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Reallocation of Resources Across Age in a Comparative European Setting

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Contribution to the Project

This paper considers the reallocation of resources across age based on the results of the National Transfer Accounts (NTA) project. We go beyond the standard NTA methodology by adding gender as a further dimension and including unpaid household work as well.

Keywords: Ageing, challenges for welfare system, demographic change, welfare state

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Reallocation of Resources Across Age in a Comparative European Setting *

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Abstract

We investigate the reallocation of resources across age and gender in a comparative European setting. Our analysis is based on concepts and data from the National Transfer Accounts (NTA) project, as well as on data from income and time use surveys. We introduce the aggregate NTA life cycle deficit as a concept of an economic dependency ratio. This dependency measure allows for flexible age limits and age-specific levels of economic dependency. We then move beyond the current NTA methodology and study gender differences in the generation of income and extend our analysis by unpaid household work. We find large cross-country differences in the age- and gender-specific levels and type of production activities and consequently in the organisation of the resource reallocation across age. Our results clearly indicate that a reform of the welfare system needs to take into account not only public transfers but also private transfers, in particular the services produced within the households for own consumption (e.g. childcare, cooking, cleaning...).

1 Introduction

Persistent low fertility and increasing survival to older ages in combination with the ageing of the baby boom generation are the key determinants of population ageing in many European countries. The consequences of the changing age structure for the overall economic development depend on the design of the economic life cycle, i.e. the age pattern of economic activities such as consumption, the generation of labour income and saving. A typical characteristic of the life cycle in modern societies are phases of economic dependency at the beginning and end of life, in the sense that in these life phases consumption exceeds the income generated through one's own labour input. In childhood and retirement at least part of consumption has to be covered through the reallocation of resources in form of transfers or asset accumulation. A shift in the age structure of the population - as a consequence of the ageing process - asks for an adjustment of the inter-generational transfer system. The current system of the reallocation of resources will be under pressure as an increasing share of elderly people has to be sustained by an ageing and shrinking population in working age.

The underlying economic theory that relates changes in the age structure of a population to the overall economic development dates back to the life cycle hypothesis by Modigliani and Brumberg (1954) and Ando and Modigliani (1963). The life cycle model is concerned with how the savings of individuals lead to the accumulation of wealth at the individual level and of the capital stock at the national level. The savings of individuals rest on the hypothesis of smooth consumption patterns over the course of their lives in the face of varying income. Saving and the accumulation of assets is one way to reallocate resources over age. In most societies transfers play a much more important role than asset reallocations: in childhood transfers are received from the parents, in old age transfers consist mainly of public pensions and publicly financed health- and long-term care services. It is important to understand the mechanisms by which resources are shifted across age groups, as these mechanisms determine whether population ageing leads to the accumulation of assets or to the expansion of transfer programs.

National Transfer Accounts (NTA) offer the method and data to study the economic life cycle at the aggregate level. NTA are built on the System of National Accounts (SNA) and add the age dimension to the SNA. National Transfer Accounts measure how much labour- and asset income each age group generates, how income is subsequently redistributed across age groups through public and private transfers and how each age group uses the disposable resources for consumption and saving. The NTA dataset consists of age-profiles of per capita averages of consumption, income as well as the in- and outflows

of transfers for each age group. Among the 41 NTA countries worldwide¹ are the following 12 European countries: Austria, Finland, France, Germany, Hungary, Italy, Poland, Slovenia, Spain, Sweden, Turkey and the UK. Due to data availability we focus on 10 European countries excluding Poland and Turkey.²

The difference between consumption and labour income is termed the *life cycle deficit* (LCD) and plays a central role in NTA. In childhood as well as in old age the life cycle deficit is positive, i.e. average consumption in these ages exceeds average labour income, while it is negative during the working years when labour income is higher than consumption. The question arises how the life cycle deficit is financed: In how far are young and old people dependent on their families, on the state or their own assets? NTA data are predestined to study the redistribution of economic output between age groups. By multiplying the observed age-specific per capita averages of economic quantities with the corresponding population numbers we obtain a measure for total production and consumption at each age and for the volume of age reallocations. With the discrepancy between consumption and labour income we in particular obtain a measure for the aggregate economic dependency of children and the elderly and the economic surplus of the working age population respectively.

An investigation of the life cycle surplus (LCS, i.e. the negative life cycle deficit of the working age population) is of particular importance. Its size determines to a large extent the potential to reallocate resources to the young and elderly in a society. Our analysis shows on an aggregate level how the LCS differs across gender and how much the different types of production activities compete with each other. Such an analysis is important in order to identify the options for reforming the age reallocation system when faced with population ageing. For instance, an increase in the labour force exit age and the labour force participation of females may not be feasible if the participation in paid labour competes with non-market production activities (e.g. childcare).

We argue that a better understanding of the reallocation of resources across age is necessary to guide any welfare reform in the face of population ageing. In particular it needs to consider gender differences in the type and the intensity of production activities at each age as well as private transfers (including goods and services produced in the households for their own consumption) in combination with public transfers. Through our analysis we obtain a comparative European picture of economic activities carried out by

¹<http://www.ntaccounts.org/web/nta/show/NTA%20Countries>

²For data from Austria, Finland, Germany, Hungary, Slovenia, Spain and Sweden see Lee and Mason (2011). For the Italian data see Zannella (2013). Turkey and Poland joined the NTA project in 2012 and 2013, respectively. For these two countries no NTA dataset is available yet.

each age group. This pattern is influenced by the country-specific institutional settings, established practices, and norms, values and attitudes as well as the current demographic structure. Indeed, it is the combination of these factors that in the end will have to guide a reform of the welfare state in various countries. With this comparative analysis we aim to identify challenges, but also possible strategies and best practice examples regarding the organisation of production and age reallocations.

In this paper we investigate the reallocation of resources across age and gender in a comparative European setting. Our analysis is based on the NTA methodology, NTA-data, as well as on income data from the European Survey of Income and Living Conditions (EU-SILC) and data from the Multinational Time Use Study (MTUS), complemented by Austrian time use data. We start by giving an overview over the NTA methodology in Section 2. Furthermore, the aggregate NTA life cycle deficit is introduced as a concept of an economic dependency ratio here. Different to the commonly used demographic measures like the young and old age dependency ratios³ that are based on fixed age limits and consider only the demographic structure, the aggregate life cycle deficit allows for flexible age limits and age specific levels of economic dependency. NTA data therefore allow to endogenously define the stages of the life cycle (see also Sanderson and Scherbov, 2010).

In Section 3 we move beyond the current NTA methodology and study gender differences in the generation of income, i.e. we introduce gender as a further dimension to NTA. Thus, we are able to present the life cycle deficit for men and women separately. With this analysis we aim to gain further insights into the cross-country differences regarding the gender-specific shape of the economic life cycle. Descriptive statistics on the economic status by age and the economic activities of women after giving birth provide further information on how the specific shapes of the age profiles emerge.

By purely considering paid work, the redistribution of resources across gender would be biased since it ignores unpaid household labour that is on average higher for females as compared to males. We therefore further extend our analysis by unpaid household work in Section 4. Similar to the NTA life cycle deficit we build up an indicator that measures the difference between the production and consumption of goods and services which are produced by unpaid household work in a specific age group. In Section 5 we combine paid work as well as unpaid household work into a measure for total production and consumption at each age and by gender. Section 6 concludes.

³The young age dependency ratio relates the number of people below age 15 to those in working age, as commonly assumed to be the age group 15 to below 65 years of age. Similarly the elderly dependency ratio records the number of the population above age 65 relative to those in working age.

2 National Transfer Accounts

In order to illustrate, measure and compare aspects of the economic life course across countries we use data and concepts from the National Transfer Accounts (NTA) project. The NTA project is a collaborative work of international research teams from 41 countries⁴ and aims at the measurement, analysis and understanding of the macroeconomic consequences of population ageing. At the centre of the project is the development of an accounting system which extends the System of National Accounts (SNA) by information on age - the so-called National Transfer Accounts. These accounts contain age group measures on generated labour- and asset income, its subsequent redistribution in the form of transfers - private and public - as well as the use of resources for consumption and savings.

The values in NTA are consistent with the System of National Accounts which records the generation of income, its subsequent redistribution among institutional units and its use for the total economy. National Transfer Accounts allocate central SNA quantities to age groups and additionally provide estimates for transfers between members of the same household, e.g. from parents to children. The broad estimation strategy for age-specific averages of economic quantities is, first, to derive the aggregate values (e.g. total income, total consumption) from the System of National Accounts and related sources. In the second step the distribution of these quantities over age groups is measured or estimated by using administrative and survey data.

The NTA dataset consists of an extensive number of age profiles containing per capita averages of labour income, asset income, public transfers, private transfers, consumption and savings for each age group. A detailed introduction to the methodology is given in Mason et al. (2009) and in Lee and Mason (2011). The latter furthermore contains a description of the results from many countries. A more detailed description and data for selected countries can be found on the homepage of the project: www.ntaccounts.org. NTA measure economic activities of individuals in a given year. It is important to note that the age patterns represent a cross-section snapshot of the economic activities of each age group and do not represent the actual life course pattern of an average individual.

Aggregate Values in the NTA System: The Relation to the SNA

The aggregate quantities in the NTA are derived from the SNA. The income measure in NTA includes all primary income which is generated by national institutional units

⁴<http://www.ntaccounts.org/web/nta/show/NTA%20Countries>

and represents the resources available in the economy taking depreciation (consumption of fixed capital) into account and before any transfers are implemented. It corresponds by and large to Net National Income (NNI) at basic prices as it is usually defined in the National Accounts.⁵ The NTA methodology distinguishes labour- and asset income, i.e. income generated through the input of labour in production and income generated through the input of capital. The main component of labour income is clearly the compensation of employees, the main component of asset income are the net operating surplus⁶ and the net property income.⁷ Further income components are mixed income, and other taxes (less subsidies) on production which are assumed to be a transfer paid out of labour and asset income. These two components are divided into a labour- and asset part and consequently added to labour- and asset income, respectively.⁸

A large part of the generated resources are redistributed between individuals through public or private transfers. A transfer is defined as “a transaction in which one person provides a good, service or asset to another person without receiving from the latter any good, service or asset in return as counterpart” (adopted from SNA, 2009). Public transfers are those transfers mandated and organized by the public sector: Payments are mainly in the form of taxes and social contributions; benefits consist mainly of public consumption (public transfers in-kind) and social benefits (in cash). Private transfers include flows within the households (e.g. from parents to children), and flows between

⁵Differences between the income concept in NTA and Net National Income at basic prices in the SNA lie in the treatment of *Taxes/Subsidies on Production and Imports*. This tax/subsidy category consists of two components: *Taxes/Subsidies on Products* and *Other Taxes/Subsidies on Production*. In NTA the tax incidence for the latter category is assumed to be on the producer. These taxes less the subsidies are therefore added to the NTA income measure - their payment is regarded as a public transfer paid out of income. However, the other taxes less the subsidies on production are not included in the net national income at basic prices (SNA concept). Another difference between net national production in NTA and the net national income in SNA are the taxes/subsidies paid by the rest of the world (ROW): The NTA net national production does not include the taxes less subsidies which are paid by the ROW as these taxes (less the subsidies) are treated as transfers.

