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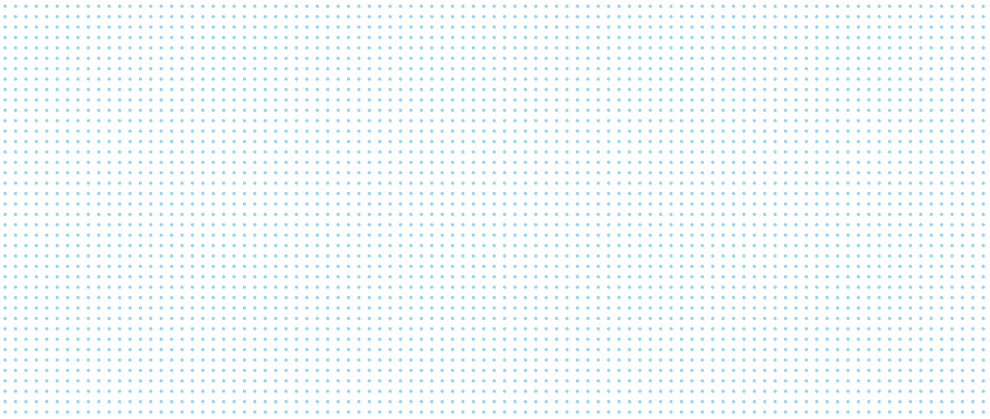

№ 22

HOUSEHOLD PRODUCTION AND CONSUMPTION OVER THE LIFECYCLE: THE NATIONAL TIME TRANSFER ACCOUNTS IN 14 EUROPEAN COUNTRIES

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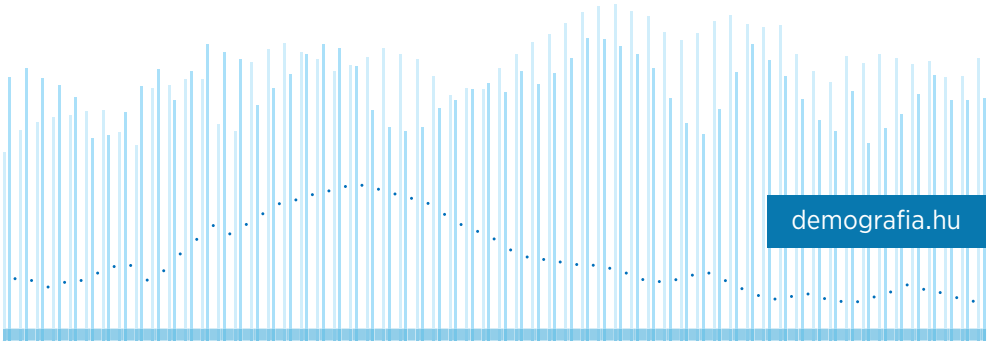

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Address: Hungarian Demographic Research Institute
Budapest, Buday László utca 1–3. 1024 Hungary
e-mail: vargha@demografia.hu

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ABSTRACT

While the importance of unpaid household labour in total economic output is recognized, little is known about the demographics of its production and consumption. Our goal is to give a comprehensive estimation on the value of production and consumption of unpaid labour by age and gender and analyse non-market economic transfers in 14 European countries, which represent about 80 per cent of the population of the European Union. Our calculations are based on publicly available harmonised data. We introduce a novel imputation method of harmonised European time use data (HETUS) to the EU income survey (EU-SILC) in order to assign time spent on home production to consumers in households. Monetary values are attributed to unpaid labour activities using harmonised data on earnings (SES). Apart from pointing out key country specific results, we make two important observations on the age patterns of non-market economic activity. First, the economic lifecycle of men and women differ. The gender gap in household production is not evenly distributed over the lifecycle and cohorts of working age women contribute the most in net terms. Secondly, the main beneficiaries of unpaid household labour are children, not adult men, nor the elderly. In contrast with the national economy, in which intergenerational flows are important in sustaining both childhood and old age, working age people almost exclusively support only children in the household economies of Europe. Older cohorts consume household goods and services mostly produced by them. With our analysis we add a new focus to the research on home production. While keeping the gender aspect, we demonstrate the importance of the lifecycle component of unpaid household labour.

Keywords: time use, household production, National Transfer Accounts (NTA), intergenerational transfers, cost of children, division of unpaid household labour by gender.

AUTHORS

Lili Vargha
Corresponding author (vargha@demografia.hu)
Hungarian Demographic Research Institute
Doctoral School of Demography and Sociology, University of Pécs

Róbert Iván Gál
Hungarian Demographic Research Institute
TARKI Social Research Institute
Corvinus University, Budapest

Michelle O. Crosby-Nagy
Corvinus University, Budapest

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1 INTRODUCTION

In order to analyse the role of age composition in macroeconomic issues, Lee and Mason (2011a) opened a new chapter in national accounting: National Transfer Accounts (NTA). By examining age patterns in market economic activity and drawing inter-age transfers, NTA explores how different generations acquire and use economic resources. NTA, however, only partly covers reallocation patterns within the household[1] because it does not cover flows generated by unpaid household labour (such as cooking, cleaning, making home repairs, or caring for children or others). In this paper we provide such calculations for 14 European countries representing about 80 per cent of the population of the European Union. The inclusion of unpaid household labour in analysing the age patterns of economic activity is justified by the considerable value produced by households. In addition, as argued by Gershuny (2011), the conventional GDP measure takes a view of labour that is too narrow to correctly represent cross-country differences and historical changes in economic activity. Folbre (2008) demonstrates that this is particularly pronounced in the case of labour devoted to childrearing. The importance of the household economy is illustrated by many recent cross-country studies on women's labour market participation, childcare and old-age care. Adding the age dimension comprehensively is important if we are to compare intergenerational resource reallocation patterns of household economies across countries. The following countries are included in our analysis: Belgium, Bulgaria, Estonia, Finland, France, Germany, Italy, Latvia, Lithuania, Poland, Slovenia, Spain, Sweden and the United Kingdom.[2]

The analysis of the age patterns of production and consumption of unpaid household labour are based on time use surveys. Accounting for goods and services carried out for someone else in the household or living in another household, we analyse how non-market economic activity varies among cohorts of different age and by gender. Moreover, we attribute monetary values to these activities and calculate non-market transfers in the economy. In other words, we estimate time transfers across ages. Following Donehower (2014) we call this the National Time Transfer Accounts (NTTA). We present the economic lifecycle in the household economy and point out key country-specific results in Europe in the early 2000s.[3] We also demonstrate that the main net beneficiaries of unpaid household labour are children, not adult men or the elderly. Looking at the amounts in cross-section, both children and the elderly consume a considerable amount of unpaid household labour. Nevertheless, older people consume non-market goods and services that are almost entirely produced by them. Therefore children are the net beneficiaries of home production while those of older ages are net providers (except for the oldest old). Households have an important role in financing childhood and a less important role in financing old age. This pattern is a feature across all the European countries analysed in this study.

We also show that the non-market economic lifecycle of men and women differ significantly. Several studies have shown that even in societies sensitive to gender equality, women usually do more unpaid labour in the household than men, while men are more active in the labour market than women (Gianelli et al 2011, Miranda 2011, Francavilla et al 2013). Women's contribution, unaccounted for in the national income, is higher than that of men. By introducing age next to the gender aspect we show that

1 NTA estimates age patterns of primary allocation and secondary redistribution of income as well as tertiary redistribution of after-tax revenues within the household (such as parents paying for the consumption of their dependent children) or between households (such as retired parents supporting their non-cohabiting adult children) and counts them as private transfers. The market part of familial transfers of the household economy is thus covered in the accounts.

2 In this paper we include only those countries for which we accessed data through the Harmonized European Time Use Survey Web Application (HETUS).

3 1999-2005. Time use data are collected once in a decade in the majority of the countries. At the time of this analysis more recent harmonised data were not accessible for many countries.

this difference holds true not only at the aggregate level, but for all ages. Nonetheless, the disparity is not evenly distributed over the life course. There are two clear peaks for women: the first one appears during childbearing age and the second after retirement, while in the case of men the second increase after retirement is more pronounced than the first. Men tend to be net beneficiaries of unpaid household labour during almost the entire lifecycle and once they are grown women are net providers at all ages. How much either gender benefits and contributes again varies by age, and even though adult men are net recipients of household services and goods, the amount they receive is far less than the amount received by children. Apart from these general trends, countries show different economic lifecycles for women and men, which we will illustrate in the paper.

Households are important suppliers of labour and contribute to the total economy. Similarly to other studies that estimate the monetary value of unpaid household labour across countries (Gianelli et al 2011, Miranda 2011), our calculations also suggest that the value of home production activities is between one-fourth and half of GDP in the analyzed countries. In childrearing the size and value of non-market economic transfers approximate those of market economic transfers. The investment of parents – in particular mothers – in the human capital of their children through the provision of household goods and services is sizeable in all European countries. When they are old, the elderly hardly benefit from intergenerational time transfers in net terms. Unpaid household labour nevertheless plays an important role in the lives of older people as well because after retirement they produce a considerable amount almost entirely outside the market and keep working in the household practically as long as they live. Our comparative European NTTA provide insights on these issues and extend the measures on the cost of children and the economic contribution of women as well as the elderly.

Like Household Satellite Accounts, National Time Transfer Accounts are estimated using time use surveys and a valuation procedure. Our analysis is based on the methodology of NTTA by Donehower (2014). Due to special features of the European harmonized time use data we had to supplement this methodology. We use a special imputation method to account for production by household structure resulting in empirically correct consumption profiles of unpaid household labour. We also use harmonised European wage data so that we end up with comparable home production measures in monetary terms.

The paper is structured as follows. In Section 2, we briefly review the approach of NTA and the first results of NTTA. In Section 3 we introduce our methods and the creation of harmonised European NTTA in 14 countries. Following the process of constructing the accounts, we go through our main steps, briefly presenting results related to these steps and point out key country-specific results. In Section 4 we present age patterns of market economic activity extended with its non-market counterpart by combining NTTA with NTA data. In the last section we summarise our results.

2 NATIONAL TRANSFER ACCOUNTS AND NATIONAL TIME TRANSFER ACCOUNTS

The most important basic activities that determine the economic lifecycle are working, consuming, sharing and saving. NTA[4] measure the age profiles of these economic activities: labour income, consumption, public transfers, private transfers and asset-based reallocations, and show how they vary across different generations. The aggregate

4 The method of National Transfer Accounts was established by Lee (1994a,b). An NTA manual was published by Mason et al. (2009) and a revised manual by the Population Division of the United Nations (United Nations, 2013). A comprehensive introduction to the method, including theoretical foundations, comparative results and a wide range of country studies can be found in Lee and Mason (2011a).

numbers of these age profiles are consistent with the European System of Accounts, which administer flows among institutions (government, households and corporations). NTA therefore offer a new way to take into account the dimension of age and redefine income streams originally flowing among institutions to flows among generations.

National income is thus mainly depicted as intergenerational flows from the working-age population to the young and the elderly. Lifecycle deficit (LCD) and lifecycle surplus (LCS) arise from the difference between consumption and labour income. Labour income in NTA includes all labour-related taxes, while consumption does not include any. Consumption consists not only of privately purchased but also publicly provided goods and services (such as public health care, education, general public goods), and it includes owner-occupied housing, too. While all generations use economic resources and their *per capita* consumption does not vary much with age, labour income is concentrated in the working ages and is minimal or zero in childhood and old age. Those of working age tend to consume less than their labour income, which results in a lifecycle surplus. Meanwhile those who are not of working age consume more than their labour income, which results in a lifecycle deficit.

The difference between consuming and producing explains the flows from one generation to another. Whenever consumption exceeds production there is a period of dependency that has to be financed through monetary flows: either by (1) public transfers via the government (tax payments and benefits), or (2) private or familial transfers, mostly within the household, or (3) asset-based reallocations (net capital income and property income). In childhood and old age the average individual is economically dependent, because his consumption has to be covered by the output produced by the working age population.

There are three major benefits of the NTA framework: first, the focus on the individual instead of institutions; second, the inclusion of the full set of market transfers in generational economy; and third, the presence of all three generations. Nevertheless economic flows generated by production outside the market are missing elements in the resource reallocation model. Activities, such as different types of housework and care, also play an important role in how dependency is sustained over the lifecycle. Extending measures of national income with the value of goods and services produced at home is not new. First estimates of Household Satellite Accounts were published in the early 2000s (for example Holloway, Short and Tamplin, 2002; Soupourmas and Ironmonger, 2002, Sik and Szep, 2003). However, adding the dimension of age into the household economy and incorporating transfers of household goods and services into intergenerational reallocation patterns is a new direction of research that extends the basic NTA framework.

The first initiative was Phananiramai (2011) on estimating time transfers for Thailand followed by the elaboration of a comprehensive methodology by Donehower (2014; earlier version from 2011), after which an increasing number of researchers began to apply national time use surveys to estimate NTTA and extend NTA with them. The first results and analyses on Europe are available for Austria (Hammer 2014), France (Solaz and Stancanelli 2012; d'Albis et al 2013), Germany (Kluge 2014), Hungary (Gál, Szabó and Vargha 2015), Italy (Zannella 2015), and Slovenia (Sambt and Malačič 2014), all of which provide insightful analysis about the reallocation patterns of individual countries. As a part of the Counting Women's Work Project,[5] research teams in Africa, Latin America and Asia also work on estimating household goods and services flowing across different ages and genders.

Full comparative NTTA are still missing in Europe. Pioneer approximations of comparative accounts have been presented by Zagheni and Zannella (2013), Hammer,

5 The website of the project is: http://www.cww-dpru.uct.ac.za

Prskawetz and Freund (2014) and Zagheni et al. (2015). These estimations, however, have limitations, for they fail to account for children in their intergenerational accounts of household goods and services, while tending to focus on working ages, the elderly and gender disparities. We find this problematic as economic dependency cannot be fully explained by accounting for only two of the three generations. As an improvement upon these earlier works, we include children aged zero or older in our analysis, and in this way account for all time produced and consumed by all individuals of all ages in the households as well as in the population. Also, the pioneer approaches do not price household labour rendering NTTA incomparable with NTA, or they use a single wage for all activities of household labour. In this paper we mobilize the Structure of Earnings Survey in order to differentiate between the values of various activities.

