities: Given the broad definition of home production, it is most unlikely that, for example, a person spending seven hours in gardening produces seven times the value of a similar person spending one hour. In other words, we assume that the marginal productivity of home production activities declines progressively. (c) The difficulty of separating "productive" time use from leisure time spent doing hobbies and having fun. Thus, an overstatement of the true economically relevant input is likely.

In order to account for these problems, we employ a series of correction procedures. Firstly, we impute missing values for the time-use variables due to item non-response by means of regression analysis. This procedure affects only less than 1% of all observations. Second, assuming a period of eight hours per day to be reserved for sleeping, eating and recreation, we apply a top-coding at 16 hours a day, separately for each activity.[5] Third, and most important, we take the square root of the time spent for each of the activities. This is done to correct for the diminishing marginal productivity of home production and for long-lasting multi-tasking activities. By using the square root of the time spent on home production activities, we apply an effective and robust method to account for a progressively decreasing effect.

Extent of Home Production

To get some first empirical insights into the distribution of home production and to shed some light on the effect of the above-mentioned corrections, Tables 2 and 3 show the incidence of

home production across household and individual characteristics. The total time spent on home production during a normal working week is on average 8.1 hours per household and 4.8 hours per person (aged 17 and above) *before* correction. This amount is reduced to 5.3 hours per household and 3.2 hours per person after applying the aforementioned corrections. Thus, there is a substantial reduction of time due to those corrections, which are by definition stronger for persons who spend long hours on a single activity.[6]

A closer look at the disaggregated number of hours spent on each of the activities (Table 2) reveals that housework is the most important single activity, with three hours per household before correction, on average. The strong reduction caused by the correction procedure indicates that housework is unequally distributed among household members, with one single member doing most of the work. The same applies to childcare, showing the strongest reduction. In contrast, errands as well as repairs and gardening seem to be more equally distributed within the households. The total time (before correction) spent on errands is only slightly above that spent on childcare, and the time spent on repairs and gardening is lower than that spent on childcare. But the corrected number of hours spent on errands lies substantially above that of childcare, and the corrected time spent on repairs and gardening is higher than that spent on children. Elderly care is rather rare in the overall population, but it requires long hours among those who do provide it.

Home production activities in repairs and gardening are more likely to occur among home-owners and households with a yard or garden. Thus, certain types of accommodation and living conditions will more likely create a need (as well as an opportunity) for home pro-

[5] There are only few cases of more than 16 hours reported for a single activity, in particular for childcare (162 cases with up to 24 hours spent on childcare).

[6] In the case of housework (and, to a lesser degree, childcare) this might be considered as problematic, given that the time regime of housework comes rather close to that of paid work, at least in terms of productivity, intensity, and stress.

duction activities. This applies, of course, to childcare activities as well, which are most likely to take place in households with children below the age of 14. These households also spend more time on housework. There is likely to be a certain degree of overlap between housework and childcare activities, which cannot be revealed by means of our time-use data.[7] Moreover, households in rural areas are in general more likely to invest their time in home production instead of relying on the market. Errands as well as elderly care appear to be quite equally distributed among different household types.

Concerning individual characteristics (Table 3), women as well as married and divorced persons engage in home production significantly more often than average. However, after corrections, the gender gap is significantly decreased, reflecting the fact that women tend to spend larger number of hours in single activities (especially in care activities[8]). Regarding age, young persons are less likely to engage in home production, as is true for persons not (yet) holding vocational degrees. Also, bad health lowers involvement in home production. On the other hand, unemployed persons are significantly more often engaged in home production and spend longer hours as well.[9] Moreover, persons with lower general and only basic vocational education spend more time in home production, especially as compared to highly qualified persons.

Deriving fictitious hourly wages

In the following empirical analysis, we apply three different approaches to monetarize the value of home production activities: the housekeeper wage approach, the opportunity cost

[7] Correlation analysis for the various home production activities shows the highest correlations between housework and errands (0.41) and housework and childcare (0.28).

[8] See Lewis et al. (2008) for a gender-specific analysis of the patterns of paid and unpaid work in Western Europe. While Lewis et al. focus on child care as the main unpaid activity of parents in two-parent families, their results are by and large in line with those presented here using a wider definition of home production activities in the total population.

[9] In a recent paper using time budget data, Burda and Hamermesh (2009) find only a moderate compensating increase in time spent on home production among the unemployed.

approach, and the predicted wage approach. For sensitivity purposes, we use two variants of housekeeper wages to cover the range of low-wage occupations. A *net* hourly wage of €4 is assigned to approximate the lowest-grade wage observed in the sectors "miscellaneous services" and "construction", whereas a wage of €8 per hour comes close to the minimum wage currently under discussion by German policy makers. Thus, the €8 wage rate approximates the protected wage rate of skilled service worker, whereas the €4 wage rate might represent current prices for shadow work in private households.

In addition to the housekeeper rate approach, we apply the "predicted wage" approach in order to account for individual variations in productivity and opportunity costs. Given the counterintuitive assumption imposed by the opportunity cost approach as discussed above, we use the *predicted* individual wages only, instead of real wages, even for employed individuals for whom we observe a market wage rate. Thus, we only introduce the predicted, and therefore limited, individual variation according to the covariates included in the regression model, in order to capture differences in individual productivity, independent of the type of activity. By doing so, the estimated value for home production activities is defined in the same way for the entire population, independently of their employment status. However, for sensitivity purposes, we also apply the *standard opportunity cost approach*, i.e., using current gross hourly wages (instead of predicted wages) for the employed.