⁶The net operating surplus is the income generated by incorporated enterprises after paying the cost of the labour input, the taxes which accrue during the production process (less the subsidies) and replacing the consumption of fixed capital. It can be interpreted as return to capital in the respective enterprises.

⁷Net property income received from the rest of the world is the net income receivable by the domestic institutional unit for putting a financial asset or a tangible non-produced asset at the disposal of another non-domestic institutional unit. It consists of interest, dividends, rents ...

⁸Mixed income implicitly consists of the remuneration for work done by the owner and the return for the input of the owners capital; it is divided into a labour- and asset share by assuming that two thirds of mixed income is labour income and one third is capital income. For the other taxes less subsidies on production a similar rule is applied: They are assumed to be paid out of labour (2/3) and asset income (1/3) and consequently added to labour and asset income, respectively.

households.

The amount of resources available after the redistribution through transfers is the disposable income, which is available for the purpose of consumption and saving. Consumption in NTA is measured in terms of basic prices. It measures the value of the resources which are used for consumption and therefore does not include taxes on products (e.g. VAT), as taxes represent transfers. The savings measure in NTA corresponds to Net Saving in the SNA. The 2010 values of the NTA aggregates for the included countries are shown in Table A-1.

National Transfer Accounts: Basic Principles and Results

NTA are based on an accounting identity which states that for each individual, and consequently for each age group, the disposable income consisting of labour income (YL), asset income (YA) and net transfers (τ) equals the value of resources used for consumption (C) and saving (S):

$$\underbrace{YL + YA + \tau}_{\text{disposable income}} = C + S \quad (1)$$

For a better graphical presentation of NTA results as well as the motivation of an NTA dependency measure we introduce *available income*, an income measure which represents the amount of resources available for the purpose of consumption and net transfer payments. We split net transfers into a positive part τ^+ , representing a net inflow (in childhood and old age), and a negative part τ^- representing a net outflow (in working age). Available income can then be derived through a rearrangement of the terms in Equation (1)

$$\underbrace{YL + \tau^+ + (YA - S)}_{\text{available income}} = C + \tau^- \quad (2)$$

Available income consists of labour income, net-transfer inflows and *asset based reallocations*. Asset based reallocations are defined as asset income minus savings ($YA - S$) and represent the amount of the economic resources which are generated/reallocated by the accumulation of assets and available for the purpose of consumption and transfer payments.

Available income and its components for Austria 2010 and Slovenia 2004 are illustrated in Figure 1. This figure plots the components of available income (positive y-axis) by age (x-axis): Labour income is represented by the white area, asset based reallocations by the black, public transfers by the light-grey and private transfers by the dark-grey area. The black line represents consumption. Those age groups for which available

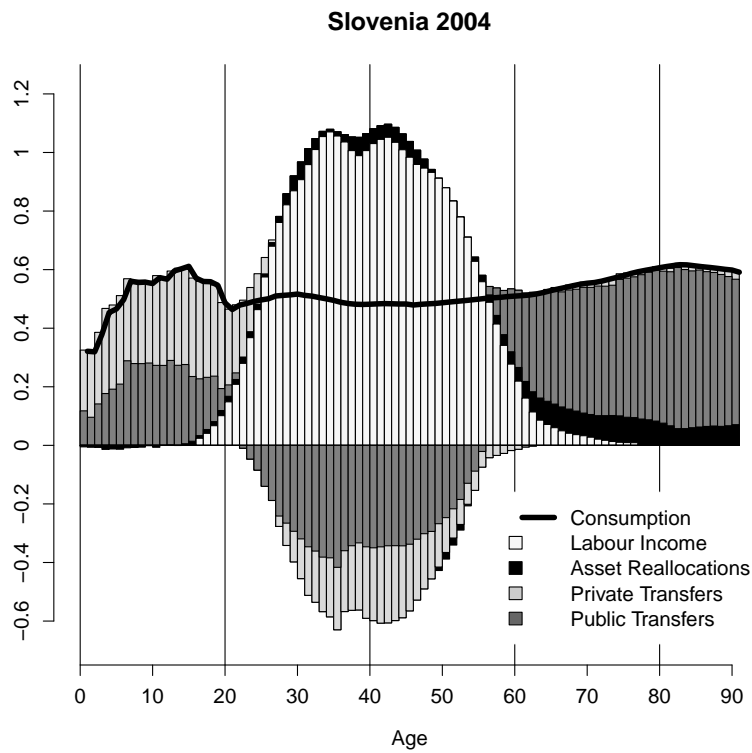
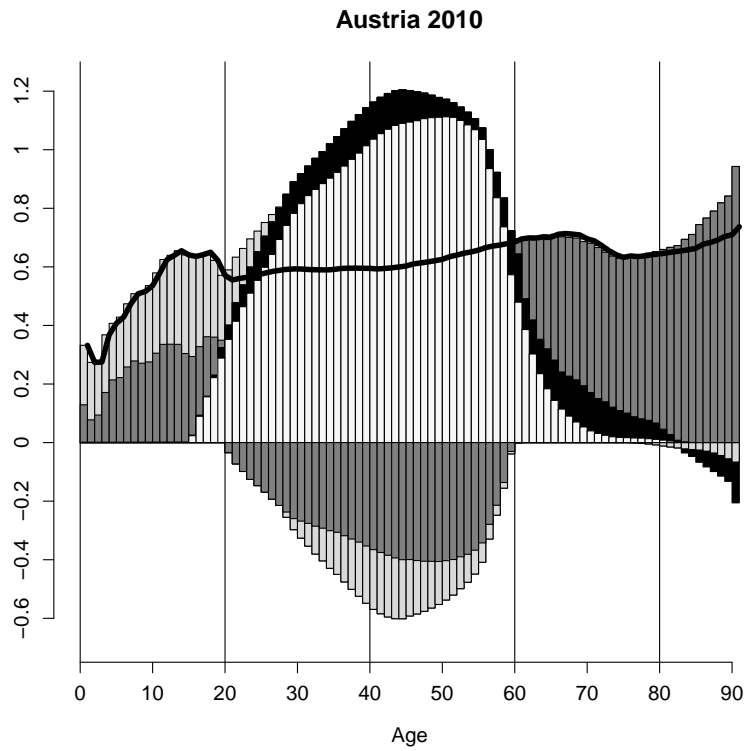


Figure 1: Income, Transfers and Consumption p.c. by 1-Year Age Groups relative to the Average Labour Income Between Age 30 and 49 - Results for Austria and Slovenia

income exceeds consumption support those age groups where available income falls short of consumption. This support either works through public or private transfers. The transfer outflows from the age groups that generate an income surplus are plotted on the negative y-axis in Figure 1. In order to make the values comparable across countries all these quantities are measured relative to the average income in the age group from 30 to 49 years.

The age groups can be divided into three “life-stages” depending on whether the consumption of an age group can be purely financed by own labour income or not. In childhood (until age the age of 23 years in Austria and 24 years in Slovenia) labour income falls short of consumption. Since children have not yet accumulated assets and have very restricted access to credit, they finance their consumption almost exclusively through transfers: Mainly through private transfers (from the parents to the child), but to a considerable extent also through public transfers, e.g. in form of publicly financed education. On the other hand, an average person in working age generates more income than needed for his/her own consumption and is able to support other age groups with this surplus income (i.e. the part of available income which exceeds the own consumption). In higher ages the pattern turns again: The age groups older than 56 years in Slovenia and 58 years in Austria are economically dependent in the sense that the consumption of these age groups is not covered by their own labour income. As they have accumulated assets during their working life, elderly persons finance a part of their consumption through asset based reallocations. However, in Austria and Slovenia the bulk of the consumption of the elderly persons is financed through public transfers such as pensions and publicly provided health- and long-term care services.

As Figure 1 indicates⁹, the qualitative shape of the per-capita age profiles is similar across countries. The economic needs of children and elderly persons are financed through asset based reallocations and through the transfer of the surplus income from the working age population. However, the type and intensity of economic activities at each age, and therefore also the shape of the age profiles differ across countries depend on country-specific characteristics of individuals (such as the level and type of education, labour market entry and exit ages, etc.), institutional arrangements (family policies, labour market regulations, etc.) as well as the overall macroeconomic situation of a country. Also the age structure of the population has a huge influence on the age reallocation of resources. Once we also take the composition of the population into account (and multiply the per capita age profiles by the respective number of people in each age group), we obtain a complete picture of how the current reallocation of economic resources across

⁹See also Lee and Mason (2011).

age is organized within a country. In particular we receive a measure for the total amount of resources which have to be reallocated to children and elderly persons as well as the amount of labour income of the population in working age which can be provided to the dependent population in other age groups.

2.1 An Economic Dependency Ratio: The Life Cycle Deficit

The difference between consumption and labour income in NTA offers a measure for the average economic dependency (if positive) or the economic ability to support others (if negative) at each age and is termed *life cycle deficit* (LCD) (Mason et al., 2006). It can also be derived by an rearrangement of the terms in Equation (1)

$$\underbrace{C - YL}_{\text{life cycle deficit}} = \tau + \underbrace{(YA - S)}_{\text{age reallocations}} \quad (3)$$

As we have illustrated with Austrian and Slovenian data the life cycle deficit is positive in childhood as well as for elderly persons and negative for the population in working age. For a negative life cycle deficit we will also use the term *life cycle surplus* (LCS). In childhood and in old age, when the life cycle deficit is positive, at least a part of consumption has to be financed through *age reallocations*, i.e. through public and private transfers from other age groups or through asset based reallocations such as asset income and dissaving. As indicated in the previous section, in order to obtain a measure for the dependency of the total population in childhood and old age the life-cycle deficit at each age is multiplied with the corresponding population size and added up afterwards. A dependency ratio is then calculated by relating the total life-cycle deficit of the children and the elderly to total labour income. The *aggregate life cycle deficit* measures the consumption of children and the elderly which cannot be financed out of their own labour income as a share of total labour income. This measure reflects both, the population structure as well as the design of the economic life course, i.e. the involvement in production and consumption activities. Likewise we can derive a support ratio by relating the total life cycle surplus (the negative life cycle deficit) of those in working age to total labour income in order to receive the *aggregate life cycle surplus*. It represents the share of labour income which is not consumed by the working age population and available for transfers to other age-groups.