3 CONSTRUCTING HARMONISED EUROPEAN NATIONAL TIME TRANSFER ACCOUNTS

3.1. DATA AND METHODS

Our analysis is based on methods of National Time Transfer Accounts by Donehower (2014), but we supplement this methodology to account for the special features of the harmonised time use data available. The main steps of the Donehower methodology are (1) identifying time spent on household production activities by age and gender in time use surveys; (2) finding appropriate wages to impute the value of time spent on the chosen activities; and (3) estimating consumption of household labour by allocating the time produced by members of the household. The last step is performed using the household roster of time use surveys that includes information about the household composition as well as the age and gender of all household members.

This method could easily be applied by researchers using national time use surveys. However, for international comparisons working with separate national datasets it is often not feasible or would require considerable resources and time. The two publicly available European harmonised sources of data – the Harmonized European Time Use Survey Web Application (HETUS)[6] and the Multinational Time Use Study (MTUS)[7] – have the advantage that they are harmonised and include comparable European data. Therefore activities and other important variables are already standardised, making the first part of creating European NTTA relatively straightforward.

Nevertheless, these data sources are disadvantaged in that they do not include the household roster and include only limited information about the household composition of the producer. Moreover the HETUS application calculates user-defined and comparable statistical tables but it is not a micro-database *per se*. Consequently, using these harmonised time use data for estimations of consumption of unpaid household labour requires more assumptions and methodological decisions than using national time use surveys. The valuation process of time spent on non-market activities also requires special consideration, as the method has to be harmonised across all countries. In the following section we briefly present how we supplement the Donehower methodology of creating NTTA adapted to the European setting. We focus on constructing NTTA using the HETUS database for 14 EU member states. We also introduce harmonised pricing of European unpaid labour based on the Structure of Earnings Survey.

6 HETUS is an effort by the EU to harmonise European time use surveys. It is currently maintained by Statistics Sweden. All important information, documentation and metadata can be found on its website: https://www.h2.scb.se/tus/tus/default.htm.

7 The MTUS offers harmonised episode and context information on time use surveys and encompasses over 60 datasets from 25 countries from around the world. The MTUS data and documentation can be found at: http://www.timeuse.org/mtus.

3.2. AGE PROFILES OF HOUSEHOLD PRODUCTION IN TIME

We estimate average time spent on unpaid household labour by age and gender using data downloaded from the HETUS website, which enables users to calculate user defined, comparable statistical tables on time use data in 14 European countries.[8] In Appendix A we summarise the details of representative national time use surveys included in HETUS and our analysis (such as the year of the national data collection, sample size, and the age of the population covered).

From the HETUS web application we downloaded mean time spent on selected activities for each country, calculated as the sum of all time spent of all survey participants divided by their number. These figures represent the average time spent on each activity on an average day in each country. We selected activities of unpaid household labour[9] based on the *third-person principle:* activities that can be done by someone else (a third person) on behalf of the respondent, such as cooking, cleaning, making repairs, shopping or caring for someone else. We also omitted parallel activities.[10] Averages in minutes were downloaded by gender for every single age in each country, giving us three production age profiles of unpaid household labour: general housework, childcare and inter-household labour.[11] Figure 1 shows the average time spent on these activities in 14 European countries weighted by population,[12] representing 80 per cent of the EU population.

People start working in the household at a young age, probably at even younger ages than indicated here, because most national samples do not include children below the age of ten. There is already a gender gap in childhood as young girls spend more time with household production than young boys. The gap grows larger with age and reaches its maximum between age 30 and 40. Around this age women have the first peak in their lifecycle, probably because of being mothers at home with smaller children. On an average day women of this age work almost six hours at home. The average time spent on home production by men between the ages of 30 and 40 is only two and a half hours, three hours less than by women of the same age. The peak at this age for men is less pronounced than for women, as they spend significantly less time on childcare, on average half an hour. The maximum of the childcare age profile for men is also shifted a few years forward, as the average age of becoming a father is higher than that of becoming a mother.

Time spent on producing goods and services in the household increases again after retirement, and this increase is more explicit for men. Thus, the curve for men increases until the age of 67 and reaches a maximum of almost four hours of unpaid household labour. The gender gap thus gets smaller with age. On average the second increase for women in their 60s is only a little higher than the first increase for women in their 30s, with a maximum of six hours of home production.

8 We excluded Norway from our analysis.

9 Parts of unpaid household labour are included in national income, such as food production for own consumption and construction of the owner-occupied house. Since we add up intergenerational transfers in the national and the household economy, it would be preferable to avoid double registration of activities. However, we are not able to filter out these activities using the HETUS data, and they are therefore included in both accounts.

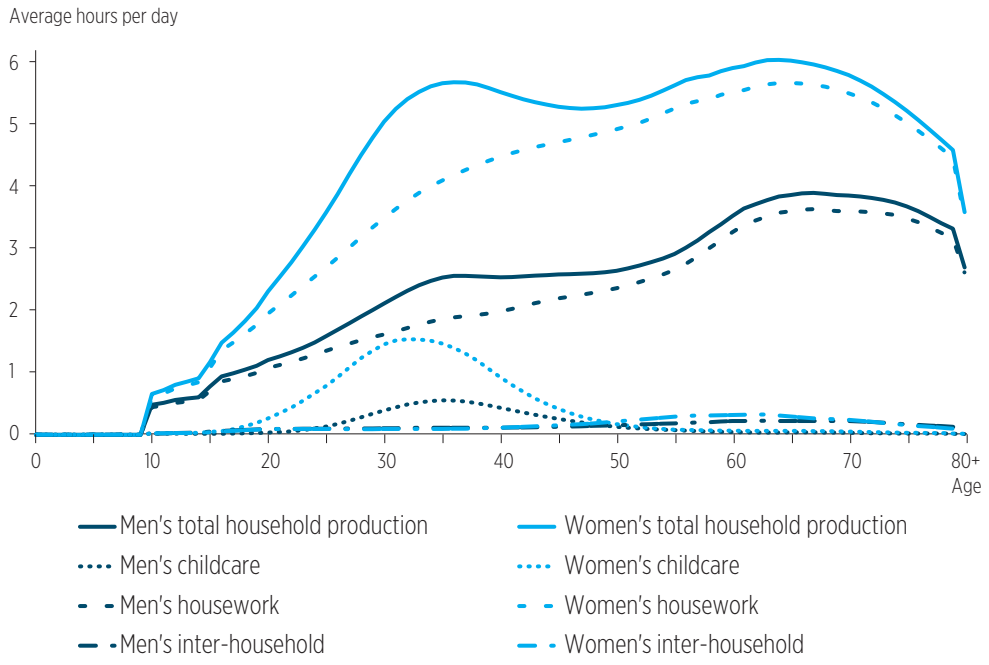
10 Time use questionnaires usually allow parallel (or 'secondary') activities, such as cleaning the dishes or helping a child with homework, to be recorded at the same time. However, as a result of the considerable variance in the time spent on these activities across European countries – and in line with the Donehower-methodology – we left these secondary activities out from our analysis.

11 The following activities were chosen for our purposes: 1. General housework activities: food preparation; dish washing; cleaning the dwelling; other household upkeep tasks; laundry; ironing; handicrafts; gardening; tending domestic animals; caring for pets; walking the dog; construction and repairs; shopping and services; other domestic work; organisational work; travel related to shopping; 2. Childcare activities: physical care and supervision of child; teaching, reading and talking to a child; transporting a child; and 3. Inter-household activities: informal help provided to other households. In HETUS no averages are shown if the number of diaries in a cell is less than 25. We found a few of these cases for older ages. In such cases we used larger age groups (for example if no single-cohort data were displayed between age 70 and 74 we used the average time use of the 70-74 aggregate age group for each single-year cohort). Age-profiles are smoothed one by one by Friedman's SuperSmoother in R. For the 80+ age group the original value is used so as not overestimate the value.

12 We used Eurostat mid-year population figures by age.

In Appendix B we include the production profiles for each country. Individual country figures all illustrate the general difference in the lifecycle patterns of men and women in the production of non-market resources. The first peak for women aged 30-40 is explicit in all analysed countries, with the highest time spent on home production in Italy (6.5 hours) and the least in Latvia (a little more than 4 hours). Interestingly, the high value in the case of Italy is not due to high childcare time but the time spent on housework activities, which is higher than the European average for all female ages. The highest peak of care time provided by women for children is found in Poland with two hours spent on childcare and it is the lowest in Belgium with a little more than an hour. The highest gender gap is found in Italy and Spain and the lowest in Belgium and Sweden at this age interval.

There is considerable variation across countries in the shape of the production profile around retirement ages. There are countries with a sharp increase (like Germany) and countries showing a more smooth transition (like Latvia). The highest time spent on production by older men is found in Bulgaria and Estonia and the lowest in Italy and Spain.



Note: Figures are population weighted.
Source: Own calculations based on HETUS data.

Figure 1
Daily per capita production of childcare, housework and inter-household unpaid labour by age and gender in hours in 14 European countries around 2000

Figure 1 also shows that in general inter-household unpaid labour, as well as childcare provided (most likely) by grandparents, is relatively small compared to intra-household home production. Between age 60 and 75 the average time spent on inter-household care and childcare summed up is only quarter of an hour for men and 4 minutes more for women on an average day. The highest values can be found in France, Poland and Slovenia, where these figures are higher than 20 minutes for both genders. Data is not consistent in all countries, and there are differences in how national time use surveys have registered time spent on childcare in one's own household for non-cohabiting children, caring for children outside the household, and other inter-household care. For these

reasons identifying and comparing the care of grandparents is problematic. Nevertheless, by measuring time spent on childcare in households without cohabiting children, we are able to identify the childcare of older people and allocate it accordingly. Old-age care and other family care are partly missing from our analysis because these items do not appear in the HETUS harmonised data as separate activities. We also acknowledge the fact that it is hard to capture informal help provided to other households with diaries as they are typically not taking place every day.

3.3. ESTIMATING CONSUMPTION OF HOUSEHOLD PRODUCTION BY AGE

Time use surveys do not record the consumption of the products and services of non-market labour. For this reason consumers have to be identified indirectly. In creating the accounts we have to find the consumer of all unpaid work produced in each household, otherwise our figures will be inaccurate. Like in the case of NTA, we need to account for the total production and distribute all labour provided. As we have seen with the production figures, the majority of unpaid labour is consumed within households (intra-household). In the case of allocating intra-household production, estimations are based on household structure and the time spent on unpaid household labour for each member in each household. However, the HETUS data are not micro survey data *per se* and do not allow for individual variation of production. Following the structure of the HETUS data we can only use average values by different characteristics of the producer. The other constraint is that we have only a limited amount of information about the household structure and have to use information taken externally from national surveys representative for both household structure and population. Therefore average time figures of production are imputed in each country to a representative survey sample according to individual characteristics such as age, gender and household type. We then aggregate time at the household level and allocate it to the members of each household using different sharing rules depending on the type of activity.

Work by Bruil and van Tongeren (2014) using Dutch time use data influenced us to develop this method. They imputed the production values of unpaid household labour by age group and gender in a register sample of the Dutch census for estimating consumption by age. Gianelli et al (2011) also used an imputation method of HETUS time use and imputed values by gender and a variable called 'lifecycle' (which is a simple variable that combines large age groups with the family status of the individual) for a cross-country analysis of total home production in Europe. We extended both these methods for our purposes by imputing values of production by smaller age groups, gender and a more detailed household structure. In characterizing the household structure one of the most important pieces of information was the age of the children living in the household. We would ideally have used censuses or micro-censuses like Bruil and van Tongeren (2014), but we did not have access to such data for many countries. We therefore used the harmonised register sample of the EU-SILC survey, like Gianelli et al (2011).[13]

By applying this method of imputation we are still not able to capture individual variation of non-market labour, but we can take into account the full available information set that has an effect on the average consumption figures by age. First of all, both gender and the age of the producer has an effect on how much time is produced and then reallocated within a household. Secondly, analysis of the consumption of non-market activities in the household shows that the number and age of children[14] as well as the number of household members – especially in the case of older people – are among

13 In some countries there were some years between the data collection of the time use survey and the EU-SILC survey (see Appendix I). However, the general household structure does not change rapidly and we decided to use a harmonised European dataset with the same weighing rules for every county rather than to experiment with other surveys.

14 Children are defined as persons aged 0-17 in HETUS which we follow throughout this study.

the most important determinants of time consumption. Considering all these factors and using the limited amount of information found in the HETUS harmonised dataset about the household of the producer[15] we created 12 types of households in the case of allocating time spent on housework,[16] and 18 types of households in the case of allocating time spent on childcare.[17] We downloaded averages of housework and childcare by the gender and age of the producer and by the different types of household he or she lives in and imputed these values into the micro-dataset.

Averages of home production in minutes were downloaded for age groups consisting of five-year intervals (for example, ages 20-24 or 75-79) by gender and by 12 household types in each country in the case of housework production.[18] The averages of childcare production were downloaded by gender, age groups and by the 18 household types in each country. The size of the age groups in case of childcare was country specific.[19] There is considerable variation in these values which enables us to estimate the average consumption of household labour by age and gender in each country.[20]

All downloaded production values are imputed to EU-SILC register samples, which are representative of the household structure as well as the population. For every combination of age, gender and household type, two values are assigned to each individual, one for housework and one for childcare. Thus in each national EU-SILC samples times in minutes spent on household production of housework and childcare, respectively, are assigned to each individual between age 0 and 80+.[21] Once intra-household production values are assigned to every individual in each household we could aggregate the time spent on non-market activities at the household level and allocate it to each member. Estimating economic flows of home production between individuals living together relies on a simple model of the household. Since goods and services produced by housework usually represent household public goods, we allocate housework time equally among household members, in line with the Donehower methodology.

In the case of childcare, time is consumed only by children and the allocation is straightforward in all households with only one child present. If there is more than one child living in the household, time has to be distributed among these children. For this we apply data driven weights (an equivalence scale) generated separately for each country. We have downloaded average time spent on childcare for all households with the smallest child being 0, 1, 2, 3 … or 17 years old in each country; and in each

15 The HETUS variables applied in the taxonomy of households are: number of household members, number of children lower than age 7; number of children aged 7-17, and the age of the youngest child in the household.