We use log *gross* hourly wage as the dependent variable in the underlying regression model, based on all persons with individual labor earnings, but estimated separately for men and women (see Table 4).[10] After simulating income taxes and social security contributions for the predicted gross wages[11], we estimate an average net hourly wage of €8.39 (with stan-

[10] The results for the regression model are shown in Table 4. We used simple OLS regression models, because a correction for potential sample selection according to Heckman did not appear to be necessary.

[11] This simulation is based on the ratio of taxes and social security contributions to market income at the household level.

dard deviation €3.64) for all persons. By sex, the predicted hourly wages are €9.85 (standard deviation €3.96) for men and €7.12 (standard deviation €2.77) for women. Thus, the average predicted wage comes close to the higher version of the two housekeeper wage approaches (€8), however, the distribution is obviously quite different.

4 Empirical Results: the Impact of Home Production on Income Inequality

In the following analyses we link fictitious income from home production as described in the previous section to a baseline cash income measure as provided in the SOEP. The principle underlying all the following analyses is to compare the situation of a baseline model using monetary annual post-government household income with the income situation *after* adding income from home production. Following the standard approach in inequality research, we assume that all household members pool and share all available resources (i.e., income) so that everyone's standard of living in the household is the same. This requires that the monetary value of home production activities is aggregated across all members of a given household and re-assigned to all of them. The modified OECD equivalence scale is applied (1; 0.5; 0.3) in order to adjust for differences in household composition and size, thus allowing for economies of scale in larger households.

4.1 Population Shares of Beneficiaries

To analyze the distributional impact of the monetary equivalent of home production, we first describe the share of persons benefiting from home production in each income quintile (based on yearly post-government incomes, equivalized by using the modified OECD scale). Table 5 gives the respective share of beneficiaries separately for each of the five home production activities (errands, housework, childcare, elderly care, repairs & gardening) as well as for total

home production. As can be seen from column A in Table 5, almost every person (99%) in the entire population lives in a household where at least one of the various activities considered is performed by at least one household member. However, when analyzing these activities separately, some differences emerge across the income distribution. Errands and housework are obviously activities that are performed by all households in order to manage their daily needs. The population shares of individuals living in households engaged in care activities for children and for the elderly clearly decrease among higher incomes, reflecting the fact that the average household with children and/or elderly members lives on a below-average cash equivalent income. Finally, home production arising from "repairs and gardening" is most prominent in the middle of the distribution. This is also reflected in the analysis of the home production activities presented above, indicating that repairs and gardening are more frequent among home-owners.

4.2 Income Advantages from Home Production

Even though almost everyone enjoys income from some sort of home production, it may not all be similar in value. Thus, in Table 6 we report income shares for each quintile in the baseline model (column A) as well as after adding fictitious income from home production using the various approaches in columns B1, B2, etc. The lowest income quintile benefits considerably from home production in relative terms, with its income share rising from 8% in the baseline model to about 10% after including a value for home production. The second and third quintiles also expand their respective share of overall income, whereas the income share of the higher income quintiles is reduced accordingly by several percentage points.

When comparing the distributional impact of home production as based on the two different housekeeper wage approaches, we find a very pronounced equalizing effect when applying a wage rate of €8, and the least equalizing effect for the wage rate of €4 per hour.

The predicted wage and the opportunity cost approach range in between, with the opportunity cost approach yielding results similar to the €4 housekeeper wage. These results reflect that individuals with a high baseline income also tend to exhibit characteristics that are linked to a higher predicted wage. The ranking of the approaches according to the strength of the inequality-reducing effect is also mirrored in the fact that the correlation between disposable baseline income and the fictitious income derived from home production is highest (0.22) for the opportunity cost approach, modest (0.09) for the predicted wage approach, and even slightly negative (-0.03) for the housekeeper wage approach.

Columns C1, C2, etc. give the average percentage increase in disposable income when adding the value of home production according to the various approaches. For the €4 housekeeper wage approach, the cash value of total home production is about 17.5% of the baseline income for the entire population, and about twice as strong in the €8 housekeeper wage as well as in the predicted wage and the opportunity cost approach. As expected, the effect of home production is much greater among the lowest incomes: in fact, in the poorest quintile, home production "adds" 40% of baseline income (and 70-80% in the two other approaches) whereas the top quintile enjoys "only" an increase of 9-23%, respectively.

More interestingly, columns D1, D2, etc. give the average value of equivalent income bound in home production for the different measurement methods. While for the housekeeper wage approaches the added value from home production is hump-shaped across the income distribution, we find a consistently increasing average amount for the predicted wage and the opportunity cost approach. This pattern is influenced by two effects: on the one hand, the number of hours spent on home production is highest in the middle income quintiles (see also column G in Table 5). On the other hand, (current and predicted) wages among high-income households are higher than among less well-off households, reflecting that individuals in rich

households tend to have characteristics yielding higher earning potentials. In the predicted wage and opportunity cost approach, this latter effect overrides the slightly hump-shaped distribution of the amount of time spent for home production.

4.3 Impact on Income Distribution and Poverty

Column A in Table 7 provides a comprehensive picture of inequality and relative poverty using the baseline income measure. We compare these results to those obtained from the amplified income. In general, adding the fictitious value for home production yields the expected and consistent pattern of reduced inequality and poverty, irrespective of the approach chosen.