Figure 2 shows aggregate consumption and aggregate labour income for each age group in Austria and Slovenia in percent of total labour income. The light grey area in young and old age represents the aggregate life cycle deficit in young and old age, respectively. The dark grey area in turn represents the life cycle surplus. In particular Austria serves

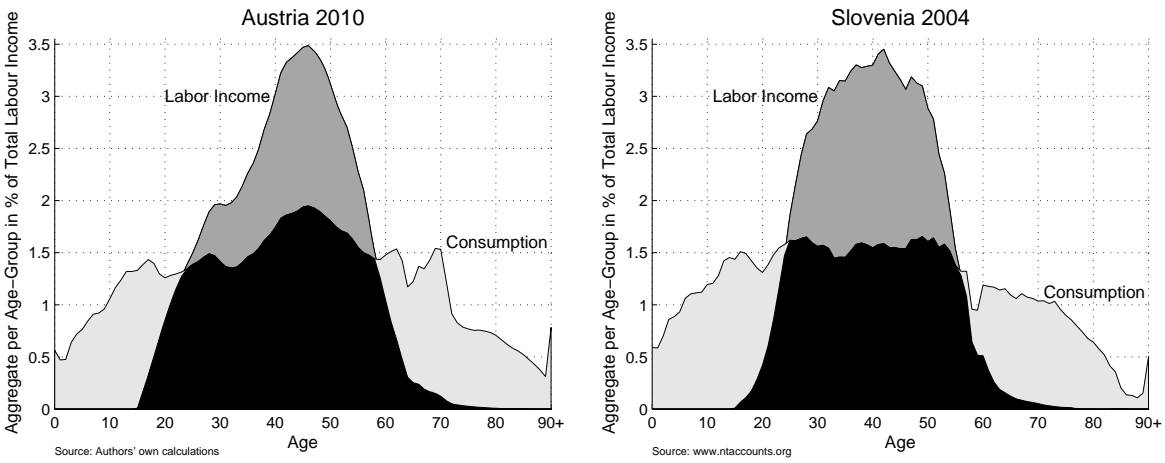


Figure 2: Aggregate Labour Income and Consumption

as an example to illustrate the importance of the age structure of the population: The peak of the labour income between age 40 and 50 represents the large contribution of the baby-boom cohort born in the 1960s. The transition of these cohorts into retirement will require a change in the reallocation of resources. This change has to be accommodated by a change in the age-specific economic behaviour of individuals, thus by a change in the shape of the per capita age profiles (e.g. by extending the working period).

The life cycle deficit in young and old age as well as the life cycle surplus for the European NTA-countries are shown in Table 1. The table also shows the commonly used demographic dependency ratios that are based on fixed age limits and ignore the heterogeneity of economic activities over age: The demographic young age dependency ratio is calculated as the share of the population younger than 15 to those aged 15-64 years, and the old age dependency ratio as the share of the population aged 65+ to those aged 15-64 years. Obviously this indicator gives only a limited and biased estimate of the economic dependency. It neither takes into account the degree of economic dependency nor the degree of the ability to support others. The life cycle deficit in turn reflects the age structure of the population as well as age-specific labour income and consumption. A major advantage is that the age borders between the life cycle stages of dependency and support are not fixed but endogenously determined by the age profiles of consumption and labour income. According to this measure an average young person stays economically dependent almost 10 years longer (up to age 23-26 as indicated by the lower age borders in Table 1) than assumed in the demographic dependency ratios (where the life cycle stage of young dependent people has been assumed to be delimited by the age 15). In old age individuals become economically dependent again about 6 years earlier (in most countries around age 59 as indicated by the upper age borders in Table 1) as compared to the assumed

age limit of 65 years for the demographic dependency ratio.

Table 1: The Aggregate Life Cycle Deficit and -Surplus in Percent of Total Labour Income as Compared to the “Standard” Young- and Old Age Dependency Ratio

Country*	LCD and LCS in % of Total Labour Income			Dependency Ratio in %		Age Borders LCD positive	
	Young (LCD)	Working Age (LCS)	Old (LCD)	Young	Old	until:	from:
Austria 2010	19	31	25	22	26	23	59
Germany 2003	21	31	32	22	27	26	58
Finland 2004	26	30	23	26	24	25	60
Hungary 2005	23	33	23	22	23	24	59
Italy 2008	24	24	30	21	30	26	59
Slovenia 2003	25	41	23	21	22	23	56
Spain 2000	25	31	21	22	25	24	59
Sweden 2003	24	41	22	27	26	24	63

* National Transfer Accounts exist in each country only for specific years, the base year therefore differs across countries.

Sources: Lee and Mason (2011), www.ntaccounts.org

Obviously, the life cycle deficit/surplus is strongly influenced by the age structure: Italy and Germany are the countries with the highest share of the population aged 65+. These are also the countries with the highest LCD in old age, corresponding to 32 and 30 percent of total labour income, respectively, and the highest total LCD (LCD in young and old age combined), corresponding to more than half of total labour income. The values for Sweden make clear that the population structure is not the only determinant of economic dependency (see also Hammer and Prskawetz, 2013): With an old age dependency ratio of 26% Sweden has a rather old population, who in addition has a rather high consumption (cf. also Figure 3). However, the LCD in old age is rather low (22%). The demographic structure and the high consumption in old age are compensated by a higher labour force participation of elderly persons: In Sweden the average labour income exceeds the average age-specific consumption until the age of 63 years, which is 3 to 7 years longer than in all the other countries.

3 The Life Cycle Deficit by Gender

The aggregate life cycle deficit certainly constitutes a major improvement for measuring economic dependency as compared to standard demographic dependency ratios that assume fixed age limits and ignore the heterogeneity of economic characteristics by age. We attempt to gain further insights into the structure of economic activities at each age with a focus on gender differences. For this aim we calculate the life cycle deficit for men and women separately. The large differences between men and women, which we find, are not surprising regarding the gendered distribution of paid work and unpaid household work. We therefore extend the analysis further in Section 4 and include also goods

and services produced by unpaid household work into our analysis. Since our focus in this paper is the comparison of the shape of the life cycle across European countries, we use a standardized population for all of the countries.¹⁰ With the use of a standardized population we control for differences in the population structure across countries.

3.1 Data

Data on labour income by age and sex is taken from the European Survey of Income and Living Conditions (EU-SILC) 2010¹¹. This survey is carried out yearly and includes highly comparable data for all EU member countries. The sample population of the EU-SILC are persons residing in private households. The data contain extensive information on incomes such as wages, income from self-employment, asset income as well as public and private cash transfers. The components of income, which are of interest for us, are those that emerge from the input of labour in production. This includes the gross remuneration of employees, the employers' social contributions and gross income from self-employment. These labour income components are reported as the annual income generated during the income reference period.¹² Beside the information on income the EU-SILC includes a wide range of variables on the socio-economic background, economic activity as well as indicators on social exclusion, poverty and living conditions. We also use information on the self-defined economic status and the household structure in order to gain further insights into the economic behaviour which shape the age profiles of labour income and consumption.

A certain limitation of our data is the fact, that age-specific information on consumption is not available for the same year as on labour income as well as across countries, and by gender. The estimation of age averages for consumption is highly complex as both, public consumption as well as private consumption, consist of many different components for which often only limited age-specific information is available. Consumption age profiles have been estimated by the country teams within the NTA project. Although there is intensive work on gender-specific NTA, consumption age profiles by sex are not available for all of the countries so far. We therefore assume that consumption does not differ

¹⁰The standardized population age-structure is calculated as average age-structure of the included countries, giving each of the countries the same weight.

¹¹We herewith acknowledge data provision by Eurostat and the European Commission respectively. Presented results and drawn conclusions are those of the authors and not those of Eurostat, the European Commission or any of the national authorities whose data have been used.

¹²With the exception of the UK the income reference period in the 2010 survey was the calendar year 2009. In the UK yearly income is extrapolated from smaller and flexible reference periods and refers to the current year.

between men and women and use the age averages provided by the NTA project for both, men and women. While these profiles are not from the same year as the income data, historical NTA data show that the shape of the age profiles changes only slowly with time. Furthermore consumption of adults is rather constant over the whole age range (see Figure 3). We make use of the aggregate values from the year 2010. Thus, the consumption and labour income age profiles are adjusted so that given the population structure in 2010 the ratio of aggregate consumption to aggregate labour income corresponds to the one derived from the SNA for 2010.¹³ For an overview of the 2010 aggregate values of income, consumption and saving see Table A-1 in the Appendix.

3.2 Results

The differences in the gender specific life cycle deficit/surplus across countries can be attributed to a) the shape and level of the consumption age profiles, and b) the shape and level of the labour income age profiles. Consumption and gender-specific income age profiles are plotted in Figure 3. To facilitate the comparison of the age patterns across countries we measure the age group averages relative to the average income in the respective country sample in EU-SILC, which is representative for the population aged 16+ living in private households. This reference value is chosen because the average wage in EU-SILC is also used to value the time used for household production in Section 5.

The shape of the consumption age profiles are rather similar across countries, with the consumption of adults being rather constant over the age range. An exception is Sweden with a strong increase of consumption from age 70 onwards, which can be attributed to Sweden's comprehensive but expensive system of long-term care (see Bengtsson, 2010). Two further specific consumption patterns are the fairly high average consumption of children in Italy, Slovenia and France as well as the - compared to younger adults - higher consumption of persons 56+ in Germany and Hungary. An important factor is the amount of total consumption relative to total labour income. Total consumption exceeds labour income in all of the analysed countries, as part of consumption is financed through asset based reallocations. The ratio of consumption to labour income in turn is influenced by the share of asset income relative to total income and by the savings rate. Table A-1 in the Appendix gives us more information about the generation and use of income in 2010, and therefore also on the share of consumption to labour income: The ratio of total consumption to labour income is rather low in Sweden and Austria as these

¹³As we standardize labour income and consumption across countries by measuring these quantities in relation to the sample average of labour income it is only the relation of consumption to labour income which influences the results. The absolute values are not relevant.