16 Originally we created nine default household types. These are as follows: 1. Single with no children; 2. Two or more household members with no children; 3. One child aged 0-3; 4. One child aged 4-6; 5. One child aged 7-17; 6. Two children, one aged 0-3, the other aged 7-17; 7. Two children, one aged 4-6, the other aged 7-17; 8. Two or more children, with a minimum of two aged 0-6 and the youngest aged 0-3; 9. Two or more children aged 7-17 but no smaller children. Three extra household types had to be created because the default HETUS types did not cover a few individuals in the EU-SILC sample. In these cases we could use information about the youngest child. These are as follows: 10. Youngest child aged 0-3; 11. Youngest child aged 4-6; 12. Youngest child aged 7-17.

17 In the case of childcare only one HETUS variable is used in the taxonomy of households: the age of the youngest child living there (age 0, 1, 2, 3, etc., up until the age of 17). Thus the first type constitutes households with the youngest child aged 0; the second type includes households with the youngest child aged 1, etc., until the eighteenth type which includes households with the youngest child aged 17.

18 As mentioned above the HETUS web application provides no averages if the number of diaries in a cell is less than 25. This happened only on a few occasions in the case of individuals living in uncommon household types and also in countries with smaller samples. We substituted these cases with the average production values or, when reasonable, with production values of neighbouring age groups.

19 For childcare, the age of the producer is again dependent on how large the samples are in the national time use surveys: with large samples age groups consisting of five-year intervals could be used, however for countries with smaller samples these intervals are bigger.

20 Because of the limitations of the HETUS web application we were not able to consider other variables for the imputation process, such as activity status, marital status, educational level etc., which have an effect on the average time use and more particularly on the time spent on domestic housework and childcare. We think that age, gender and a detailed household structure fit best our purposes.

21 Several checks have been done to assess if the general age – production averages remained intact after imputation. These checks prove that our method is correct. Production values by household types are less reliable for countries with smaller samples of time use surveys (such as Estonia). Results for these countries could therefore be less accurate.

household with two or more children we used these figures to calculate the shares for allocating childcare among siblings. According to this scale the share decreases by age, but the exact weights depend on the number and age of children living in the household; and they are calculated independently (see these equivalence scales in Appendix C).[22]

Having the production age profiles by household type allows us to identify childcare performed in households without children, such as when grandparents care for their non-cohabiting grandchildren. This time is allocated in the same way as time consumed by children within the household and added to the general childcare consumption age profile. Inter-household labour is distributed by intra-household consumption patterns.[23]

To see whether our HETUS estimates are robust across countries we compare our profiles with the age profiles estimated from national time use surveys. We have so far been able to do this in two cases. Solaz and Stancanelli (2012) estimate French production and consumption age averages from the original national time use survey, the exact source of the French HETUS aggregates we used. Though the methods for distributing childcare differ in these two estimations, the age profiles for people older than three are very similar for the two sources and methods (see Appendix D). In case of Italy, consumption age profiles are estimated by Zannella (2015) using the national time use survey from 2008. Our estimated age profiles are from 2003, the patterns are still very similar (see Appendix E).

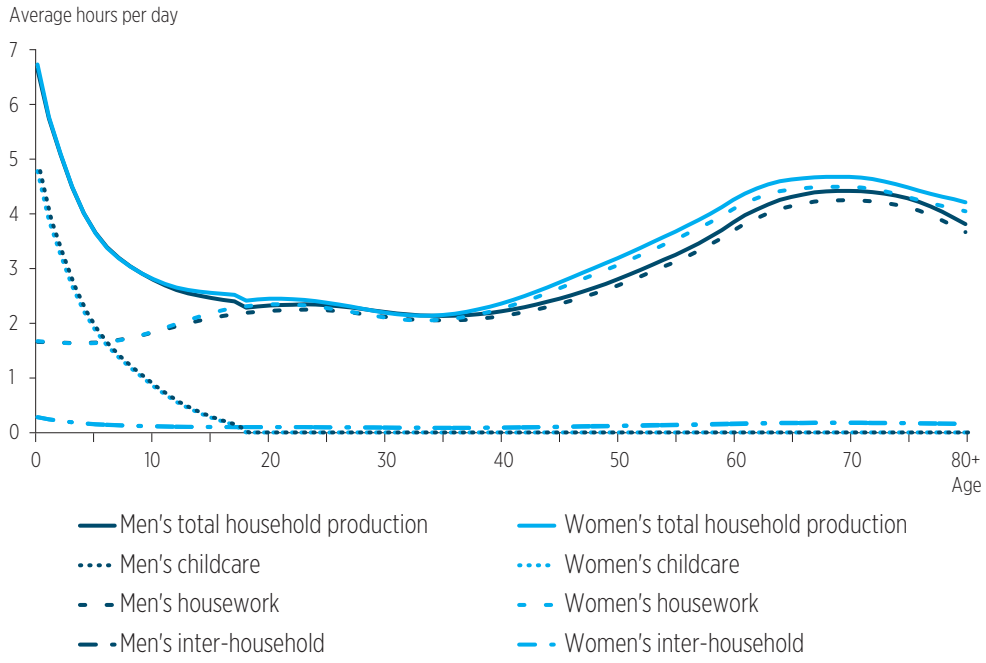
3.4. AGE PROFILES OF TIME CONSUMPTION

Figure 2 demonstrates that consumption of household labour for both genders is relatively small in active age but twice as much in old age and even more for small children. It is highest for the newborn; an average child aged 0 in the 14 European countries consumes almost 7 hours of unpaid household labour. The consumption curve declines gradually with age and reaches its minimum between age 30 and 40 with a value around 2 hours. Above age 40 it increases again reaching a second maximum (4.5 hours) around age 70. This age pattern of consuming unpaid household labour is the mirror image of the age distribution of public transfers in Europe, for which the main receivers are elderly people (Miller 2011). Since time devoted to general household work was uniformly distributed, consumption patterns of men and women are similar.

Country-specific age-profiles can be found in Appendix F. On average the per capita time consumed by children aged 0-17 is around 3.5 hours on an average day. Per capita total consumption by children is highest in Italy, Poland, Spain (3.8 hours) and the lowest in Belgium, France and Sweden, (little less than 3 hours). Consumption by the youngest generation (ages 0-3) is more than 4 hours in all analysed European countries; it is highest in Poland and Slovenia (around 7 hours per day) and the lowest in Belgium and France (little more than 4 hours). The consumption of care time only by children decreases gradually with age. On average it is 5 hours for infants (0-year-olds), 4 hours for 1-year-olds, and 3 hours for 2-year-old children; it is around 1 hour for a 9-year-old, and the curve reaches less than 15 minutes in every country by the age of 17. In the case of working ages the average time consumed in a day is 2.6 hours; national values vary between 2.2 hours (Sweden) and 3 hours (Bulgaria and Estonia). Per capita consumption by the elderly is on average 4.3 hours in all countries combined. It is the highest in Estonia (5 hours) and the lowest in Spain (3.8 hours), where the contribution of men in production is among the lowest.

22 We could unfortunately not take into account the gender of the children in question as we do not have this information in the standardised European time use surveys.

23 The final age profiles are smoothed separately for housework, childcare and inter-household care by Friedman's Super-Smoother in R. For infants (0 year old) the care time is not smoothed so as not to underestimate the value (Donehower 2014).



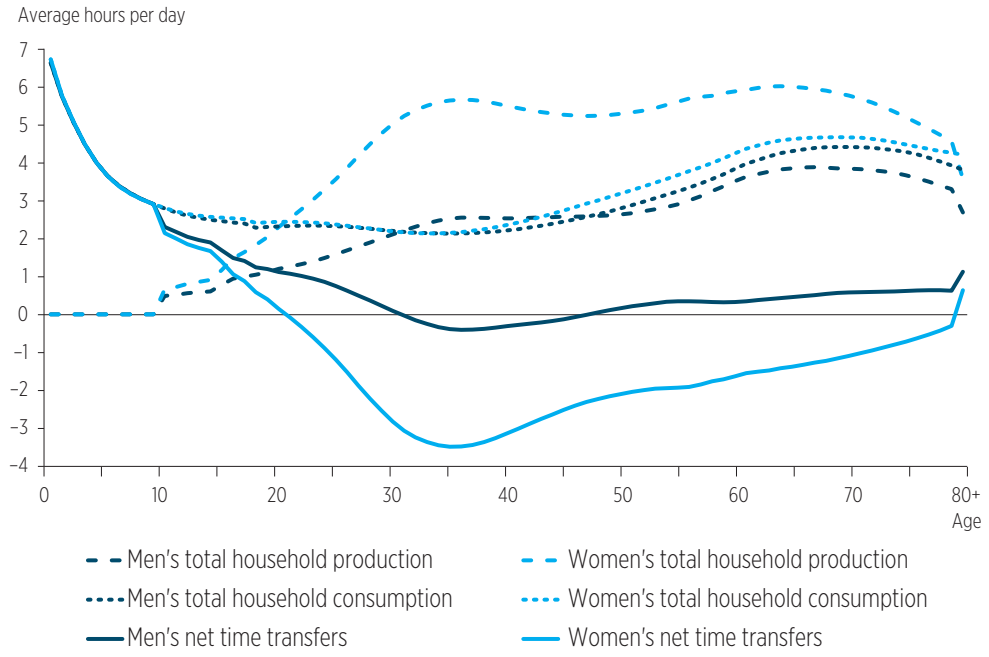
Note: Figures are population weighted.
Source: Own calculations based on HETUS, EU-SILC and Eurostat population data.

Figure 2
Daily per capita consumption of childcare, housework and inter-household unpaid labour by age and gender in hours in 14 European countries around 2000

3.5. NET TIME TRANSFERS

Net time transfers are calculated by subtracting production from consumption, cohort by cohort. They are the non-market counterpart of lifecycle deficit and surplus (LCD/LCS) in the national economy. They show the amount of household goods and services flowing among people of different age groups or gender in net terms. Age profiles of net time transfers by gender are presented in Figure 3. As above, figures are population weighted. The solid lines present the age profiles of net time transfers in 14 EU countries, respectively for men and women, and show whether a cohort is a net giver or receiver of home goods and services. Men are generally net beneficiaries, while women produce a huge surplus in the household economy. They are net providers above the age of 21 years until they die and the average net time given by all cohorts of women is almost an hour of work on an average day (see Table 1).

Highest amounts of goods and services transferred by women cohorts are during childbearing years. Above this age their surplus declines gradually, shown by the increase of the solid grey line on the graph. They are still givers, but in net terms they give less and less time to others. On the other hand there are only 17 cohorts of men who are net givers of time, all aged between 31 and 47. After the childrearing period, the time deficit for men increases with age and reaches a maximum for the oldest old (age 80+) with a little more than an hour of net time transfers. However, as Figure 3 illustrates the main beneficiaries of household goods and services are not men but children (age 0-17). An average child – irrespective of gender – receives 3.5 times more net time than an average man, all together three hours of home goods and services (see Table 1). Even in countries where men's participation in household labour is the lowest, such as Italy and Spain, the per capita net transfers flowing to children is higher than that to men. The level of net transfers for children would be only a little less if activities are registered for younger ages in time use surveys.



Note: Figures are population weighted.

Source: Own calculations based on HETUS, EU-SILC and Eurostat population data.

Figure 3

Daily per capita production and consumption of time spent on unpaid labour and net time transfers by age and gender in hours in 14 European countries around 2000

As we have seen for consumption figures, time received is especially high for younger children. For the elderly (60+)[24] only older men are net receivers – receiving an average of around half an hour. Even though consumption is high at older ages, older cohorts of both men and women produce a significant amount in the household. If they do not live alone, older people tend to live in older couples separately from their younger relatives. Therefore the majority of household production by older people is consumed by older people themselves. We note that if old-age care and inter-household family care are better captured in time use surveys, net time transfers flowing to the oldest cohorts would be probably a little higher.

There are important country specific results we would like to note.[25] The maximum surplus is provided by women around 30-40 years old in every country, except for Bulgaria where older women also contribute with almost the same amount of surplus. In Italy and Spain net time given by women is the highest for all ages as well as during childbearing ages. The net contribution of Italian, Polish and Spanish women of childbearing age is almost two hours more than that of women in Belgium and Latvia of the same age. In some countries, such as in Italy and Latvia, all cohorts of men are dependent on the housework of women. In these countries no male cohorts generate surplus of household goods and services, in other words there are no male cohorts who are net providers. In Spain as well as in Bulgaria the surplus they provide and thus the net time they give is very small (less than five minutes per capita). Nevertheless, in Sweden (and to a lesser extent in Belgium, Finland, Germany, and Poland) the net contribution of men around childrearing ages is significant compared to the average.

24 This age represents the average age of becoming net receiver from net giver of resources in the national economy in the EU countries covered here estimated from national NTA age profiles.

25 We present country by country age profiles in Appendix G and tables in Appendix H.

Table 1

Daily per capita production and consumption of unpaid household labour and net time transfers in hours in 14 European countries around 2000

	All ages			Age group								
				0–17			18–59			60–		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Production	3.1	2.1	4.1	0.4	0.3	0.5	3.6	2.3	4.9	4.5	3.6	5.2
Consumption	3.1	3.0	3.2	3.4	3.4	3.4	2.6	2.5	2.7	4.3	4.2	4.5
Net Time Transfers	0.0	0.9	–0.9	3.0	3.1	2.9	–1.0	0.2	–2.2	–0.2	0.6	–0.7

Note: Figures are population weighted.
Source: Own calculations based on HETUS, EU-SILC and Eurostat population data.

3.6. PRICING HOUSEHOLD LABOUR

A pricing procedure is applied in NTTA in order to account not only for the time but also the value of home production. The literature distinguishes between the output and the input method of valuing unpaid household labour. The former derives the value of an activity from the value of the product created by the activity in question (such as the value of a dinner for the activity cooking). This approach allows the differences in productivity and economies of scale to be taken into account, which is an advantage compared to the input approach. Productivity of labour depends on age: on average, a 40-year-old person finishes a task faster than an 80-year-old. Output pricing assigns the same value to the same dinner irrespective of the time spent preparing it. By contrast, input pricing assigns a higher value to the same dish prepared by someone who spends more time on it and who is less productive. The activities of older people, who are slower, are eventually valued more than those carried out by faster-working younger people. In addition, input pricing does not capture the economies of scale. Following our example of food production, it does not account for the number of dishes prepared. Five times the same dish in a restaurant costs five times the unit price; so does output pricing. However, five times the same dish in a household does not take five times more time to be prepared. In this way input pricing tends to undervalue household labour.