Again, comparing the various approaches yields a robust ordering, with the strongest inequality reducing effect for the €8 housekeeper wage, and a subsequently declining strength of this leveling effect when applying the predicted wage, the opportunity cost and, lastly, the €4 housekeeper wage approach. For example, the Gini coefficient is cut down by 14% (€4 wage rate), 15% (opportunity cost), 19% (predicted wage) and 23% (€8 wage rate), respectively. The results for the decile ratios indicate that this effect is driven similarly by changes in the upper as well as in the lower half of the distribution. The results for relative poverty as measured by the FGT index (see Foster, Greer and Thorbecke 1984)—based on a dynamically adjusted poverty threshold—show the same pattern. The head count poverty ratio (FGT0) is reduced from 15% (baseline income) to less than 11% after adding fictitious income from home production based on the €8 housekeeper wage approach. For all other approaches, the reduction effect is smaller, and smallest for the opportunity cost approach. However, the poverty reduction effect is monotonically increasing in the poverty aversion parameter alpha.

An alternative presentation of these findings is given in Figure 1, where the Lorenz curve for the baseline income distribution at all points is clearly to the right of the corresponding graphs using the three alternatively enriched income measures. At the same time the Lorenz curve for the predicted wage approach always lies in between the two "housekeeper wage" curves, i.e., there are no intersections of these graphs.

4.4 Decomposition of Inequality and Poverty by Socio-Economic Structure

Finally, Tables 8 and 9 provide some insight as to which societal subgroups might actually profit most from home production.[12] So far, the sensitivity and robustness analyses showed a consistent ordering of the various approaches. In order to reduce the complexity of the following tables, we refrain from presenting the results for the housekeeper wage approach based on €8 per hour and the opportunity cost approach in Table 8.

Looking at decomposition by household type, the figures on income levels and inequality given in Table 8 show family households with dependent children, in particular monoparental households, as well as elderly people (singles and couples) to profit most from the additional consideration of income from home production. In the former case, this is obviously driven by accounting for childcare as one form of home production. With respect to the socio-economic status of the household head, it is the unemployed and pensioners who improve their relative income position, while white-collar workers and the self-employed lose in relative terms. To complete the picture, highly educated households lose and the least-educated households gain in relative terms. All this yields the conclusion that households with lower cash incomes profit (also due to the low base effect when calculating relative changes) while households highly engaged in the labor market gain less because they invest less time in

[12] All statistical analysis have been conducted using Stata version 9.2, and the decomposition add-ons INEQFAC, INEQDECO, and POVDECO, all written by Stephen Jenkins.

home production due to the higher opportunity costs. Obviously, this cumulates in an overall reduction of income inequality as shown above.

Decomposing inequality (measured by the MLD) in between-groups and within-group inequality generally shows that the former is reduced even more than the latter. However, the exception here is inequality across educational levels of the household head, which shows that adding home production clearly increases the relative contribution of the between-group inequality across educational levels when using the predicted wage approach, whereas there is no change when applying the housekeeper wage rate of €4 per hour. For all other grouping variables, the relative contribution of the between-groups inequality remains basically unchanged or, if anything, slightly declines.

Results on the impact of home production on relative poverty (see Table 9) are by and large consistent with the findings on inequality. However, there are some group-specific deviations. Whereas overall poverty is significantly reduced when including fictitious income from home production, this does not hold for all social groups. In particular, white-collar households exhibit no changes in poverty when applying the first three approaches, and there is even an increase in the poverty head-count ratio from the rather low baseline level of 4.9% to 5.6% based on the opportunity cost approach. For the elderly, there appears to be a reduction in poverty only based on the housekeeper wage approach, but not so for the opportunity cost and predicted wage approach. This is linked to the diminishing effect of higher age in the wage prediction. Looking at differences across the educational levels of household heads, more highly educated households again exhibit an exceptional pattern of stronger reductions in poverty for the predicted wage approach than for the opportunity cost approach.

Decomposing total inequality by income component (factor decomposition – see Table 10) shows that the overall contribution of the added value for home production to total ine-

quality of the extended income measure is close to zero. This is particularly the case for the €4 housekeeper wage approach, with almost 99.5% of total inequality being attributable to the money measure of disposable income. Although the share of the fictitious income from home production amounts to one-quarter of the extended income measure for the three other approaches, the contribution to inequality is still below 10% for the €8 housekeeper wage and predicted wage approach, and reaches a maximum of 12% for the opportunity cost approach.

In any case, the contribution of each of the home production activities is of positive value or (almost) zero otherwise. This suggests that individual welfare provided by home production activities is also unevenly distributed, at least to some extent. This is particularly the case within the framework of the opportunity cost approach, and for errands and housework. Care activities, although unevenly distributed among the population, do not contribute to total inequality in significant terms.

5 Conclusion

This paper supports claims of cash income being a less than perfect measure of individual well-being, and clearly underscores the need to consider non-cash income advantages arising from various home production activities. Our empirical analyses for Germany reveal that basically the entire population profits from at least one household member doing unpaid work at home. Nevertheless, there is quite some variation across socio-economic and demographic characteristics. In line with the international literature, as well as with national findings about the distributional impact of other non-cash components[13], we find inequality and poverty in an extended welfare measure to be by and large lower than in a purely cash-based approach (see

[13] See Frick et al. (2006) for non-cash income bound in public educational transfers, Frick et al. (2007a, 2007b) for imputed rent and Frick et al. (2008) for public health transfers, respectively. All these analyses refer to the same population used in the paper at hand, which allows for a comprehensive analysis of the impact of non-cash incomes from four different sources on the income distribution in Germany in 2002 (see Frick et al. 2009).

also Gottschalk and Smeeding 1997). Sensitivity analyses and robustness checks comparing results obtained from different approaches to measure home production do provide indications of methodological effects arising from the choice of the method. Although the substantive notion of reduced inequality in well-being is quite stable, the degree of variation in our findings confirms the need for a harmonized approach in cross-nationally comparative research.