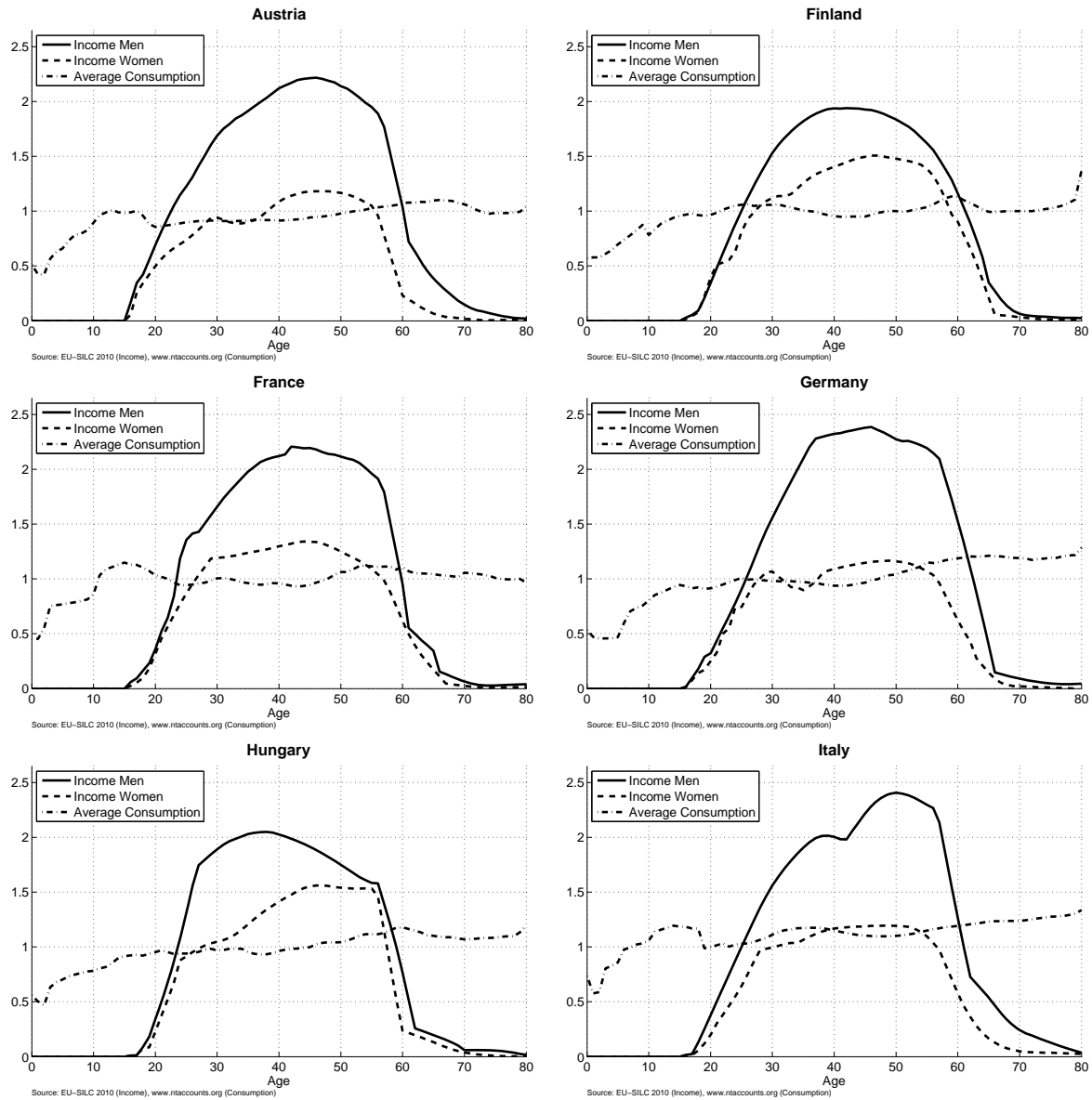


Figure 3: Labour Income and Consumption by Age and Sex in Relation to the EU-SILC Sample Average of Labour Income

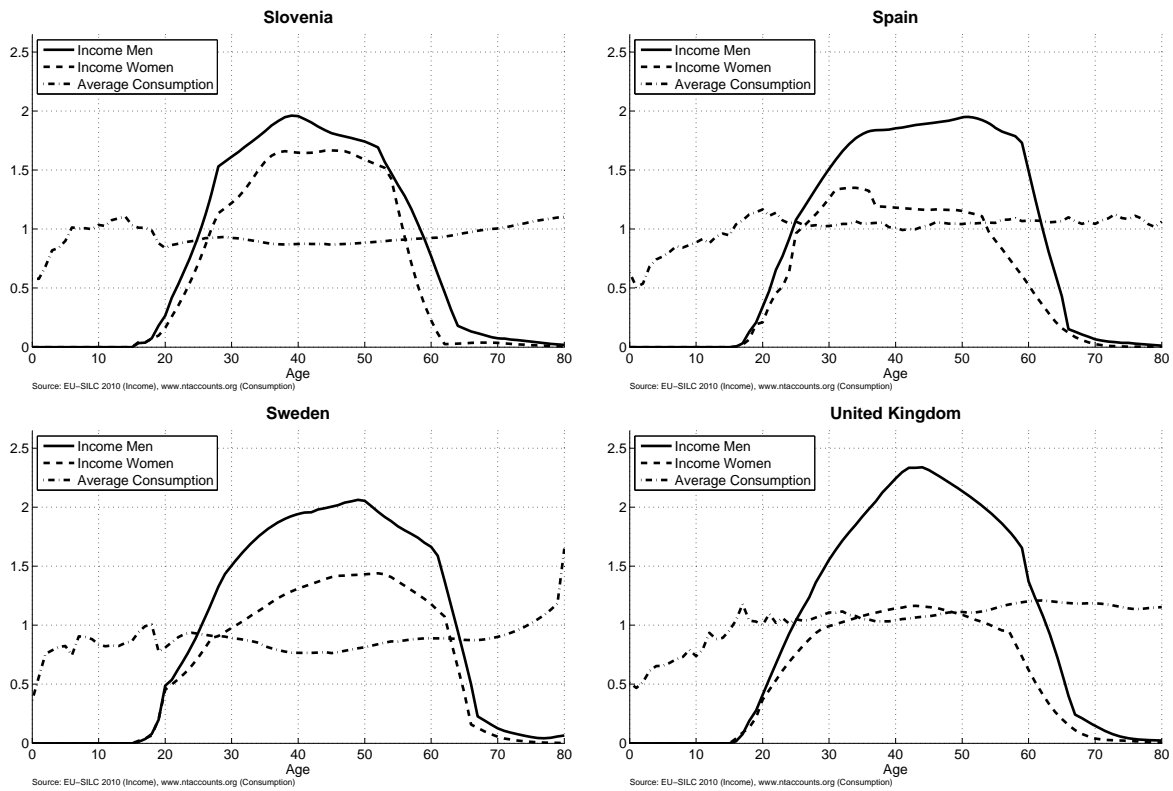


Figure 3: Labour Income and Consumption by Age and Sex in Relation to the EU-SILC Sample Average of Labour Income

are countries with high savings rates. A large part of asset income is saved/reinvested and only a small part used for consumption. The rather low level of consumption relative to labour income in Slovenia is a result of a low share of asset income (of total income) and a moderately high savings rate. The high values of consumption relative to labour income for the other countries can be explained through a combination of a low/moderate savings rate of the private sector and large dissaving of the public sector (in particular in the UK, Spain, France and Hungary). As can be seen from Table A-1 in the Appendix, Italy is an extreme case with a negative savings rate - consumption exceeds labour and asset income altogether. The result is a very high ratio of consumption to labour income and consequently a comparatively large life cycle deficit and low life cycle surplus than in Sweden or Austria, for instance (Figure 3).

The LCD in young and old age for men and women is obviously strongly affected by the shape of the labour income age profile, in particular by the ages at entry and exit from the labour force. In Austria people start generating income at a slightly younger age than in the other countries, but otherwise the income age profiles in young age are quite similar across countries. However, there are considerable differences for the age group 56+ (see Table 2). The two extreme examples regarding the labour participation of elderly persons are Slovenia with a very low average amount of labour income generated by the age groups 56+ on the one hand, and Sweden with a comparable high amount - with a particular large contribution of women - on the other hand. However, the most astonishing differences across countries are in the share of the labour income generated by women as compared to the labour income of men. In most of the countries the average labour income of women is considerably lower than that of men. An exception is Slovenia, where the difference between the labour income age-profile of men and women is low. The difference is also comparably small in Finland, Sweden and Hungary (see Figure 3).

The information on the distribution of income by sex and age which is provided by the age profiles is comprehensively summarized in Table 2. The values show the contribution of men and women (in four age groups) to total labour income in the economy. That is, we multiply the per capita age group averages of labour income with the respective (standard-) population to receive a measure for total labour income of these groups. We then calculate the contribution of each of these groups as a share of total income. The population aged 25 and less contribute a rather similar share to total labour income in all countries. As already mentioned, an exception is Austria where due to an early entry into the labour market the share (9.3 percent) is somewhat higher than in other countries. The differences in old age are higher: While the age group 56+ contributes 19 percent to total labour income in Sweden, the share is only 8.5 percent in Slovenia. Remarkable are

the cross-country differences in the share of labour income contributed by women: While the labour income of women amounts to only about one third of total income in Austria and Germany, it is more than 44 percent in Slovenia, around 43 percent in Finland and around 41 percent in Hungary and Sweden.

Table 2: The Generation of Labour Income by Age and Sex in Percent of Total Labour Income

Austria				Finland			
	Men	Women	Total		Men	Women	Total
<= 25	5.7	3.6	9.3	<= 25	3.4	2.8	6.2
26 - 40	23.5	11.7	35.1	26 - 40	21.1	14.7	35.9
40 - 55	28.6	15.3	43.8	40 - 55	24.1	19.1	43.2
56+	8.6	3.1	11.7	56+	8.2	6.5	14.7
Total	66.3	33.7	100.0	Total	56.9	43.1	100.0
France				Germany			
	Men	Women	Total		Men	Women	Total
<= 25	4.1	2.9	7.0	<= 25	3.2	2.5	5.7
26 - 40	22.8	14.5	37.3	26 - 40	23.0	12.0	35.0
40 - 55	27.3	16.2	43.5	40 - 55	29.7	14.6	44.2
56+	7.5	4.7	12.2	56+	10.5	4.6	15.1
Total	61.7	38.3	100.0	Total	66.4	33.6	100.0
Hungary				Italy			
	Men	Women	Total		Men	Women	Total
<= 25	3.9	2.8	6.7	<= 25	3.5	2.0	5.5
26 - 40	24.8	14.4	39.1	26 - 40	21.8	12.7	34.4
40 - 55	23.8	20.1	43.9	40 - 55	29.3	15.3	44.6
56+	6.1	4.2	10.3	56+	10.7	4.8	15.5
Total	58.5	41.5	100.0	Total	65.2	34.8	100.0
Slovenia				Spain			
	Men	Women	Total		Men	Women	Total
<= 25	3.2	2.1	5.3	<= 25	3.7	2.6	6.3
26 - 40	22.8	18.0	40.7	26 - 40	21.8	15.9	37.7
40 - 55	23.8	21.6	45.4	40 - 55	26.0	15.4	41.5
56+	5.9	2.7	8.5	56+	10.3	4.2	14.5
Total	55.6	44.4	100.0	Total	61.9	38.1	100.0
Sweden				United Kingdom			
	Men	Women	Total		Men	Women	Total
<= 25	3.3	2.7	5.9	<= 25	3.8	2.8	6.6
26 - 40	20.0	12.8	32.8	26 - 40	22.4	12.7	35.1
40 - 55	24.7	17.5	42.2	40 - 55	28.6	14.4	42.9
56+	11.0	8.0	19.0	56+	10.4	4.9	15.3
Total	59.0	41.0	100.0	Total	65.2	34.8	100.0

To facilitate the comparison across countries a standard population is applied for all countries.