Time use surveys unfortunately do not usually include information about the output of household production. Data on other means of production – such as the imputed rent of a home and the value of household durables – are also very limited. Therefore, in line with the Donehower methodology and with almost all studies on the value of household labour, we apply the input approach: we assign wages to the different activities of unpaid household labour to estimate the value of home production.

Valuing unpaid household labour is, however, not straightforward even when using the simpler input approach. It is difficult because it is unpaid: there is no market mechanism that attributes monetary values to these activities. Applying observable market prices raises two problems. First, it is not obvious whose wage should be considered: the wage of the person who is doing the household work (the opportunity cost approach) or that of the person whose job is done (specialist replacement wage approach). In the first approach we apply the unit wage of the respondent of the survey (an IT expert for instance, even if she just washes up the dishes). In the second approach we use the regular market wage of someone who washes dishes full-time as his or her main job. Since much household labour requires basic or no skills, the opportunity cost approach assigns higher value to household

labour than the replacement wage approach, in particular tasks done by men. We follow the approach of the Donehower methodology, which applies the specialist replacement wage.

The two main flaws of the input approach mentioned above, insensitivity to productivity differentials and economies of scale, make the labour produced by older people appear to be more valuable than it is in reality. We demonstrated this in the case of age-specific productivity differentials above. Economies of scale create such an age effect because the household size is also age dependent. Older people in Europe typically live alone or in couples and do not cohabit with their adult children. The households of older people are therefore smaller on average than the size of two-generation households, which tend to be inhabited by people of working age and their children. The current standard of NTTA does not correct for any of these two deficiencies and we would need to make a series of assumptions to correct for them.

Most skills that are used in household production are in the unskilled category; no higher degree is likely required to perform these activities. Washing dishes, driving a car or grocery shopping are some of the few activities that would not likely be paid the average wage. This would make any pricing of household labour based on average wages overpriced. In order to present a more fine-tuned and representative picture of household economies by country, we match activities to occupation categories. Data for valuing home production for the 14 HETUS countries come from the four-yearly waves of the Structure of Earnings Survey (SES).[26] Our calculations are based on the 2002 wave. Pricing of time use profiles from HETUS is conducted in four steps: assignment of HETUS activities to ISCO occupational codes;[27] extraction of wages per minute by occupation using the SES;[28] adjusting to employer paid taxes and contributions;[29] and rescaling for cross-country comparisons. A number of methodological decisions are made in order to arrive at comparable and standardised data across the countries.[30]

3.7. THE AGGREGATE VALUE OF UNPAID HOUSEHOLD LABOUR AND THE NATIONAL TIME TRANSFER ACCOUNTS IN EUROPE

After pricing time use activities we can give an approximation of the total value of household labour and estimate economic activity not accounted for in National Accounts. Appendix K shows the estimated value of labour devoted to home production of non-market services as a percentage of GDP in each country. The value varies between 24 per cent in Latvia up to 57 per cent in Germany. The average ratio is 43 per cent.[31]

26 The compilation of structural statistics on earnings is based on local units and enterprises, and provides information on employees in enterprises with 10 or more employees. SES data are centrally processed by Eurostat. More information about SES can be found here: http://ec.europa.eu/eurostat/web/microdata/structure-of-earnings-survey.

27 For each household production activity one occupational code is chosen using the International Standard Classification of Occupations (ISCO-88) applied in SES 2002. The structure of the SES micro-data is different for the different countries: for some countries more detailed minor ISCO categories are accessible and for other countries we find only broader occupational categories within the major ISCO groups. In order to obtain more standardised figures we used the broader occupational categories (see Appendix J for a more detailed list of codes).

28 We use the median hourly earnings by occupation. The average is sensitive to extreme values and the median value provides a better representation of the central tendency of these occupational wages.

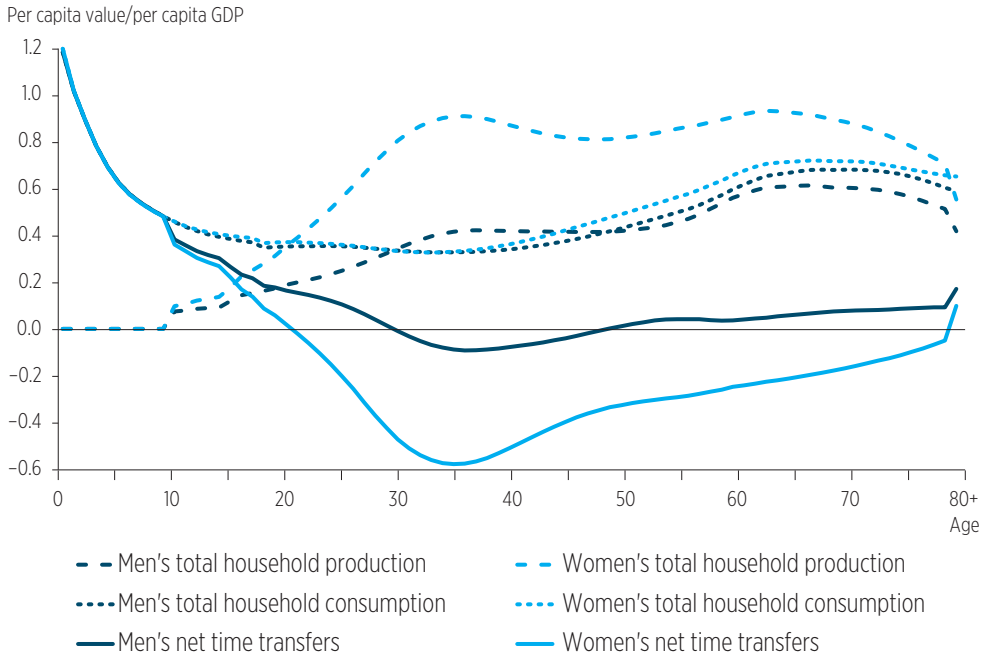
29 The SES provides employee gross earnings with the exclusion of taxes and contributions paid by employers. Labour income in NTA however account for the total labour costs, including taxes nominally paid by the employers. In order to have a consistent NTTA with NTA, these taxes are added, too. An adjustment factor for each country is therefore created using the ratio of the National Accounts entries of compensation of employees to gross wages and salaries downloaded from Eurostat.

30 Age profiles in monetary terms are estimated for the full year of 2002. The HETUS time-use data are sometimes earlier or later than 2002, but the age patterns of home production and consumption do not change in one to three years. In the last section we adjust NTTA profiles so that they are consistent with the year of previously estimated NTA profiles. We did not access the SES 2002 micro-data for Germany and Slovenia; therefore in these two cases we use wages from the Eurostat website based on the SES 2002 survey. For these countries we have to limit ourselves to the major ISCO-88 groups. The Eurostat website provides the average hourly earnings by occupation, which we then adjust with an average mean-median ratio calculated from the micro-data.

31 These results are similar to Gianelli et al (2011). They estimate the gross value of total home production between 12 and 47 per cent of GDP in 24 European countries. They also find the highest levels of home production in monetary terms in Germany and Belgium and the lowest in Latvia. If we clean our calculations from employer paid taxes the gross values are between 19 and 46 per cent of national GDPs.

Women's share in the aggregate amount oscillates between 60-70 per cent. However, their production and net contribution varies by age.

In Figure 4 we present priced age profiles showing production and consumption of household labour by gender.[32] Country profiles are rescaled by using per capita GDP in order to facilitate cross-country comparability. The figure demonstrates that pricing unpaid household labour has other effects than only enabling combined analysis of the national economy and the household economy. The comparison of Figures 3 and 4 shows that men have a slightly longer net giver period, if household labour is measured in monetary terms. More importantly, the order of the modes changes for women. Since child-raising activities such as teaching are better paid than the bulk of housework or agricultural work, which is typical in older ages, attributing wages to activities lifts the first peak around the mid-30s. This result justifies the use of detailed wage information of the SES. Yet, the main conclusions drawn from the figures are similar.



Note: Figures are population weighted. Age profiles are normalised using per capita GDPs of the respective countries.

Source: Own calculations based on HETUS, EU-SILC, SES and Eurostat population data..

Figure 4

Per capita production and consumption of unpaid household labour and net time transfers by age and gender in monetary terms in 14 European countries in 2002

Figure 4 and Table 2 illustrate that the highest value of per capita net time transfers flow to children: 52 per cent of per capita GDP on average in the respective countries. The youngest cohort (age 0) consumes 120 per cent on average in the form of household goods and services. The average amount received by the elderly is lower than that received by children. Except for the oldest old cohorts, older women in general are net givers of household goods and services. Men above 60 are net beneficiaries of home production in each country receiving on average an equivalent of 8 per cent of per capita GDP. Among the 80 years old or older men it grows up to 17 per cent. Women cohorts of working age (18-59) contribute the most to the household economy. Their average per

32 We present country-by-country figures in Appendix L.

capita value of surplus is 35 per cent of the per capita GDP in the respective countries. Working age men are net providers only during childbearing ages.

Applying population weights, children receive 4 per cent of aggregate GDP in Latvia up to 15 per cent of GDP in Poland in the form of household goods and services. Net time transfers flowing to adult men (18 years old or older) are the highest in Italy and Spain with 5 and 4 per cent of GDP, respectively. However, even in these two countries, which are characterised by the smallest male contribution to household labour, children receive twice as much net time transfers in aggregate terms than adult men (11 per cent of GDP in Italy and 8 per cent in Spain). The high levels of household goods and service provided by working age women is also shown in population weighted terms. Even in Latvia where the least amount is found, working age women transfer an amount of 4 per cent of aggregate GDP in the form of household goods and services. In Italy where the population weighted net contribution of working age women is the highest, the value of net time transfers reaches 13 per cent of GDP.

Table 2

National Time Transfer Accounts in 14 European countries in 2002: per capita production and consumption of unpaid household labour and net time transfers in monetary terms, % of per capita GDP

	All ages			Age group								
				0–17			18–59			60–		
	Total	Men	Women	Total	Men	Women	Total	Men	Women	Total	Men	Women
Production	49	34	64	6	5	8	56	37	76	70	57	80
Consumption	49	47	51	58	57	58	39	38	41	67	65	69
Net Time Transfers	0	13	–13	52	52	50	–17	1	–35	–3	8	–11

Note: Figures are population weighted.
Source: Own calculations based on HETUS, EU-SILC and Eurostat population data.

4 NATIONAL TIME TRANSFER ACCOUNTS COMBINED WITH NATIONAL TRANSFER ACCOUNTS

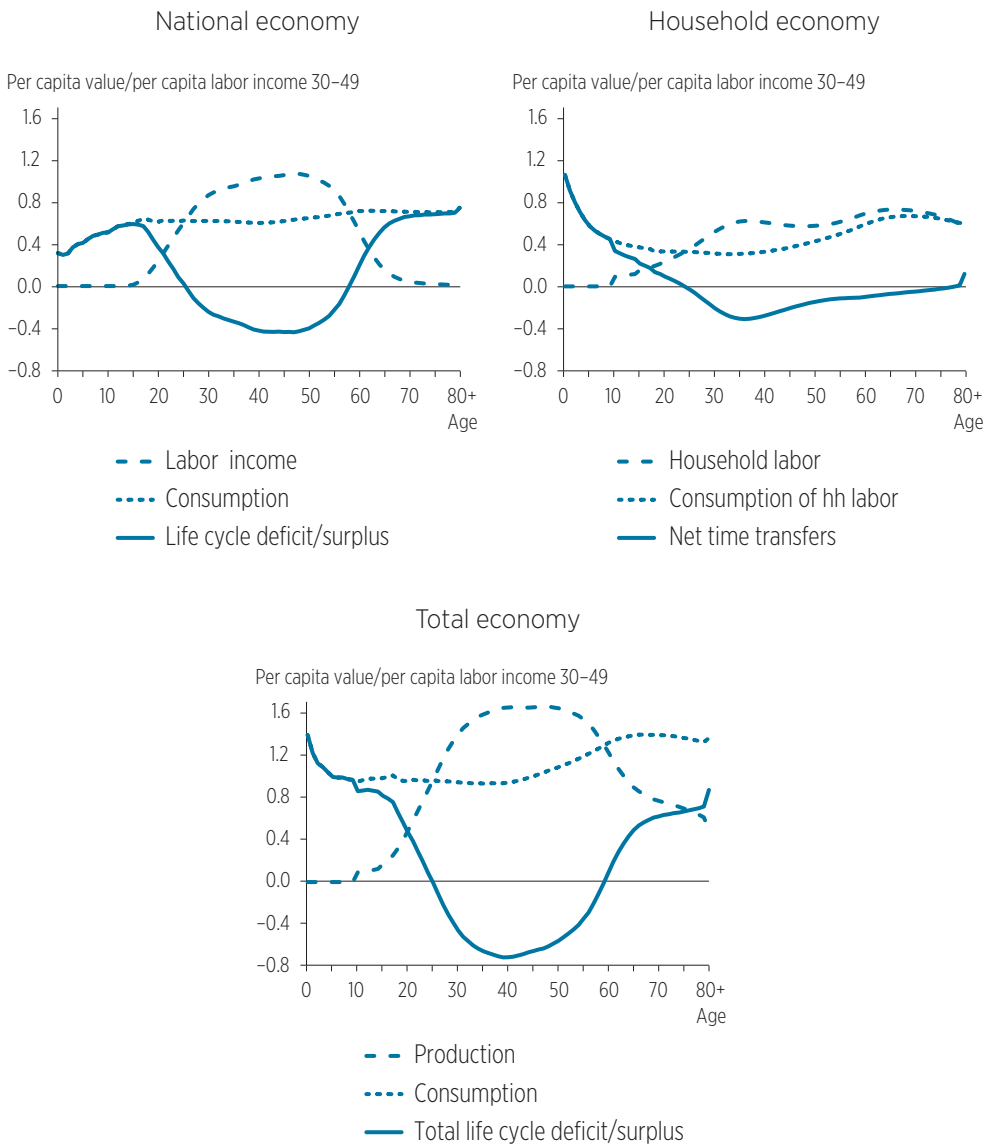
We have so far analysed the age patterns of unpaid household labour and its consumption, limiting ourselves to the household economy. After valuing household labour in monetary terms we can combine the age profiles of the national economy and the household economy. In the national economy consumption is rather smoothly distributed over the lifecycle while production is concentrated predominantly in the working ages. The age profile of labour income and consumption in the national economy panel of Figure 5 illustrates these patterns in nine European countries, representing 57 percent of the population of the European Union.[33]

The upper two panels of the figure 5 demonstrate that the age profiles of labour income and household labour in monetary terms are markedly different. In Europe, hardly any potential new entrants to the labour market can get a job without completing

33 Countries included are Finland, France, Germany, Hungary, Italy, Slovenia, Spain, Sweden and the United Kingdom. Data are downloaded from the NTA website: www.ntaccounts.org.

secondary education. Consequently, the labour income profile rises steeply between the ages of 16 and 25. In contrast, in the household people start working at a younger age. As we have seen, the curve of home production has two peaks. Market labour income mostly disappears after retirement age but people keep working in the household practically as long as they live. In this respect the dashed line in the right panel resembles the age profiles characterising hunter-gatherer societies rather than the labour income curve of developed nations (see Lee and Mason 2011b).