This paper proposes a new specification for measuring the monetary value of home production that comprises two distinct features: First, we adjust the numbers of hours spent on home production to reduce bias arising from multi-tasking and, more important, to incorporate diminishing marginal productivity. Second, the proposed predicted wage approach approximates the hourly wage rate for home production by means of the predicted wages of *all* individuals, rather then using "true" market wages from paid employment. The predicted wage approach thus accounts for rather general, predicted differences in individual productivity and earnings capacity. This is grounded in the consideration that people engaging in home production activities typically act as "amateurs," lacking professional skills in the things they do at home—whatever professional skills they may otherwise possess. By means of these two features—adjusting the underlying time measure and predicting individual productivity and opportunity—the proposed predicted wage approach yields a more *robust* measure of the economic utility derived from home production, in terms of the underlying assumption as well as the estimation results.

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7 Tables

Table 1: Previous Studies on the Distributional Effect of Home Production

Study	Country	Data	Population	Method	Version	Ref. Year	GINI baseline	GINI plus homeprod.	GINI change in %	home prod. in % of baseline
Bryant & Zick 1985	USA	Panel Study of Income Dynamics (PSID)	White, married-couple households where the husband is employed	opportunity cost	rural households	1975	0.280	0.290	3.6	77.0
					urban households		0.270	0.300	11.1	73.3
					rural households	1979	0.260	0.240	-7.7	80.1
					urban households		0.250	0.240	-4.0	97.4
Zick & Bryant 1990	USA	PSID	White, married couples with husband employed	opportunity cost		1975	0.281	0.309	10.0	75.7
						1979	0.259	0.268	3.5	81.0
Bonke 1992	DK	Time Use Survey	Couples with employed husbands (aged 16-76)	opportunity cost		1987	0.164	0.169	3.0	47.8
Aslaksen & Koren 1996	Norway	Time Budget Survey	All households	housekeeper wage		1990	0.289	0.225	-22.1	--
Jenkins & O'Leary 1996	UK	Social Change and Economic Life (+ FES)	Adults in 1-family-households (20-59)	housekeeper wage		1986/87	0.292	0.170	-41.8	86.3
				opportunity cost			0.292	0.209	-28.4	65.4
Gottschalk & Mayer 2002	USA	Panel Study of Income Dynamics (PSID)	Households with head aged 25-64	opportunity cost, incl. leisure time	decile ratios instead of Gini reported: p50/p20; p80/p50	1976	1.90; 1.62	1.81; 1.51	-4.9; -6.6	241.8
						1992	2.19; 1.85	1.92; 1.68	-12.5; -8.7	228.4
				housekeeper wage		1976	1.90; 1.62	1.76; 1.55	-7.2; -4.3	13.9
						1992	2.19; 1.85	2.02; 1.76	-7.5; -4.6	12.5
				opportunity cost		1976	1.90; 1.62	1.78; 1.57	-6.6; -3.1	40.8
						1992	2.19; 1.85	2.05; 1.78	-6.2; -3.5	33.3
Fazis & Steward 2006	USA	American Time Use Survey (ATUS)	Adults in 1-family-households (25-64)	housekeeper wage	general, excl. sec. childcare	2003	0.416	0.328	-21.2	30.5
					special, excl. sec. childcare			0.324	-22.1	33.1
					general, incl. sec. childcare			0.299	-28.1	44.7
					special, incl. sec. childcare			0.297	-28.6	46.7
Zick et al. 2008	USA	Time Use in Economic and Social Accounts (1975), ATUS (2003)	Adults	housekeeper wage		1975	0.343	0.300	-12.5	23.2
						2003	0.412	0.346	-16.0	31.8
				opportunity cost		1975	0.343	0.283	-17.5	44.9
						2003	0.412	0.363	-11.9	48.5
Koutsambelas & Tsakloglou 2008	Greece	Budget Household Survey	Adults	consumption	income from own production	2004	0.322	0.315	-2.1	1.8

Table 2: Home Production Activities by Selected Household Characteristics in Germany, 2002