Source: EU-SILC 2010; Authors' own calculations

With this comprehensive information on the level as well as the distribution of income and consumption by age and sex we are equipped to understand the results of the aggregate life cycle deficit/surplus by gender shown in Table 3.¹⁴ There are remarkable differences

¹⁴The results are different from those shown in Table 1. These differences can be explained by the different data sources implying different time points as well as the application of a standard population for Table 3.

across countries as a result of the differences in the level and shape of the age profiles: The LCD in young and old age is among the highest in Italy, reflecting the high consumption expenditure relative to labour income. In old age the LCD is lowest in Sweden, which is due to the overall low consumption as a share of labour income (despite the increase in old age) and the high contribution of the age group 56+ to labour income. In particular women in this age group contribute more than in other countries. Remarkable are also the differences in the age-borders between a positive and negative life cycle deficit.¹⁵ An average person in Sweden covers his/her consumption by own labour income until the age of 63 years, while the corresponding age is 57 years in Hungary and Slovenia. A more detailed picture on the LCD by gender is given in Figure 4.

There are huge gender differences across countries in the generation of the life cycle surplus. Outstanding are Slovenia and Sweden where the working age population generates a large surplus income which can be reallocated to other age groups. In these two countries it is mainly the large contribution of women to total labour income which explains the result.

The cross-country differences in the share of women's labour relative to the income of men can be explained by the differences in their labour force participation. In virtually all of the countries men between the age of 30 and 49 years are - if not unemployed - full time employees. The labour force participation of women differs greatly across countries, but also across age within countries. Table A-2 shows the self-defined economic status of women by 10 year age groups. It is clear that in those countries with a low gender gap in the average labour income the majority of women work full time. The low share of female labour income in the other countries arises through a combination of a high prevalence of part-time work and a high share of women who report that their main activity is fulfilling domestic tasks and care responsibilities. These differences can be ascribed to differences in labour market behaviour of women after giving birth to a child and are closely connected to the country-specific institutional environment. Figure 5 plots the income of women relative to the average labour income of men in the age group 30-49 by the age of the youngest co-residing child, Table A-3 shows the corresponding composition of activity statuses. In Sweden, Finland and Slovenia women reduce paid work in the first 1-2 years after giving birth to a child but return to paid work rather fast and mostly full-time¹⁶. Such a pattern can also be observed for Hungary, where

¹⁵We do not report the gender-specific age borders, because for women the LCD can become positive also during working life, see e.g. Austria and Germany

¹⁶The drop in labour income becomes visible only at age 1 of the youngest child, since the labour income at age 0 includes a woman's labour income that has been generated in the income reference period before the child has been born.

Table 3: The Aggregate Life Cycle Deficit and -Surplus by Gender in Percent of Total Labour Income

Country	Sex	LCD and LCS in % of Total Labour Income			Age Borders LCD positive	
		Young (LCD)	Working Age (LCS)	Old (LCD)	until:	from:
Austria	Women	11	3	18	23	59
	Men	10	30	10		
	Total	20	31	26		
Finland	Women	12	9	15	26	59
	Men	12	20	9		
	Total	24	29	25		
France	Women	12	6	15	23	59
	Men	12	27	10		
	Total	24	32	24		
Germany	Women	11	2	18	26	60
	Men	10	30	10		
	Total	21	31	28		
Hungary	Women	11	9	18	23	58
	Men	11	24	12		
	Total	22	33	30		
Italy	Women	16	1	19	26	59
	Men	14	25	11		
	Total	29	24	29		
Slovenia	Women	14	16	18	25	58
	Men	14	23	11		
	Total	28	39	28		
Spain	Women	14	4	18	25	60
	Men	14	23	10		
	Total	27	25	25		
Sweden	Women	11	12	13	25	64
	Men	11	29	8		
	Total	22	41	21		
UK	Women	12	1	18	26	59
	Men	11	25	10		
	Total	23	24	26		

To facilitate the comparison across countries a standard population is applied for all countries.

Source: Authors' own calculations based on EU-SILC (income) and data from the NTA project (consumption).

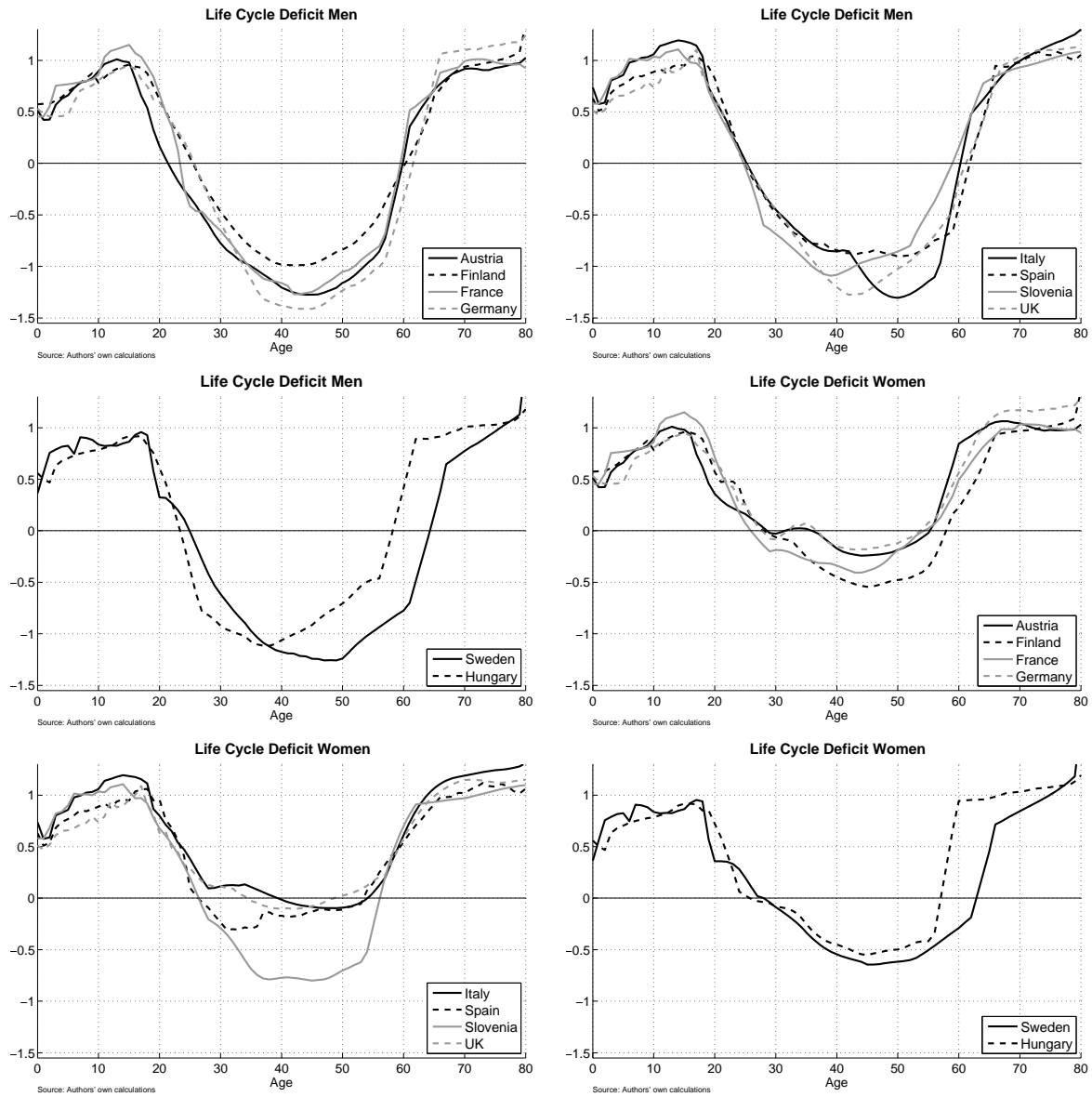


Figure 4: The Life Cycle Deficit in Relation to the EU-SILC Sample Average of Labour Income

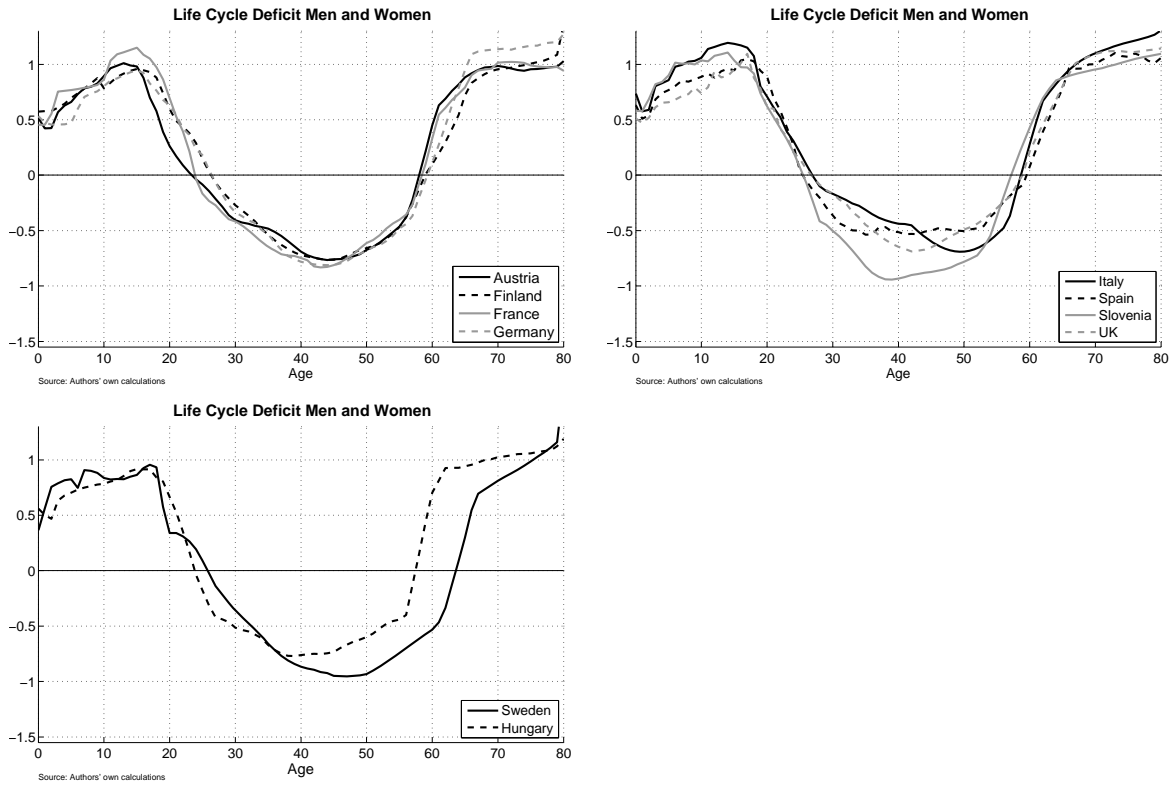


Figure 4: The Life Cycle Deficit in Relation to the EU-SILC Sample Average of Labour Income