The solid lines in the panels depict lifecycle deficit and surplus in the national economy and its equivalent in the household economy, net time transfers. Due to differences in the production and consumption profiles of the two sectors, the two curves are markedly different. NTA describes a situation with two streams of resources flowing in opposite



Note: Figures are population weighted. Respective age profiles of NTTA are adjusted to the year of NTA data. Age profiles are normalised using the per capita value of labour income for people between age 30 and 49 in the respective countries. *Total economy:* combination of the national economy and the household economy.

Source: Own calculations based on NTA, HETUS, SES and Eurostat population data..

Figure 5

Per capita production and consumption and the resulting lifecycle deficit/surplus in monetary terms in the national economy, the household economy and the total economy in 9 European countries around 2000.

directions from working age population to children and the elderly. In contrast, the household economy, in these nine European countries at least, is characterised by a unidirectional flow from parents to children. The net amount of household services and goods received is high in childhood and marginal above the age of 60. The youngest generation till the age of 7 receives more resources from the household economy than from the national economy. By combining the market and non-market sectors of the economy and looking at the age patterns of all economic activities (on the lower panel of Figure 5 as "Total economy") we find two significant differences in comparison with the national economy. First, production in older ages is higher; and secondly the total lifecycle deficit of children is larger than the total lifecycle deficit of the elderly. Consequently, there are even more resources flowing to children than previously thought; and these additional resources are provided mostly by the working age cohorts. In the European case, families and welfare states are the most important vehicles of lifecycle financing through intergenerational transfers. The respective roles of them, however, are different in the reallocation system (Gál, Vanhuysse, Vargha forthcoming).

4.1. SUMMARY OF RESULTS

This paper presents how economic resources are produced and consumed in the household economy of 14 European countries. By measuring the age patterns of the production and consumption of unpaid household labour we are able to analyse how goods and services produced in the household are transferred among different generations and genders. We supplement previous methodologies and introduce a novel imputation method of time use, in order to use a harmonized dataset of European time use surveys, and systematically account for all three generations in each country: children, working age population and the elderly. Monetary values to different unpaid family work activities carried out in the household are also attributed using harmonized European data on wages. Our results show that reallocation in the household economy is important principally in funding the consumption of children. As others, we also find a strong gender component in the production of household labour. We also extend these previous findings by demonstrating that gender differences exist not only in the aggregates (women produce significantly more than men in all countries) but also in the age patterns (women have a more explicit bimodal production pattern). The gender difference is not evenly distributed throughout the economic life course.

By comparing production and consumption of unpaid labour we identify the net beneficiaries of household goods and services. Men are net beneficiaries through most of their lives whereas women are net providers of net time transfers once they grow up. How much they benefit from and contribute to the household economy again varies by age; cohorts of working age women contribute by far the most in net terms. Our descriptive analysis shows that even though adult men are recipients of a sizeable amount of intra-generational net time transfers, in total they receive less than children. Despite of the emphasis on the gender aspect of research on home production, there is a very strong life-stage component. It is children and not adult men who are the main beneficiaries of household labour.

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APPENDIX A

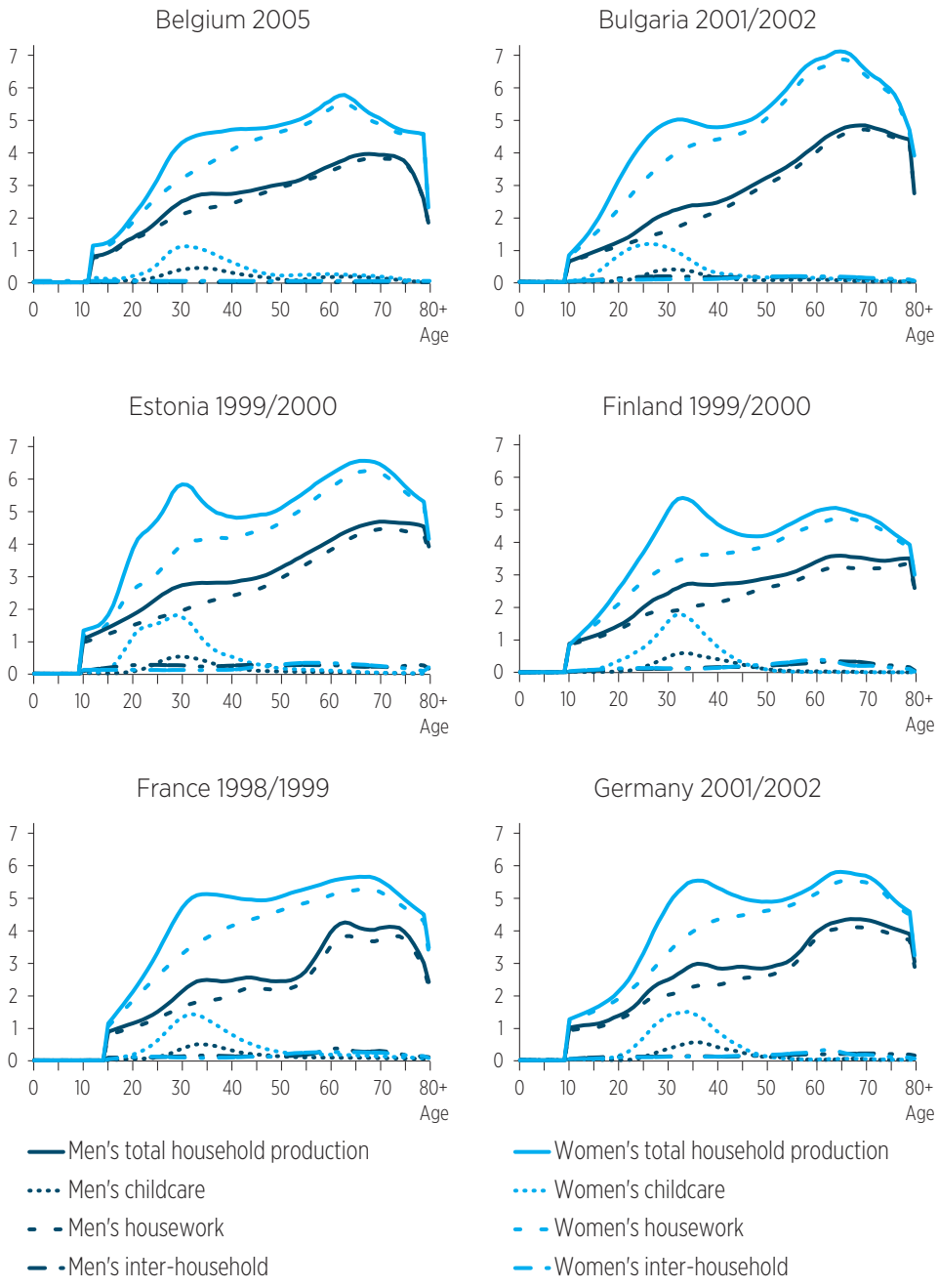
Summarised information on national time use surveys included in the HETUS database

Country	Fieldwork period	Age of population covered in the national survey	Sample size	Age of population on HETUS website
Belgium	2005	12+	12824	12+
Bulgaria	2001/2002	7+	7603	10+
Estonia	1999/2000	10+	5728	10+
Finland	1999/2000	10+	5332	10+
France	1998/1999	15+	15441	15+
Germany	2001/2002	10+	12655	10–75
Italy	2002/2003	3+	55760	10+
Latvia	2003	10+	3804	10+
Lithuania	2003	10+	4768	10+
Poland	2003/2004	15+	20264	16+
Slovenia	2000/2001	10+	6190	10+
Spain	2002/2003	10+	46774	10+
Sweden	2000/2001	20–84	3998	20–84
United Kingdom	2000/2001	8+	10366	10+

Source: HETUS

APPENDIX B

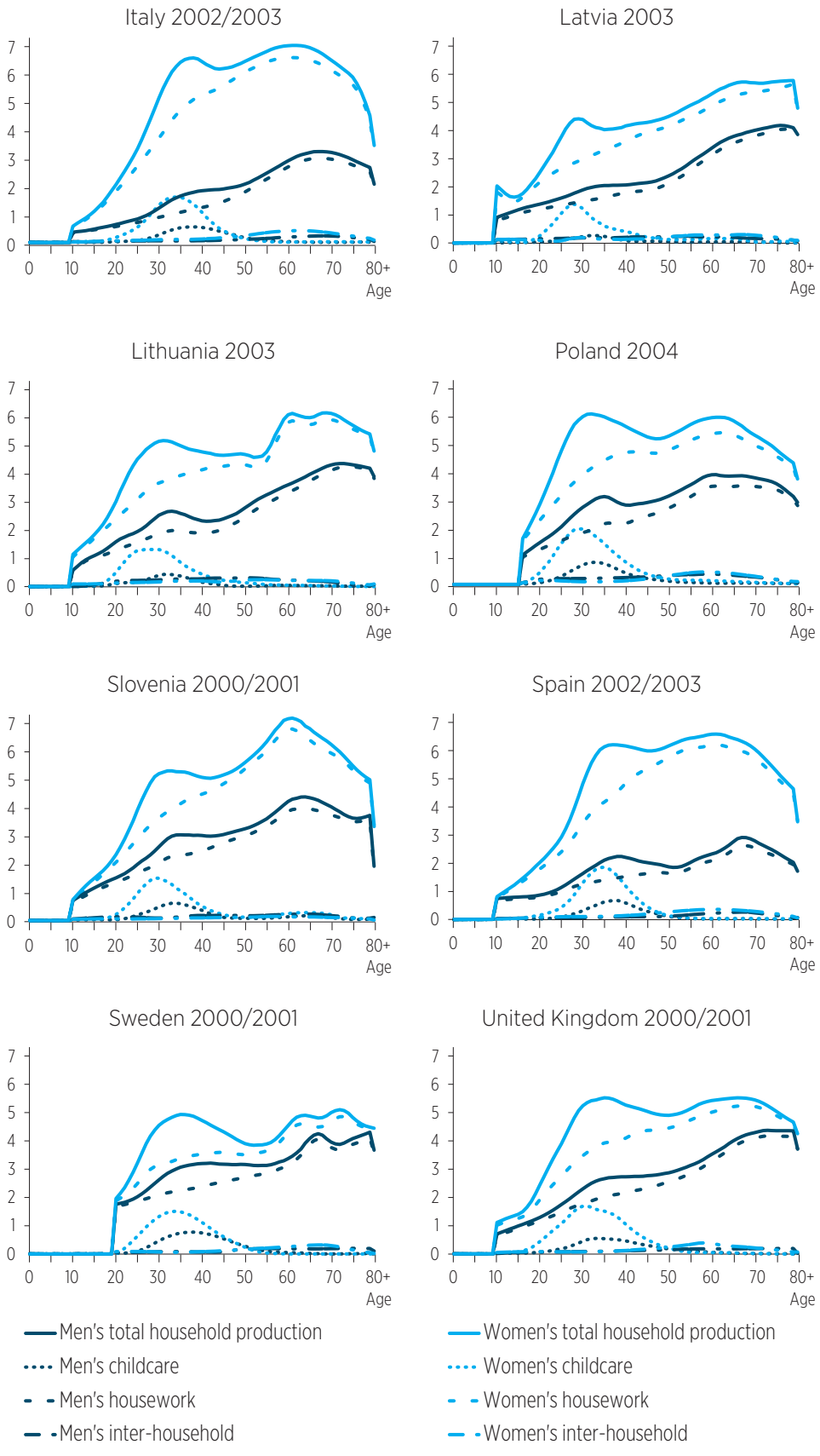
Production age profiles in hours per day in HETUS countries around 2000



Source: Own calculations based on HETUS data.

APPENDIX B

Production age profiles in hours per day in HETUS countries around 2000 (continued)



Source: Own calculations based on HETUS data.