Household characteristics		Average number of hours per normal week day spent in …											
		Total Home Production		Errands		Housework		Childcare		Elderly care		Repairs & Gardening	
Garden	yes	**6.1**	**[9.5]**	1.6	[1.9]	2.1	[3.4]	0.9	[2.0]	0.2	[0.3]	1.4	[1.9]
	no	**4.3**	**[6.4]**	1.4	[1.7]	1.7	[2.6]	0.5	[1.2]	0.1	[0.2]	0.5	[0.7]
Home owner	yes	**6.4**	**[9.7]**	1.7	[2.0]	2.1	[3.5]	0.8	[1.9]	0.2	[0.3]	1.5	[2.1]
	no	**4.5**	**[6.9]**	1.4	[1.7]	1.7	[2.7]	0.6	[1.5]	0.1	[0.2]	0.6	[0.8]
Community size	< 2.000	**6.3**	**[9.9]**	1.7	[2.0]	2.1	[3.5]	0.8	[2.0]	0.1	[0.3]	1.5	[2.1]
	2.000 - 500.000	**5.4**	**[8.3]**	1.5	[1.8]	1.9	[3.1]	0.7	[1.8]	0.1	[0.2]	1.0	[1.4]
	> 500.000	**4.3**	**[6.3]**	1.4	[1.7]	1.7	[2.5]	0.5	[1.2]	0.1	[0.2]	0.6	[0.7]
Region	West	**5.2**	**[8.0]**	1.5	[1.8]	1.9	[3.0]	0.7	[1.8]	0.1	[0.2]	1.0	[1.2]
	East	**5.6**	**[8.3]**	1.7	[2.1]	2.0	[3.0]	0.6	[1.2]	0.1	[0.3]	1.2	[1.7]
Children in hh	no	**4.6**	**[6.3]**	1.5	[1.8]	1.8	[2.9]	0.1	[0.2]	0.1	[0.2]	1.0	[1.3]
	yes	**8.1**	**[14.9]**	1.7	[2.0]	2.2	[3.7]	3.0	[7.6]	0.1	[0.2]	1.1	[1.3]
Total		**5.3**	**[8.1]**	**1.5**	**[1.8]**	**1.9**	**[3.0]**	**0.7**	**[1.7]**	**0.1**	**[0.2]**	**1.0**	**[1.3]**

[x.x] values in brackets give the respective number of hours before correction. Corrections include imputation for missing values in cases of item non-response, top-coding at 16 hours a day for each activity and accounting for multiple activities by taking the square root of hours spent in each activity.

Population: Private households.
Source: SOEP 2002; authors' calculations.

Table 3: Home Production by Selected Individual Characteristics in Germany, 2002

Personal characteristics		individually engaged in home production %	hours spent in home production "before correction"	"corrected" hours spent in home production
Sex	male	91.3	3.3	2.6
	female	97.0	6.2	3.7
Age group	17-24	82.2	2.5	1.9
	25-40	95.5	6.0	3.5
	41-55	96.0	4.6	3.2
	56-65	96.0	4.7	3.2
	> 66	95.7	4.9	3.2
Marital status	married	96.0	5.7	3.5
	single	89.1	3.0	2.3
	divorced	96.9	4.8	3.2
	widowed	95.8	4.7	3.2
Migration background	no	94.5	4.8	3.2
	yes	92.9	5.3	3.2
Health status	very good	90.1	3.8	2.7
	good	94.5	4.7	3.1
	satisfying	96.4	5.2	3.4
	not so good	94.7	5.2	3.3
	bad	83.2	4.1	2.6
General schooling	lower secondary	94.1	5.0	3.2
	intermediate	95.1	5.0	3.3
	college	93.9	4.1	2.9
Vocational education	none	90.7	4.5	2.9
	basic vocational	96.1	5.3	3.4
	higher vocational	95.2	4.4	3.1
	tertiary	94.3	4.0	2.9
Unemployed	no	94.0	4.7	3.1
	yes	98.6	6.4	3.9
Employment status	fulltime	93.5	3.1	2.5
	part time	99.1	6.5	4.0
	training	80.2	2.1	1.8
	irregular	94.3	6.4	3.7
	not working	94.9	6.0	3.6
Total Population		94.3	4.8	3.2

Population: Persons aged 17 and over in private households.
Source: SOEP 2002; authors' calculations.

Table 4: Regression of Gross Log Hourly Wages

		male			female		
		Coeff.	t	P>|t|	Coeff.	t	P>|t|
Age		0.090	25.5	0.000	0.082	18.9	0.000
Age squared		-0.001	-22.2	0.000	-0.001	-16.6	0.000
Migration background (Ref: no)	yes	-0.024	-1.3	0.193	0.059	2.7	0.008
East Germany (Ref: West)	yes	-0.409	-26.1	0.000	-0.268	-15.5	0.000
Community size (Ref: 20-100,000)	< 2,000	-0.087	-3.9	0.000	-0.045	-1.7	0.084
	2-20,000	-0.027	-1.8	0.075	-0.011	-0.7	0.506
	100-500,000	-0.011	-0.6	0.553	-0.001	-0.1	0.960
	>500,000	0.059	2.9	0.003	0.071	3.2	0.002
Health (Ref: good)	very good	0.057	3.0	0.003	0.026	1.2	0.237
	satisfying	-0.065	-4.9	0.000	-0.057	-3.7	0.000
	bad	-0.123	-5.4	0.000	-0.074	-3.1	0.002
	very bad	-0.342	-6.0	0.000	-0.241	-3.8	0.000
Schooling (Ref: lower sec.)	intermediate	0.120	7.9	0.000	0.123	7.1	0.000
	college	0.228	12.1	0.000	0.234	10.6	0.000
Vocational education (Ref: none)	basic voc.	0.287	15.6	0.000	0.316	16.3	0.000
	higher voc.	0.296	12.3	0.000	0.450	15.0	0.000
	tertiary	0.478	20.1	0.000	0.585	22.1	0.000
Marital status (Ref: married)	single	-0.101	-5.2	0.000	0.052	2.3	0.020
	divorced	-0.033	-1.6	0.120	0.079	3.7	0.000
	widowed	0.007	0.1	0.919	0.076	1.7	0.085
No. of children<6 in hh		0.069	5.8	0.000	0.016	0.9	0.349
Constant		0.128	1.6	0.106	0.017	0.2	0.859
Observations		7588			6314		
Adj. R-squared		0.460			0.341		

Dependent Variable: Log (Current Gross Hourly Wage).
Population: Persons aged 17 and over in private households in work.
Source: SOEP 2002; authors' calculations.