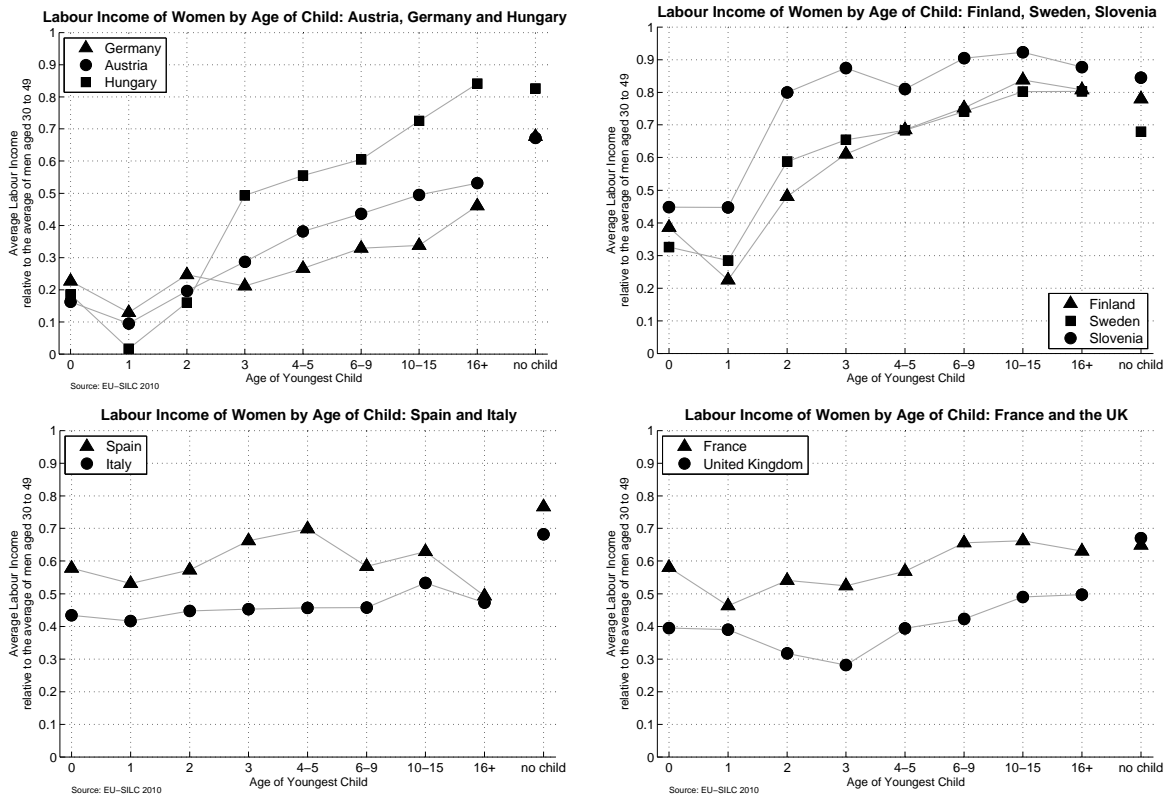


Figure 5: Labour Income by Age of Youngest Child

women with older children are mostly employed full-time. We have to be aware however, that these differences in the labour market participation across age might reflect a cohort effect. Hence, the behaviour of currently young mothers might be different when their child grows older. In addition, part of the increase in labour income with the age of the youngest child may be ascribed to a seniority effect, i.e. reflect the increase in wages due to ageing (of mothers here). Germany and Austria are countries where almost all of the women drop out of the labour force in the first 2-3 years after giving birth to a child and re-enter the labour force slowly, and to a large degree part-time. In Italy, Spain, France and the UK the level of mothers' labour income does not seem to be related to the age of the youngest co-residing child. In these countries (with the exception of France) as well as for Germany and Austria the level of labour income for women with co-residing children is considerably lower as for women who do not live with own children in the same household (the category "no child" in Figure 5). The comparison group "no child" consist of women between the age of 25 and 55 who are not students, not retired and who do not live together with their own children.

4 Non-market household production

The life cycle deficit as it is calculated in the previous section underestimates the actual contribution of women. In virtually all countries women spend on average notably more time on unpaid household work than men, who in turn devote more time to paid work (see e.g. Miranda, 2011). However, there are pronounced cross-country differences in the share and level of unpaid work carried out by women. These differences have been documented and analysed in a large number of comparative studies on the gendered distribution of production activities (see e.g. Gimenez-Nadal and Sevilla, 2012, for an analysis of changes over time). Several studies analyse how the national context and welfare state arrangements shape the distribution of unpaid household work. One way is by providing or denying access to resources and opportunities, e.g. to parental leave, child benefits, childcare facilities or survivor benefits. Hook (2010) for example finds that long parental leaves are positively related to gender specialization and lower contributions of men to household work. She suggests that paternity leave not only boosts the involvement in housework and childcare in the short, but also in the long run as fathers acquire skills as caretaker and the paternity leave fosters the relation between the father and children. The macro-level environment influences the level and distribution of household work by shaping social norms and attitudes. Geist (2005) shows with data from the International Social Survey Program that in conservative welfare state regimes (Austria, Germany, Mediterranean Countries) it is more rare for couples to share housework equally than in social-democratic regimes (Scandinavian countries), which explicitly promote gender equity.

Most measures of production ignore a large part of the goods and services which are produced by unpaid household work, in particular also the SNA. It covers the some of the goods and services produced by households for own use, e.g. own account construction of dwellings or food produced for own use, but ignores the bulk of household production such as cleaning, cooking or childcare. The output of these production activities is difficult to measure and assess, because the goods and services are not traded on the market and therefore do not have a market price. Nevertheless, there is widespread agreement that this type of production should be included also into the SNA (see e.g. Stiglitz et al., 2009). A shift of production from the household to the market (e.g. the preparation of meals) or to the government (e.g. childcare) should not affect the output measure here. To not obscure the measures in the core accounts of the SNA which have a solid basis on observed market transactions, household production which is not covered in the SNA is suggested to be introduced in the SNA through satellite accounts (e.g. Abraham and Mackie, 2005). The so-called “satellite accounts” are consistent with the system of

SNA and expand the production boundary without interfering in the core accounts. An extension of the production measure by non-market production is especially important for NTA: A large part of the goods and services produced within the households for own consumption, i.e. by one household member, is enjoyed and consumed by other household members. This is obvious in the case of childcare, but also cleaning, washing and cooking activities are usually carried out also for other household members.

As this kind of output is difficult to observe, non-market production of the households for own consumption is valued by an “input approach”. Since time constitutes the most important input, the measures are mainly based on time use surveys. This approach is also used in NTA: We measure non-market production by the time used for non-market production activities. Consumption of these goods and services is estimated by using information of total production in the household and the household composition.

4.1 Time Use Data: The Multinational and Austrian Time Use Survey

This part of our analysis is based on data from the Multinational Time Use Survey (MTUS)¹⁷ (Gershuny et al., 2012) and the Austrian time use survey from 2008¹⁸. MTUS contains data from about 60 diary based time use surveys in 20 countries. Participants fill out diaries with predefined time slots (between 5 and 30 minutes) for which the respondent reports the activity he/she is carrying out during that period. This information is later coded in terms of categories of activities. As the design and the coding of activities is different across surveys these data are harmonised within the MTUS to enable and facilitate comparisons across time and countries. Beside variables on the socio-economic background and household structure the MTUS includes the time used on the survey day(s)¹⁹ for 51 different categories of activities. We use the most recent survey for those countries who are also member of the NTA project: Germany (2001), Finland (1999)²⁰, France (1998), Italy (2002), United Kingdom (2000)²¹, Slovenia (2000)

¹⁷This document presents results drawn from the Multinational Time Use Study (MTUS), but the interpretation of this data and other views expressed in this text are those of the authors. This text does not necessarily represent the views of the MTUS team or any agency which has contributed data to the MTUS archive. The authors bear full responsibility for all errors and omissions in the interpretation of the MTUS data.

¹⁸STATISTICS AUSTRIA, Time Use Survey 2008/09 (developed on behalf of the Federal Minister for Women and Public Services)

¹⁹While there are diaries for 2 days for each observation in Slovenia, Finland, Sweden, the UK and Germany, it is one day in the other countries.

²⁰We thank Statistics Finland for the provision of data access.

²¹There is a survey from 2005 for the UK, but his survey does not contain all the required information on the household structure.

and Spain (2002)²². Furthermore, we make use of the Austrian time use data from 2008, which is not yet included in the MTUS database. We could unfortunately not make use of the Swedish data, as the Swedish survey contains only one member of each household. The estimation how the goods and services produced by unpaid work are redistributed within the household requires time use information about all, or at least most of, adult household members.

While the MTUS data is well-suited to give an overview and analyse otherwise often neglected production activities, smaller differences between surveys and age groups have to be interpreted with care. There are large methodical differences across surveys such as the length of time slots in the diary, the coding of variables and the collection of variables on the socio-demographic background. These differences are likely to influence the results, in particular the total amount of time devoted to a certain group of activities.

4.2 Methodology

The estimation of household production activities by age is straight forward: We simply take the average minutes devoted to these production activities by single years of age. Household production includes the categories cook/wash up, housework (laundry, cleaning activities), other domestic work (repair, paperwork, pet care, care for adults), gardening, shopping, childcare and travel related to these activities.

Moreover, we aim at gaining estimates for the consumption of these goods and services which are produced by unpaid household work. As most of the time use data includes only household members above the age of ten (France 15+, Italy 3+ and UK 8+) we cannot get estimates for the goods and services that are consumed by children. In particular are the bulk of childcare activities enjoyed by the children in the first years of their life, the amount of consumption is therefore strongly dependent on the age of the child. In order to maintain comparability across countries, we report estimates for consumption only for the age groups 15+ and assume that childcare services are completely consumed by persons below the age of 15 years.