APPENDIX C

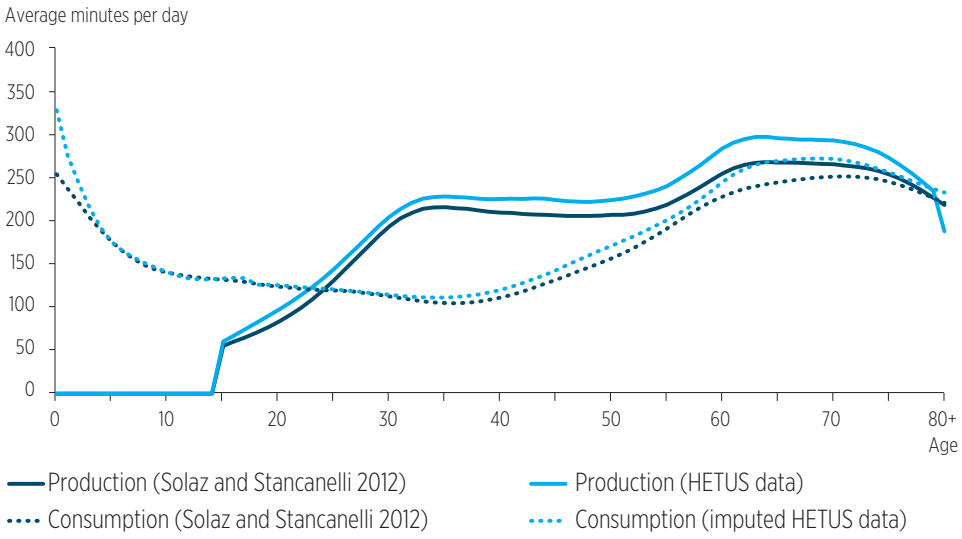
Equivalence scales for allocating childcare with two or more children living in a household

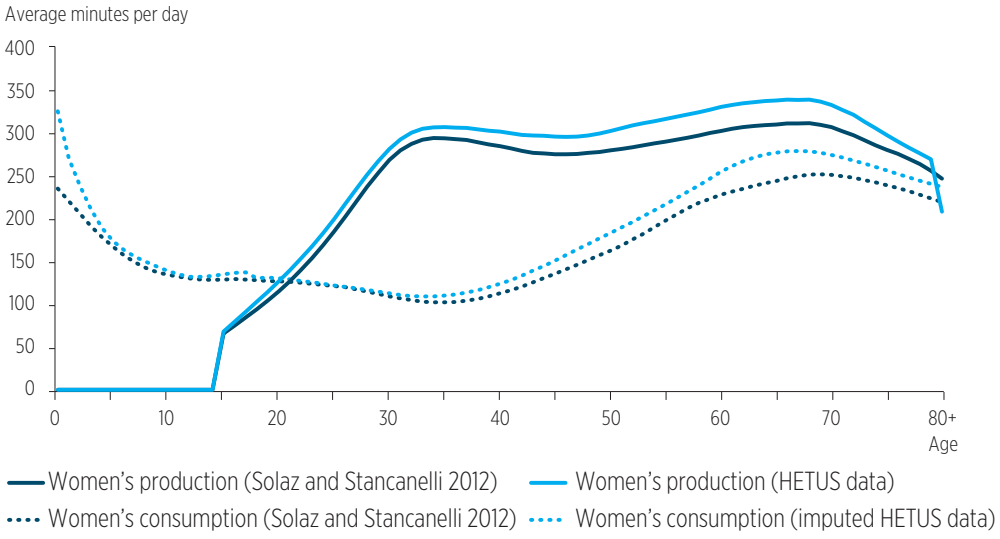
Age of child	Belgium	Bulgaria	Estonia	Finland	France	Germany	Italy	Latvia	Lithuania	Poland	Slovenia	Spain	Sweden	United Kingdom
0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	0.70	0.77	0.75	0.85	0.80	0.78	0.80	0.53	0.92	0.81	0.83	0.85	0.75	0.74
2	0.53	0.60	0.71	0.62	0.65	0.52	0.71	0.41	0.65	0.65	0.49	0.73	0.61	0.63
3	0.47	0.41	0.44	0.48	0.52	0.43	0.58	0.37	0.52	0.52	0.41	0.59	0.52	0.59
4	0.44	0.47	0.52	0.34	0.44	0.36	0.49	0.30	0.34	0.41	0.31	0.53	0.47	0.47
5	0.33	0.28	0.36	0.29	0.44	0.39	0.45	0.32	0.31	0.39	0.31	0.46	0.41	0.40
6	0.41	0.28	0.33	0.22	0.37	0.35	0.39	0.27	0.22	0.31	0.33	0.36	0.41	0.36
7	0.27	0.23	0.21	0.15	0.37	0.27	0.31	0.23	0.24	0.28	0.21	0.29	0.34	0.28
8	0.21	0.17	0.23	0.12	0.29	0.24	0.29	0.19	0.20	0.25	0.20	0.29	0.35	0.23
9	0.17	0.13	0.21	0.09	0.27	0.15	0.24	0.19	0.11	0.21	0.17	0.24	0.29	0.21
10	0.17	0.09	0.10	0.07	0.19	0.09	0.20	0.07	0.05	0.16	0.06	0.13	0.31	0.12
11	0.14	0.09	0.06	0.04	0.18	0.09	0.13	0.05	0.04	0.11	0.08	0.11	0.25	0.12
12	0.06	0.03	0.05	0.03	0.10	0.07	0.10	0.06	0.04	0.08	0.03	0.06	0.19	0.07
13	0.07	0.03	0.06	0.05	0.08	0.06	0.06	0.03	0.01	0.06	0.05	0.06	0.17	0.06
14	0.05	0.02	0.03	0.04	0.08	0.04	0.08	0.03	0.01	0.03	0.04	0.02	0.16	0.05
15	0.04	0.01	0.02	0.04	0.05	0.05	0.05	0.02	0.01	0.03	0.02	0.03	0.10	0.04
16	0.04	0.01	0.01	0.02	0.05	0.02	0.04	0.01	0.01	0.01	0.02	0.02	0.06	0.02
17	0.01	0.01	0.00	0.02	0.04	0.01	0.04	0.01	0.00	0.01	0.01	0.01	0.11	0.02

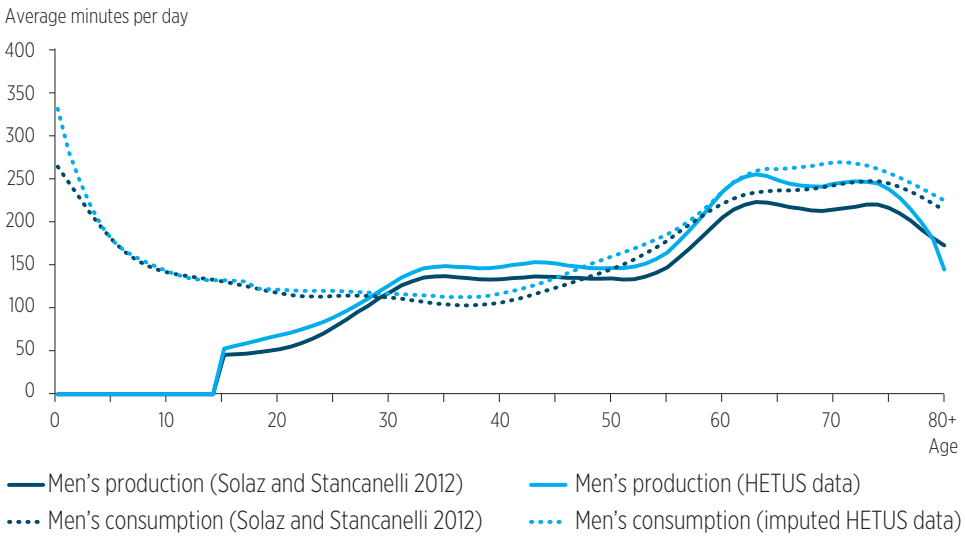
Source: Own calculations based on HETUS data.

APPENDIX D

Production and consumption age profiles in minutes per day in France (1998/1999) estimated by Solaz and Stancanelli (2012) and using HETUS data with the imputation method

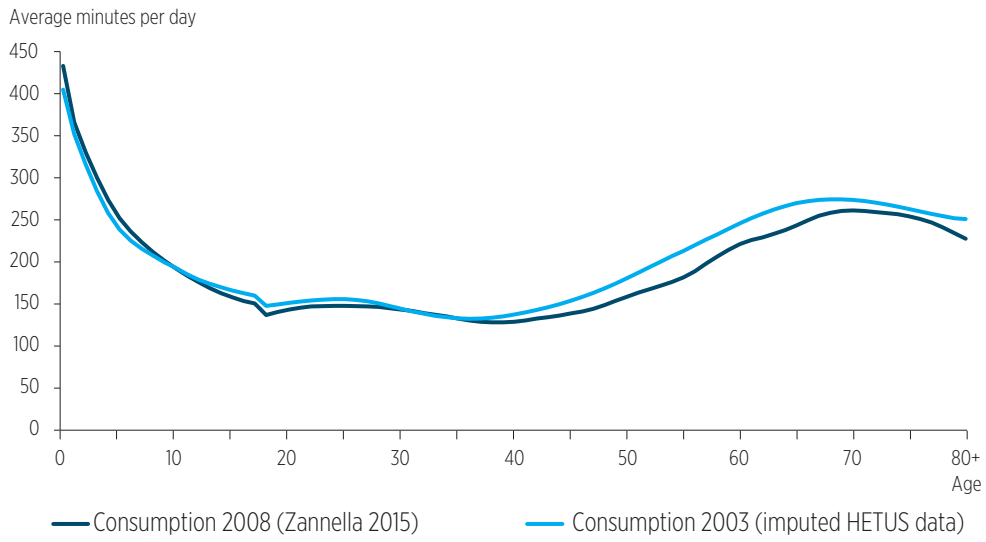






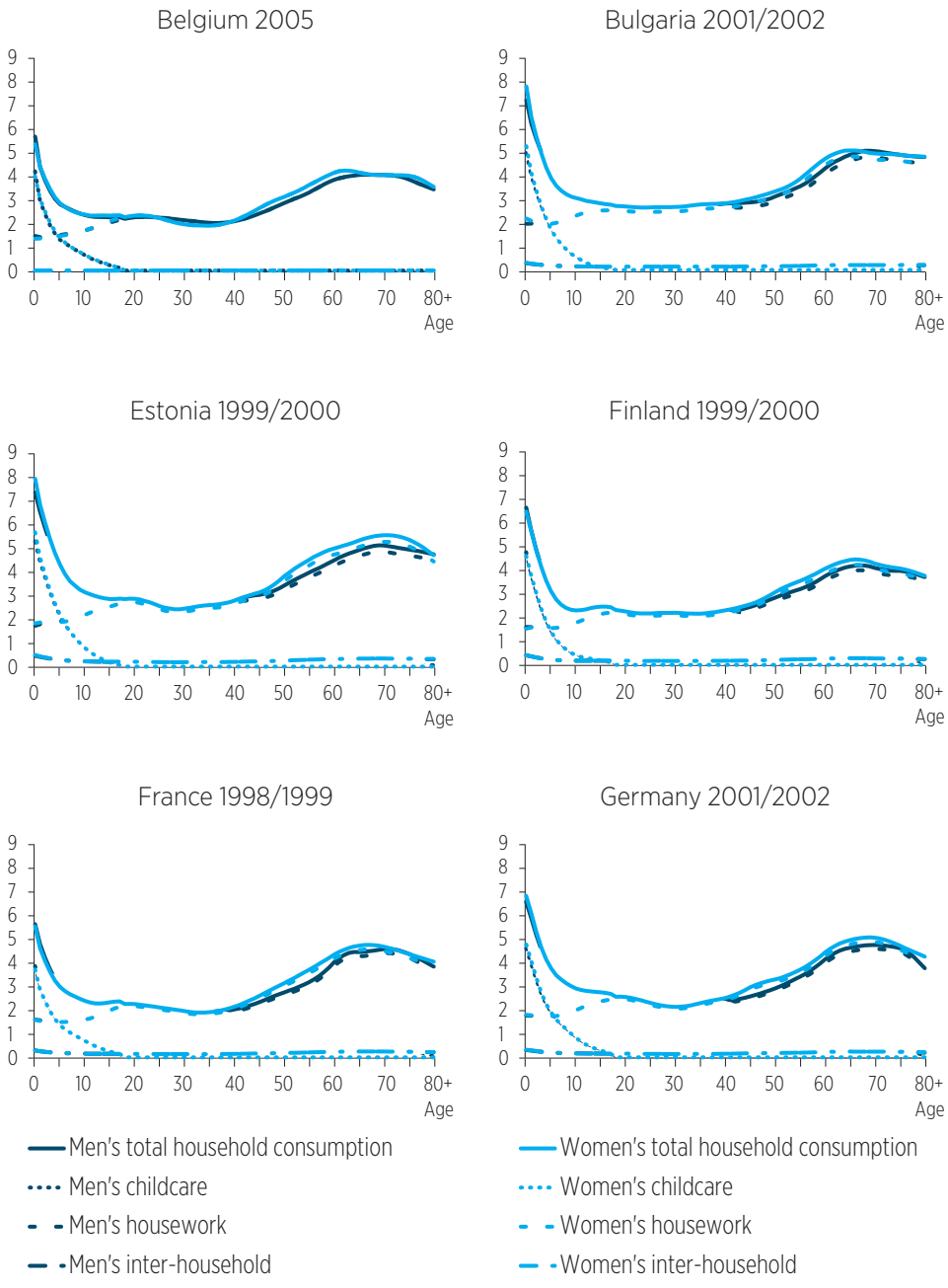
APPENDIX E

Consumption age profiles in minutes per day in Italy (2003 and 2008) estimated by Zannella (2015) and using HETUS data with the imputation method