Table 5: Beneficiaries from Home Production Activities by Income Quintile

Quintile	**Population share of beneficiaries**						**G** hours spent for home production per capita
	A	**B**	**C**	**D**	**E**	**F**	
	Total Home Production	Errands	Housework	Childcare	Elderly care	Repairs & Gardening	
1 (bottom)	98.4	96.4	98.1	56.1	55.9	74.8	2.37
2	99.5	97.6	99.4	54.4	54.0	80.9	2.59
3	99.6	98.3	99.3	53.2	55.3	84.2	2.61
4	99.4	97.4	99.1	41.1	42.7	81.4	2.60
5 (top)	99.0	96.7	98.3	35.4	38.2	78.3	2.42
All	99.2	97.3	98.9	48.0	49.2	79.9	2.52
N in Mil.	81,650,299						
n	31,080						

Population: Individuals in private households.
Source: SOEP 2002; authors' calculations.

Table 6: Income Advantages from Home Production

Quintile	Income Share					% Increase disposable income				Mean transfer (equiv.)			
	A **Baseline**	**B1** **plus house.4**	**B2** **plus house.8**	**B3** **plus pred.wage**	**B4** **plus opp.cost**	**C1** **plus house.4**	**C2** **plus house.8**	**C3** **plus pred.wage**	**C4** **plus opp.cost**	**D1** **plus house.4**	**D2** **plus house.8**	**D3** **plus pred.wage**	**D4** **plus opp.cost**
1 (bottom)	8.2	9.6	10.4	10.0	9.7	39.1	78.2	79.5	73.8	2948	5897	6000	5566
2	13.6	14.7	15.3	14.9	14.6	26.8	53.6	51.8	48.1	3348	6696	6464	6012
3	17.4	18.0	18.5	18.3	18.1	21.5	43.0	44.0	42.3	3418	6836	7000	6728
4	22.4	22.2	22.2	22.3	22.3	16.2	32.3	34.6	34.5	3313	6625	7089	7079
5 (top)	38.4	35.6	33.6	34.5	35.3	8.6	17.3	20.8	23.0	3039	6079	7303	8104
All	100.0	100.0	100.0	100.0	100.0	17.5	35.1	37.0	36.6	3213	6427	6771	6697
N in Mil.	81,650,299												
n	31,080												

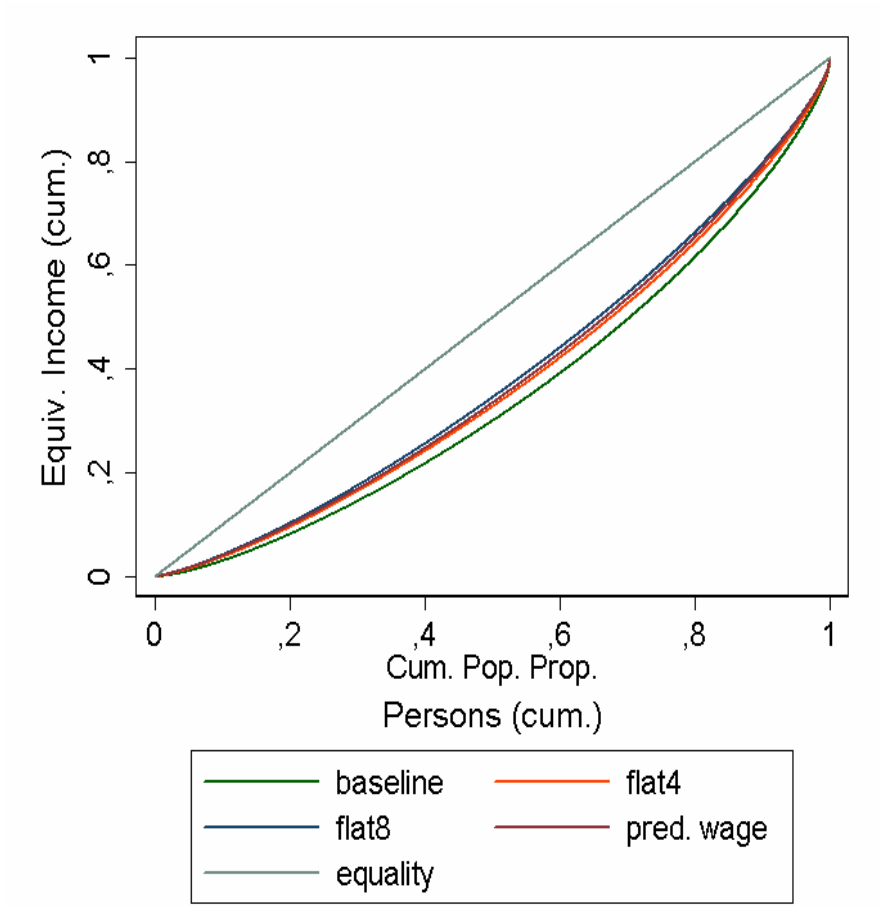
Population: Individuals in private households.
Source: SOEP 2002; authors' calculations.