The basic assumption regarding the consumption of goods and services emerging from non-market household production (excluding childcare) is, that these goods and services are distributed within the household in equal shares, i.e. every household member consumes the same amount. This assumption is necessary since it is not observable how much each member of the household really consumes. It is also justified as many of

²²The survey from Spain 2002 does not include the Basque country. The Basque survey has been carried out separately from the rest of Spain and does not include required information on the household structure.

the goods and service have public good character within the households in the sense of non-rivalry and non-excludability (e.g. having a clean flat, having an attractive garden). Assigning the consumption of these goods to certain household members is neither possible nor sensible.²³ To calculate the consumption of goods and services produced by household members we sum up the total time which is spent to produce these goods and services and equally divide it among all household members.

4.3 Results

The averages of time devoted to non-market household production by age and sex are plotted in Figure 6. There are two peaks in the age profiles for women: One in the age groups around 30-35 years and another one in the age groups from 60-70 years. The first one emerges from childcare as in these age-groups there is a high number of women who have small children. The peak in retirement age emerges as part of the time which is used for paid work in other age groups is replaced by household production. For women the level of time use for household work is quite similar in Austria, Germany, Finland, France and the UK, where adult women on average devote about 5 hours (300 minutes) daily to non-market production activities (a bit more in the ages of peak non-market activities, a bit less from about 40 to 55). In Spain women spend around 1 hour more in non-market production activities (around 360 minutes) and in Italy almost two hours more than in the other countries (around 400 minutes). Slovenia is exceptional: There is a smaller peak in childbearing age but a larger peak around the age of 60. Women in these age groups spend, similar as in Italy, on average almost 7 hours a day in non-market production activities. For men the picture is somewhat different: They do most of household work in retirement, when they devote between 3 and 4 hours to unpaid work. Their contribution is over the whole age-range comparatively high in Slovenia and rather low in Italy, Spain and France.

The consumption of goods and services which are produced by the household members for their own consumption is rather constant until the age of 50 with a slight reduction at the age of 35, when due to the presence of children the household size is larger and household production has to be distributed over a larger number of persons. It peaks in old age, indicating that the larger amount of non-market production in old age is consumed by the elderly person themselves and does not represent a transfer to other

²³The assumption that the goods and services produced by unpaid household work are shared by the household members is simplifying also in another dimension: Unpaid production can also be carried out for members of another household. While most national time use surveys include an indicator if an activity is also carried out for another household such information is not included in the version of MTUS we are using.

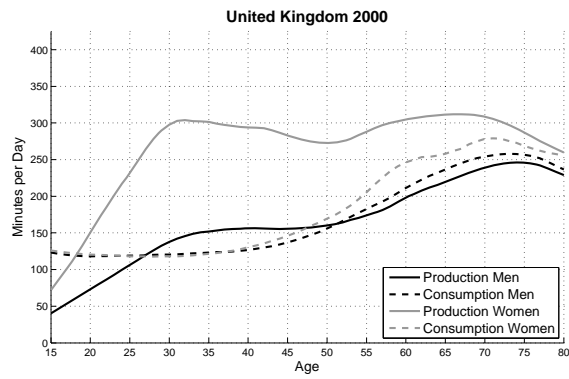
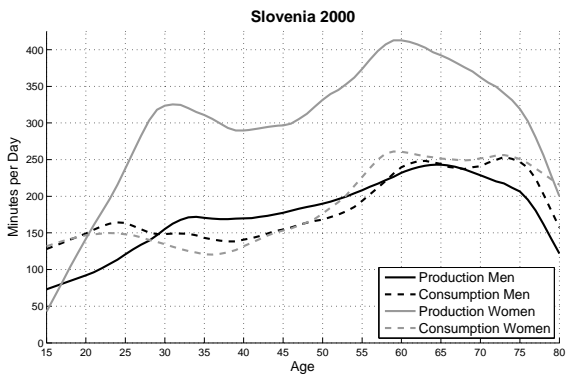
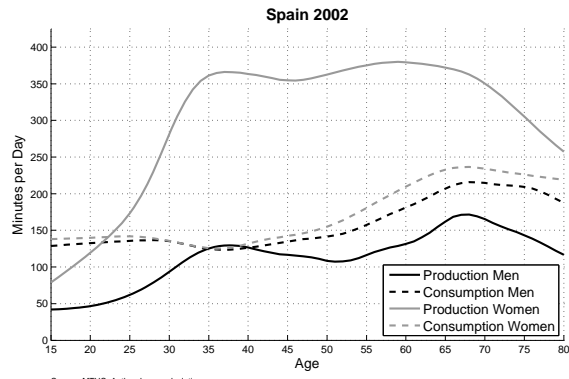
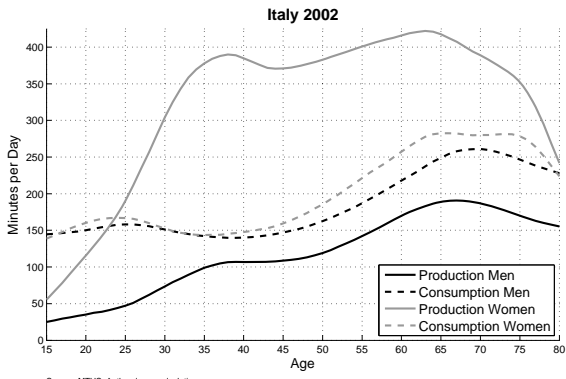
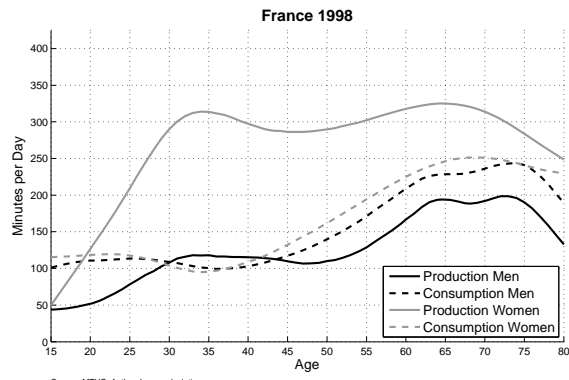
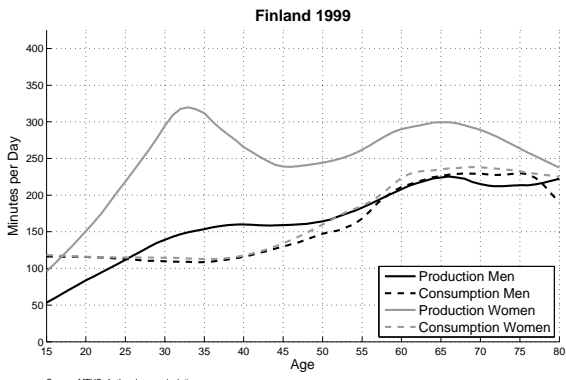
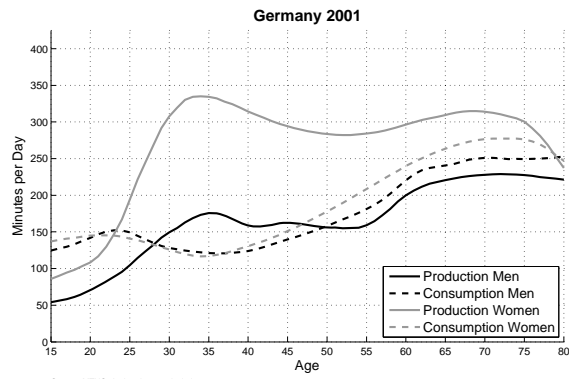
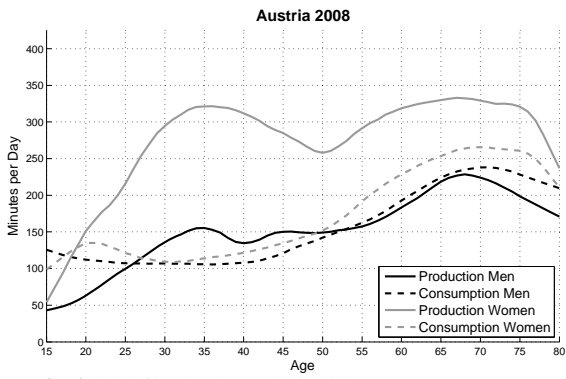


Figure 6: Unpaid Work: Production and Consumption in Minutes

generations and age-groups.

With this information we can calculate the LCD at each age for non-market work by subtracting the production from the consumption age profile. The result is plotted in Figure 7. While the LCD for men is comparably moderate in Austria, Germany, Finland, Slovenia and the UK, it reflects the low contribution to unpaid household work in France, Spain and Italy. In Italy the LCD stays positive over the whole age range. Hence, an Italian man consumes on average at each age more non-market goods and services than he produces. Women in turn produce more non-market goods and services than they consume with the exception of the teen ages. While the shape as well as the level of the time use LCD is similar in most of the countries, the time use LCS (negative LCD) for women is much larger in Spain and Italy. Interesting is the shape for Slovenia: While it is similar to the other countries until the age of 45 years, the LCS remains large also in the age groups of the elderly, even more so for women. Since in Slovenia also the time use LCD for men is not especially high it is an indication that the high labour force participation of women in Slovenia is supported by transfers of non-market goods and services from retirees to the younger age groups.

With the exception of the childbearing ages for women people devote most time to unpaid household work around the age of 65 years, when they partly replace paid work with non-market production activities. When they live in the same household as their children part of these production activities is assumed to be consumed by children, reflected in the negative LCD in old age. Hence, while elderly parents receive (public) transfers from their children, they provide resources through non-market household production. An important factor influencing these results is the household structure. As we assume that transfer flows in form of non-market production of goods and services occur only within the households, intergenerational flows are only possible if several generations live together. There are huge cross-country differences in the share of persons aged 60-70 who still live together with their children (Table 4). The share is highest in Slovenia (28%), Italy (35%) and Spain (40%), which explains the lower LCD of the age group 61-70 years in these countries. An overview of the aggregate time use LCS as well as the (old age) LCD by gender and corresponding age limits can be found in Table A-4 in the Appendix.