APPENDIX F

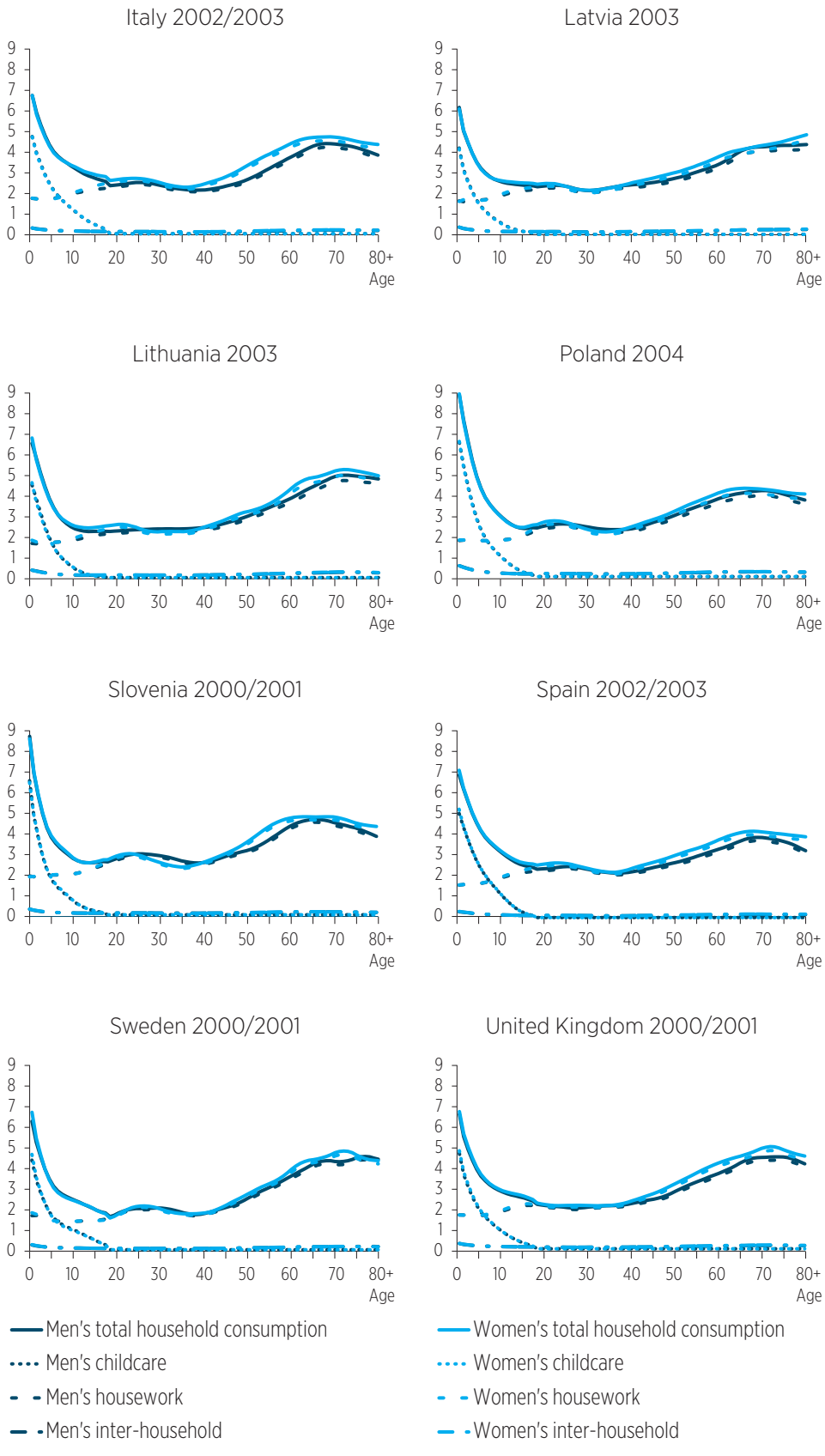
Consumption age profiles in hours per day in HETUS countries around 2000



Source: Own calculations based on HETUS, EU-SILC and Eurostat population data.

APPENDIX F

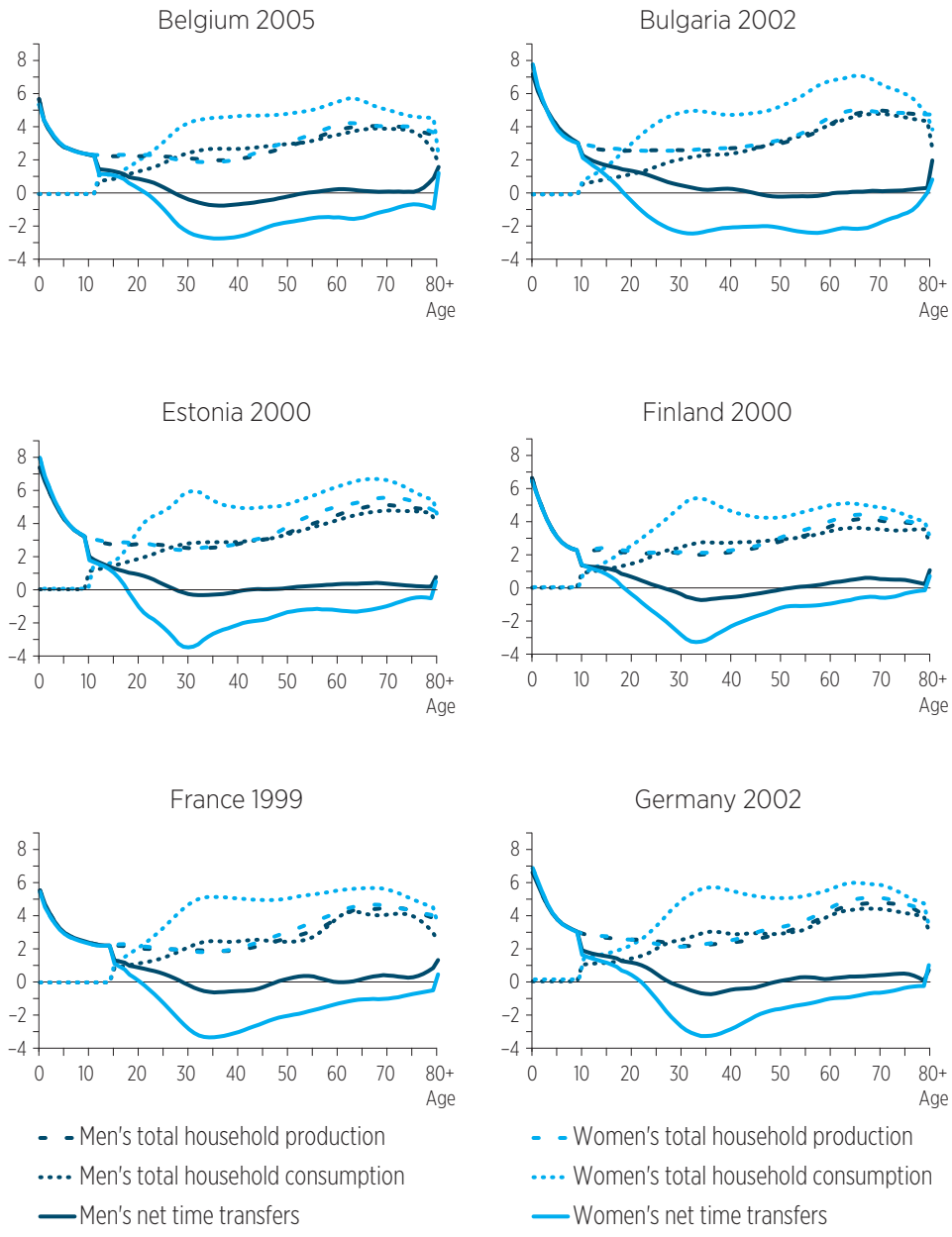
Consumption age profiles in hours per day in HETUS countries around 2000 (continued)



Source: Own calculations based on HETUS, EU-SILC and Eurostat population data.

APPENDIX G

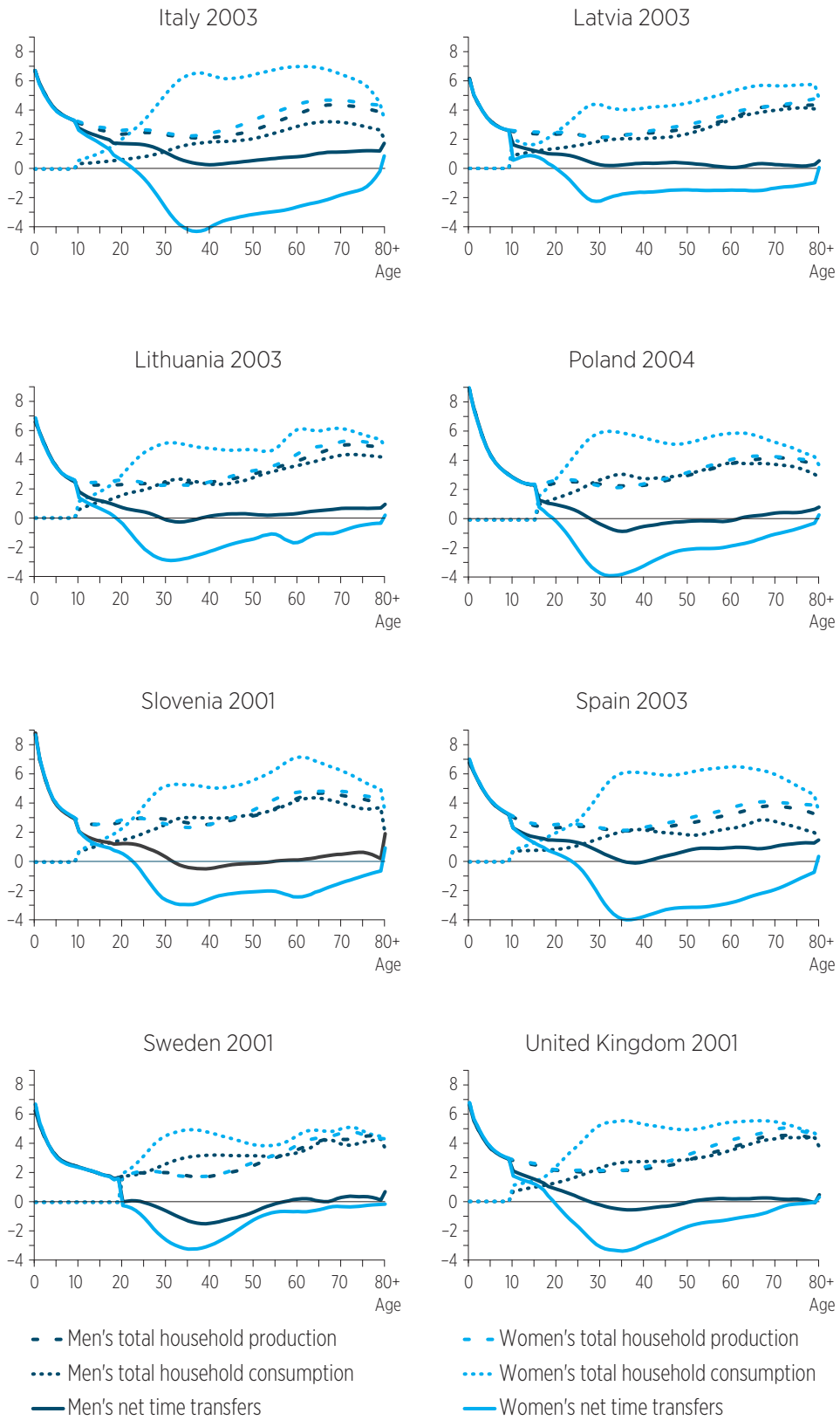
Net time transfer age profiles in hours per day in HETUS countries around 2000



Source: Own calculations based on HETUS, EU-SILC and Eurostat population data.

APPENDIX G

Net time transfer age profiles in hours per day in HETUS countries around 2000 (continued)



Source: Own calculations based on HETUS, EU-SILC and Eurostat population data.

APPENDIX H

Daily per capita production and consumption of unpaid household labour and net time transfers by age groups and gender in hours per day in HETUS countries around 2000

	All ages			Age group								
				0–17			18–59			60–		
	Total	M	W	Total	M	W	Total	M	W	Total	M	W
Production 14 EU country average	3.1	2.1	4.1	0.4	0.3	0.5	3.6	2.3	4.9	4.5	3.6	5.2
Consumption 14 EU country average	3.1	3.0	3.2	3.4	3.4	3.4	2.6	2.5	2.7	4.3	4.2	4.5
Net Time Transfers 14 EU country average	0.0	0.9	–0.9	3.0	3.1	2.9	–1.0	0.2	–2.2	–0.2	0.6	–0.7
BE production	2.9	2.3	3.6	0.4	0.3	0.4	3.4	2.6	4.3	4.0	3.5	4.5
BE consumption	2.9	2.8	3.0	2.9	2.9	2.9	2.5	2.5	2.6	3.9	3.9	4.0
BE net time transfers	0.0	0.6	–0.6	2.5	2.5	2.4	–0.9	–0.1	–1.7	–0.1	0.4	–0.5
BG production	3.5	2.5	4.5	0.6	0.5	0.8	3.7	2.5	4.9	5.4	4.4	6.2
BG consumption	3.5	3.4	3.6	3.6	3.6	3.6	3.0	2.9	3.0	4.9	4.8	4.9
BG net time transfers	0.0	0.9	–0.9	3.0	3.1	2.8	–0.7	0.4	–1.9	–0.6	0.4	–1.3
DE production	3.3	2.5	4.1	0.6	0.5	0.7	3.6	2.6	4.7	4.6	4.1	5.0
DE consumption	3.3	3.1	3.4	3.5	3.5	3.5	2.6	2.6	2.7	4.6	4.4	4.6
DE net time transfers	–0.1	0.6	–0.7	2.9	2.9	2.8	–1.0	–0.1	–1.9	–0.1	0.3	–0.4
EE production	3.6	2.6	4.5	0.8	0.7	0.9	4.0	2.8	5.1	5.4	4.5	5.9
EE consumption	3.6	3.4	3.7	3.7	3.6	3.7	3.0	2.9	3.1	5.0	4.8	5.2
EE net time transfers	0.0	0.8	–0.7	2.8	2.9	2.8	–1.0	0.1	–2.0	–0.4	0.3	–0.8
FI production	2.9	2.2	3.6	0.6	0.5	0.6	3.4	2.6	4.3	4.0	3.4	4.4
FI consumption	2.9	2.8	3.0	3.0	3.0	3.1	2.5	2.4	2.6	4.0	3.9	4.1
FI net time transfers	0.0	0.6	–0.5	2.5	2.6	2.4	–1.0	–0.2	–1.8	0.0	0.5	–0.3
FR production	2.8	2.0	3.7	0.2	0.2	0.2	3.4	2.2	4.5	4.5	3.8	5.0
FR consumption	2.8	2.7	2.9	2.9	2.9	2.8	2.3	2.2	2.4	4.3	4.2	4.3
FR net time transfers	0.0	0.8	–0.7	2.7	2.7	2.6	–1.0	0.0	–2.1	–0.2	0.4	–0.6
IT production	3.3	1.7	4.8	0.3	0.2	0.4	3.6	1.6	5.6	4.6	2.9	5.8
IT consumption	3.3	3.1	3.5	3.8	3.7	3.8	2.7	2.5	2.9	4.4	4.1	4.5
IT net time transfers	0.0	1.4	–1.3	3.4	3.5	3.3	–0.9	0.8	–2.7	–0.2	1.2	–1.2

Source: Own calculations based on HETUS, EU-SILC and Eurostat population data.