Table 7: Inequality and Home Production

Inequality indices	Value of the Index					Proportional change in %			
	A **Baseline**	**B1** **plus house.4**	**B2** **plus house.8**	**B3** **plus pred. wage**	**B4** **plus opp. cost**	**C1** **plus house.4**	**C2** **plus house.8**	**C3** **plus pred. wage**	**C4** **plus opp. cost**
Gini	0.298	0.257	0.230	0.243	0.254	-13.9	-22.8	-18.6	-14.9
Atkinson 0.5	0.078	0.058	0.047	0.051	0.056	-25.5	-39.6	-34.4	-28.4
Atkinson 1.5	0.234	0.160	0.130	0.142	0.155	-31.5	-44.2	-39.2	-33.7
MLD	0.164	0.117	0.094	0.103	0.113	-28.6	-42.6	-37.2	-31.2
DR: 90/10	3.71	3.04	2.71	2.90	3.058	-17.9	-26.9	-21.7	-17.6
DR: 90/50	1.89	1.71	1.60	1.65	1.716	-9.7	-15.7	-12.6	-9.3
DR: 50/10	1.96	1.78	1.70	1.75	1.783	-9.3	-13.4	-10.5	-9.1
FGT0	14.96	12.17	10.82	11.91	12.41	-18.7	-27.7	-20.4	-17.0
FGT1	4.44	2.97	2.35	2.62	2.86	-33.2	-47.0	-40.9	-35.6
FGT2	2.12	1.18	0.84	0.93	1.08	-44.4	-60.3	-56.0	-49.2

Population: Individuals in private households.
Source: SOEP 2002; authors' calculations.

Figure 1: Lorenz Curves: Baseline Income vs. Extended Income Including Home Production



Population: Individuals in private households.
Source: SOEP 2002; authors' calculations.

Table 8: Inequality Decomposition and Home Production

Characteristic of household or household head	A	income						inequality					
		B	C	D	E	F	G	H	I	J	K	L	M
	Pop. Share	baseline	house4 diff.	pred. wage diff.	baseline	incl. house4	incl. pred. wage	baseline	house4 chg.	pred. wage chg.	baseline	incl. house4	incl. pred. wage
		EURO			Relative Income Position			MLD	%	%	Inequality contribution in %		
Household type													
Older single persons or couples (at least one 65+)	16,9	16532	3438	6438	90	93	92	0.142	-28.1	-26.1	14.7	14.8	17.3
Younger single persons or couples (none 65+)	27,8	21055	2780	6268	115	111	109	0.190	-24.9	-35.5	32.4	34.1	33.3
Couple with children up to 18 (no other HH members)	37,1	17647	3439	7491	96	98	100	0.139	-31.1	-42.4	31.5	30.4	28.8
Mono-parental household	4,2	11394	3157	6253	62	68	70	0.119	-43.0	-50.5	3.1	2.4	2.4
Other household types	14,0	18853	3223	6418	103	103	101	0.157	-25.0	-33.2	13.4	14.1	14.3
% Within groups inequality	./.	./.	./.	./.	./.	./.	./.	0.156	-28.1	-36.5	95.1	95.8	96.1
% Between groups inequality	./.	./.	./.	./.	./.	./.	./.	0.008	-39.0	-50.4	4.9	4.2	3.9
Socioeconomic group of HH head													
Blue collar worker	19,1	14935	3229	5984	82	84	83	0.066	-24.4	-30.3	7.7	8.2	8.5
White collar worker	34,0	21664	2977	6611	118	114	113	0.108	-22.0	-30.6	22.4	24.5	24.8
Self-employed	7,3	30554	2854	7360	167	155	151	0.200	-17.0	-31.8	8.9	10.4	9.7
Unemployed	6,8	11960	3521	7418	65	72	77	0.148	-36.3	-44.4	6.1	5.5	5.4
Pensioner	24,4	16270	3542	7137	89	92	93	0.128	-28.6	-28.0	19.1	19.1	21.9
Other	8,4	12865	3246	7109	70	75	80	0.313	-38.1	-50.4	16.2	14.0	12.8
% Within groups inequality	./.	./.	./.	./.	./.	./.	./.	0.132	-27.6	-35.1	80.5	81.6	83.1
% Between groups inequality	./.	./.	./.	./.	./.	./.	./.	0.032	-32.9	-45.6	19.5	18.4	16.9
Educational level of HH head													
Tertiary education	15,6	26554	3052	8349	145	138	139	0.177	-21.4	-39.4	16.9	18.6	16.3
Upper secondary education	12,7	20008	3207	7520	109	108	110	0.174	-28.1	-44.4	13.5	13.6	11.9
Lower secondary education	34,4	16892	3217	6599	92	93	94	0.125	-28.2	-38.7	26.3	26.4	25.6
Primary education or less	37,4	15613	3279	6017	85	88	86	0.141	-32.8	-37.8	32.1	30.2	31.8
% Within groups inequality	./.	./.	./.	./.	./.	./.	./.	0.145	-28.6	-39.4	88.8	88.8	85.7
% Between groups inequality	./.	./.	./.	./.	./.	./.	./.	0.018	-29.0	-19.7	11.2	11.1	14.3
Age of HH member													
Below 25	26,4	16149	3223	6709	88	90	91	0.165	-30.5	-30.9	26.6	25.9	29.3
25-64	56,0	19925	3139	6933	109	107	107	0.162	-27.4	-32.5	55.4	56.3	59.5
Over 64	17,6	16438	3433	6345	90	92	91	0.139	-28.5	-25.9	14.9	14.9	17.6
% Within groups inequality	./.	./.	./.	./.	./.	./.	./.	0.159	-28.4	-31.0	96.9	97.1	106.4
% Between groups inequality	./.	./.	./.	./.	./.	./.	./.	0.005	-33.9	-36.3	3.1	2.9	3.1
ALL	100,0	18313	3213	6771	100	100	100	0.164	-28.6	-37.2	100.0	100.0	100.0

Column A: Population share; B, C, D: Mean equivalent income; E, F and G: Mean equivalent income relative to the national mean; H: Mean log deviation; I and J: change of MLD in % of baseline; K, L and M: contribution to total inequality

Population: Individuals in private households.