APPENDIX H

Daily per capita production and consumption of unpaid household labour and net time transfers by age groups and gender in hours per day in HETUS countries around 2000 (continued)

	All ages			Age group								
				0–17			18–59			60–		
	Total	M	W	Total	M	W	Total	M	W	Total	M	W
LV production	3.0	2.0	3.9	0.8	0.6	1.0	3.1	2.0	4.1	4.9	3.8	5.5
LV consumption	3.0	2.9	3.2	3.0	3.0	3.0	2.6	2.5	2.6	4.3	4.1	4.3
LV net time transfers	0.0	0.8	–0.7	2.2	2.3	2.0	–0.5	0.4	–1.4	–0.7	0.2	–1.1
LT production	3.2	2.2	4.1	0.7	0.5	0.9	3.5	2.4	4.6	5.1	4.0	5.8
LT consumption	3.2	3.0	3.4	3.1	3.0	3.1	2.7	2.6	2.7	4.9	4.6	5.0
LT net time transfers	0.0	0.8	–0.7	2.4	2.5	2.2	–0.9	0.2	–1.9	–0.3	0.6	–0.8
PL production	3.2	2.3	4.1	0.2	0.2	0.3	3.9	2.7	5.2	4.6	3.7	5.1
PL consumption	3.2	3.2	3.3	3.8	3.8	3.8	2.8	2.7	2.8	4.2	4.1	4.3
PL net time transfers	0.0	0.9	–0.8	3.6	3.6	3.5	–1.2	0.0	–2.3	–0.4	0.4	–0.9
SI production	3.4	2.5	4.3	0.6	0.5	0.7	3.8	2.8	4.9	5.1	3.9	5.9
SI consumption	3.4	3.3	3.5	3.6	3.6	3.7	3.0	3.0	3.0	4.6	4.5	4.7
SI net time transfers	0.0	0.8	–0.8	3.1	3.1	3.0	–0.8	0.2	–1.9	–0.5	0.5	–1.2
ES production	3.0	1.6	4.4	0.5	0.4	0.6	3.4	1.7	5.1	4.1	2.4	5.4
ES consumption	3.0	2.9	3.2	3.8	3.8	3.8	2.5	2.4	2.6	3.8	3.6	4.0
ES net time transfers	0.0	1.3	–1.2	3.3	3.4	3.3	–0.9	0.7	–2.5	–0.3	1.1	–1.4
SE production	2.9	2.4	3.3	0.0	0.0	0.0	3.4	2.8	4.0	4.4	3.9	4.8
SE consumption	2.9	2.8	2.9	2.9	2.9	2.9	2.2	2.2	2.3	4.3	4.2	4.4
SE net time transfers	0.0	0.4	–0.4	2.9	2.9	2.9	–1.1	–0.6	–1.7	0.0	0.3	–0.3
UK production	3.1	2.3	3.9	0.5	0.4	0.6	3.6	2.5	4.8	4.6	4.0	5.1
UK consumption	3.1	3.0	3.3	3.4	3.4	3.5	2.5	2.4	2.6	4.5	4.2	4.7
UK net time transfers	0.0	0.7	–0.7	2.9	3.0	2.9	–1.1	–0.1	–2.2	–0.1	0.2	–0.4

Source: Own calculations based on HETUS, EU-SILC and Eurostat population data.

APPENDIX I

Survey years used for constructing NTTA in 14 EU countries

Country	Year of time use survey fieldwork period (Source: HETUS)	Population (Source: Eurostat)	Year of EU-SILC fieldwork period*	Year of Structure of Earnings Survey fieldwork period
Belgium	2005	2005	2004	2002
Bulgaria	2001/2002	2002	2007	2002
Estonia	1999/2000	2000	2004	2002
Finland	1999/2000	2000	2004	2002
France	1998/1999	1999	2004	2002
Germany	2001/2002	2002	2005	2002
Italy	2002/2003	2003	2004	2002
Latvia	2003	2003	2005	2002
Lithuania	2003	2003	2005	2002
Poland	2003/2004	2004	2005	2002
Slovenia	2000/2001	2001	2005	2002
Spain	2002/2003	2003	2004	2002
Sweden	2000/2001	2001	2004	2002
United Kingdom	2000/2001	2001	2005	2002

* In EU-SILC the age variable is the age from the income reference year, thus from the year previous to the fieldwork.

APPENDIX J

ISCO-88 categories used for the different home production activities

HETUS category of home production activities	ISCO-88 occupa-tional code	Label of ISCO-88 code
Food preparation	51	Personal and protective services workers
Dish washing	91	Sales and services elementary occupations
Cleaning dwelling	91	Sales and services elementary occupations
Other household upkeep	91	Sales and services elementary occupations
Laundry	91	Sales and services elementary occupations
Ironing	91	Sales and services elementary occupations
Handicraft	73	Precision, handicraft, craft printing and related trades workers
Gardening	92	Agricultural, fishery and related labourers
Tending domestic animals	92	Agricultural, fishery and related labourers
Caring for pets	92	Agricultural, fishery and related labourers
Walking the dog	92	Agricultural, fishery and related labourers
Construction and repairs	93	Labourers in mining, construction, manufacturing and transport
Shopping and services	91	Sales and services elementary occupations
Physical care, supervision of child	51	Personal and protective services workers
Teaching, reading, talking with child	33	Teaching associate professionals
Other domestic work	51	Personal and protective services workers
Organisational work	41	Office clerks
Travel related to shopping	83	Drivers and mobile plant operators
Transporting a child	83	Drivers and mobile plant operators
Other domestic travel	83	Drivers and mobile plant operators
Informal help to other households	51	Personal and protective services workers

Detailed explanations of the ISCO-88 codes may be found on the website of the International Labour Organization: http://www.ilo.org/public/english/bureau/stat/isco/isco88/major.htm.

APPENDIX K

Total aggregate value of home production as a share of GDP in the respective countries

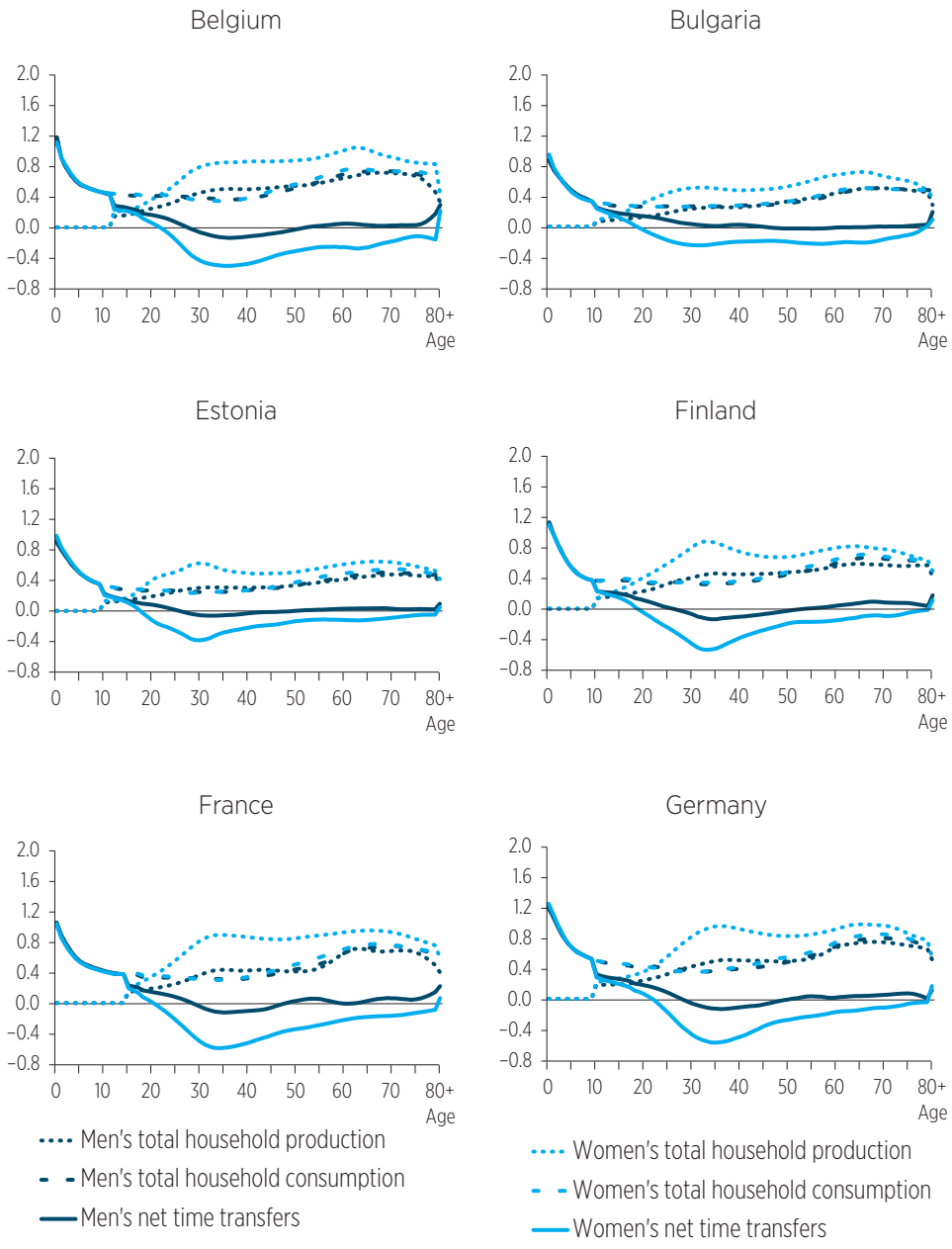
(%)

Country	Total aggregate value of home production
Belgium	53.7
Bulgaria	36.0
Estonia	36.9
Finland	47.5
France	48.9
Germany	56.9
Italy	54.7
Latvia	23.6
Lithuania	30.7
Poland	49.2
Slovenia	38.0
Spain	40.6
Sweden	44.1
United Kingdom	45.5

Source: Own calculations based on HETUS, SES and Eurostat population data.

APPENDIX L

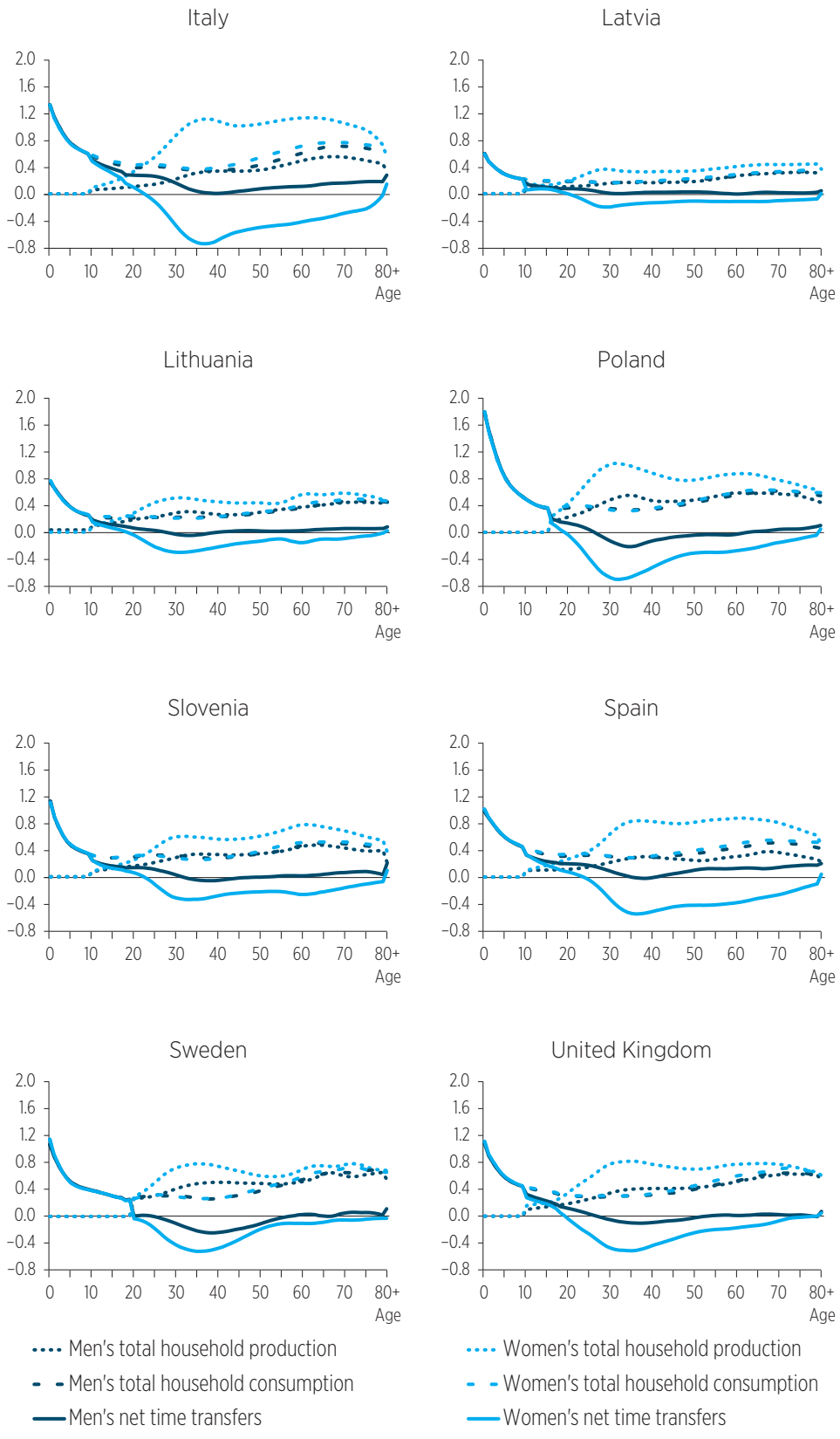
Age profiles of production and consumption of unpaid household labour and net time transfers in monetary terms by age and gender in HETUS countries in 2002



Note: Age profiles are normalised by per capita GDP in the respective countries.
Source: Own calculations based on HETUS, EU-SILC, SES and Eurostat population data.

APPENDIX L

Age profiles of production and consumption of unpaid household labour and net time transfers in monetary terms by age and gender in HETUS countries in 2002 (continued)



Note: Age profiles are normalised by per capita GDP in the respective countries.
Source: Own calculations based on HETUS, EU-SILC, SES and Eurostat population data.

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