Source: SOEP 2002; authors' calculations.

Table 9: Poverty Decomposition and Home Production

Characteristic of household or household head	Population share	FGT(0)					change in %			
		A	B1	B2	B3	B4	C1	C2	C3	C4
		base	house4	house8	pred. wage	opp.cost	house4	house8	pred. wage	opp.cost
Household type										
Older single persons or couples (at least one 65+)	16.9	16.6	12.9	11.5	17.0	16.7	-22.8	-30.6	2.1	0.2
Younger single persons or couples (none 65+)	27.8	14.8	12.7	11.9	11.5	12.2	-14.0	-19.6	-22.4	-17.2
Couple with children up to 18 (no other HH members)	37.1	12.5	10.1	8.6	8.6	9.2	-19.8	-31.1	-31.6	-26.5
Mono-parental household	4.2	40.5	30.8	22.9	27.8	29.9	-24.0	-43.4	-31.4	-26.1
Other household types	14.0	12.3	10.5	9.9	10.3	10.9	-14.6	-19.7	-16.8	-11.7
Socioeconomic group of HH head										
Blue collar worker	19.1	12.9	10.7	9.0	10.3	11.8	-17.2	-30.4	-19.7	-8.2
White collar worker	34.0	4.9	4.9	5.1	4.8	5.6	-1.6	3.8	-3.2	13.4
Self-employed	7.3	5.8	4.8	4.8	4.1	5.5	-17.4	-17.6	-29.8	-5.6
Unemployed	6.8	43.7	31.1	25.5	26.4	25.9	-28.9	-41.6	-39.6	-40.8
Pensioner	24.4	15.4	11.7	9.9	13.5	13.2	-24.1	-35.4	-12.2	-14.3
Other	8.4	44.1	38.1	33.8	34.0	34.3	-13.7	-23.4	-23.0	-22.2
Educational level of HH head										
Tertiary education	15.6	6.8	5.9	5.9	3.5	5.2	-13.8	-13.9	-48.7	-23.7
Upper secondary education	12.7	10.7	9.3	8.1	6.9	8.2	-13.0	-24.4	-35.2	-24.0
Lower secondary education	34.4	15.0	12.2	11.0	11.2	11.8	-18.8	-26.7	-25.7	-21.7
Primary education or less	37.4	19.8	15.8	13.6	17.6	17.5	-20.3	-31.4	-11.2	-11.8
Age of HH member										
Below 25	26.4	20.2	16.8	14.8	16.1	16.8	-16.7	-26.4	-20.1	-16.8
25-64	56.0	12.1	9.8	8.7	8.3	9.1	-18.8	-27.8	-31.8	-25.0
Over 64	17.6	16.4	12.8	11.3	16.8	16.4	-22.0	-31.0	2.6	0.4
ALL	100.0	15.0	12.2	10.8	11.8	12.4	-18.6	-27.9	-21.0	-17.2

Column A, B1-B4: Poverty index (FGT0); C1-C4: change in poverty (FGT0) in % of baseline.
Population: Individuals in private households.
Source: SOEP 2002; authors' calculations.

Table 10: Factor Decomposition

Method	**Disposable cash income**	**Income advantage from home production …** errands & housework	care activities	repairs & gardening	*all*	**Total**
			Income in € (mean)			
housekeeper €4	18,219	2,020	595	599	*3,213*	21,433
housekeeper €8	18,219	4,039	1,189	1,198	*6,427*	24,646
predicted wage	18,219	4,100	1,295	1,375	*6,771*	25,084
opportunity cost	18,219	4,056	1,285	1,357	*6,697*	25,010
			Income Contribution (%)			
housekeeper €4	85.07	9.38	2.76	2.78	*14.93*	100
housekeeper €8	74.02	16.33	4.81	4.84	*25.98*	100
predicted wage	73.01	16.35	5.16	5.48	*26.99*	100
opportunity cost	73.22	16.22	5.14	5.42	*26.78*	100
			Inequality (I2)			
housekeeper €4	0.211	0.0004	-0.0003	0.0009	*0.0010*	0.212
housekeeper €8	0.159	0.0016	0.0004	0.0021	*0.0041*	0.163
predicted wage	0.159	0.0066	0.0020	0.0041	*0.0127*	0.172
opportunity cost	0.167	0.0125	0.0046	0.0062	*0.0233*	0.190
			Inequality Contribution (%)			
housekeeper €4	99.48	0.19	-0.14	0.42	*0.47*	100.00
housekeeper €8	97.55	0.98	0.24	1.29	*2.51*	100.00
predicted wage	92.61	3.84	1.16	2.39	*7.39*	100.00
opportunity cost	87.73	6.58	2.42	3.26	*12.27*	100.00

Population: Individuals in private households.
Source: SOEP 2002; authors' calculations.