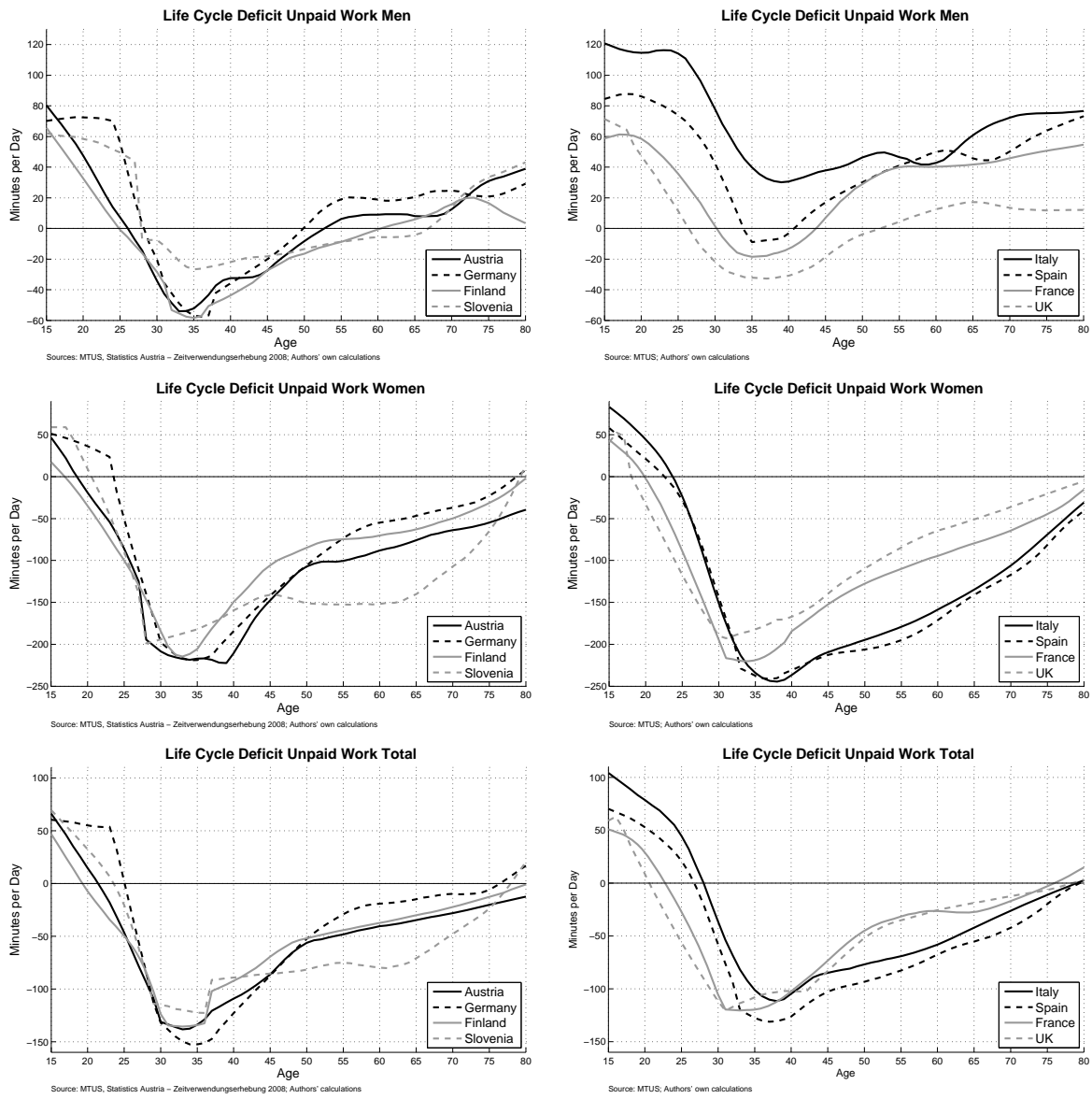


Figure 7: Unpaid Work: Life Cycle Deficit of Men and Women in Minutes

Table 4: Percentage of Persons Living With Own Child

Percentage of Persons Living With Own Child							
Country/Age	<= 20	21-30	31-40	41-50	51-60	60-70	71+
Austria	2	31	72	70	38	16	17
Germany	1	24	66	62	26	6	8
Spain	3	20	65	80	65	40	33
Finland	2	31	70	69	24	5	9
France	2	34	78	72	32	9	9
Italy	2	25	65	75	61	35	20
Slovenia	1	29	84	87	55	28	22
UK	4	31	73	76	43	14	10

Source: EU-SILC 2010

5 The Life Cycle Deficit Including Market- and Non-Market Production

In the next step we combine both, market and non-market production into one single measure. The usual approach is to value the time used for non-market production in monetary terms. It is generally suggested to use wage rates which would be obtained on the market for similar activities (e.g. European Communities, 2003). As in MTUS the activity categories are quite general and include many different tasks, we use the same wage for all of the household production activities in our analysis. The wage we apply to value unpaid work corresponds to the average hourly net income of a worker in the age group 30-49 years within a country.²⁴ This approach has the advantage that it is comparable across countries and does not obscure the results by differences in the wage rates across occupations.

The measures for total production and total consumption at each age are plotted in Figure 8. As expected the gender differences are clearly lower as compared to the life cycle deficit calculated only for market production in Section 3. According to this measure women in Spain have a higher income than men. They devote considerably more time to production activities than men and are thereby able to compensate for the lower valuation of an hour of household work as compared to one hour of paid work (paid work is calculated gross and also includes taxes paid in the production process). The total contribution of women is also higher in Slovenia as the differences in the average labour income between men and women are low and women devote somewhat more time to household work than men - they do a second shift (Hochschild and Machung, 1989). For the other countries a gender gap remains. However this does not imply that women engage less in production activities. Indeed, in most countries women are involved in production activities to the same extent as men. The size of the gap depends on their share of household work and its valuation.

Table 5 shows the life cycle surplus of those in working age and the life cycle deficit in old age by using the total income from market and non-market production. The aggregate LCD of the elderly is smaller compared to the values in Table 3, as elderly

²⁴The average hourly net income is calculated from EU-SILC by dividing the average weekly gross income through the average number of working hours. The gross-net conversion was made using EUROSTAT data on net earnings and tax rates. However, the information on working hours corresponds to the survey period and not necessarily to the income reference period. We restrict the analysis to the age group 30-49 years because we assume that in this group changes in the employment status between the income reference period and the survey are low. Information on the employment status during the whole income reference period is unfortunately not available for all of the countries.

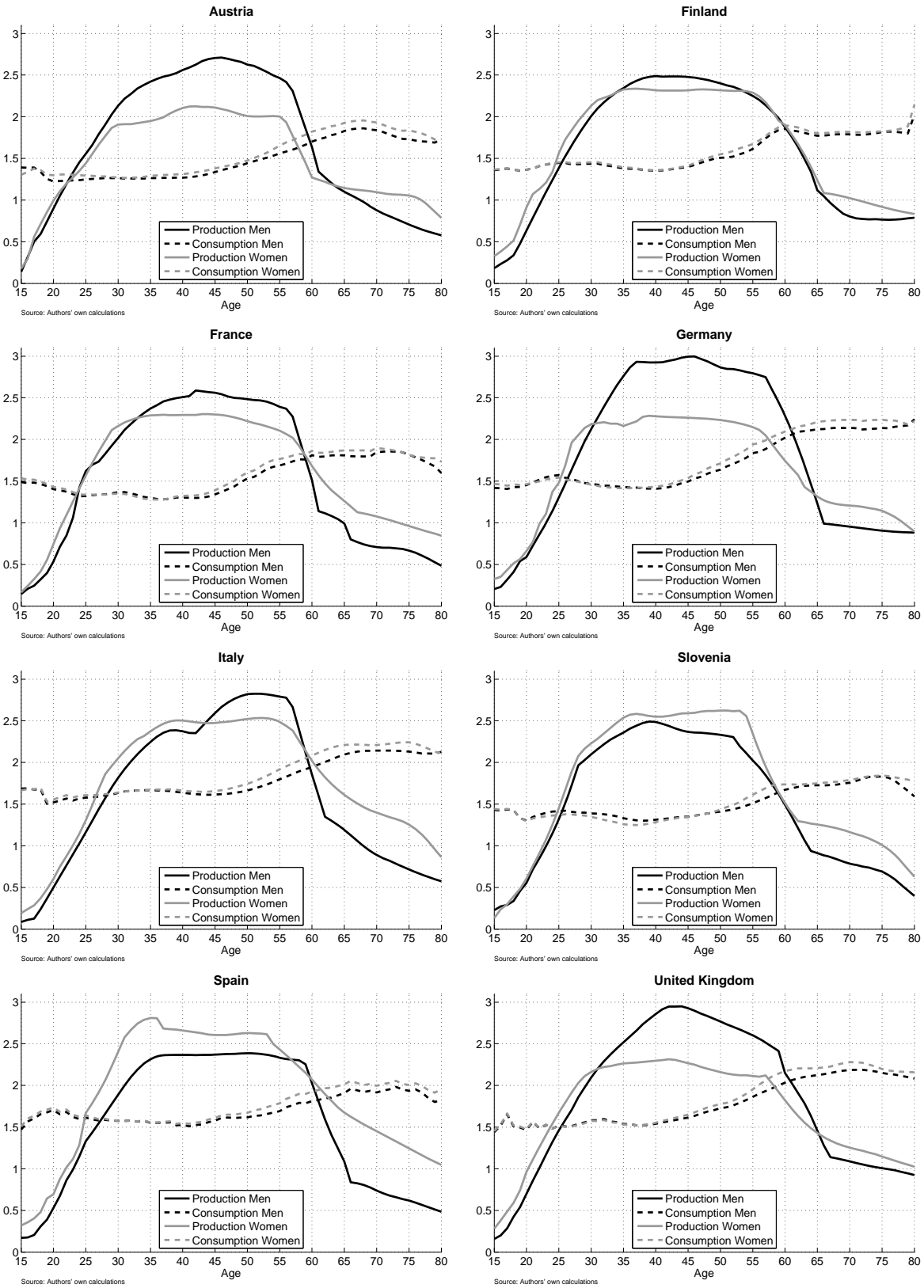


Figure 8: Market and Non-Market Production and Consumption by Age and Sex relative to the EU-SILC Sample-Average of Labour Income from Paid Work

persons generate slightly more resources through unpaid work as they consume and the inclusion of household production increases the generated income. This in turn decreases the aggregate life cycle deficit of the elderly as a share of total income.

The consideration of non-market work “flattens” the increase of the LCD around the age of 60 (Figure 9) for women as they partly replace paid work with unpaid household work. These goods and services are not only produced by themselves but constitute a transfer to their partner and, if they live in the same household, to their children. The age borders which separate the LCS from the LCD for women are therefore higher as compared to the pure results for market work in Section 3.

Table 5: The Aggregate Life Cycle Deficit and -Surplus for Paid and Unpaid Work by Gender

Country	Sex	LCD and LCS in % of Total Labour Income		Age Borders LCD positive	
		Working Age (LCS)	Old (LCD)	until:	from:
Austria	Women	10	8	23	58
	Men	18	6	22	60
	Total	28	14	22	59
Finland	Women	12	7	24	61
	Men	13	6	25	61
	Total	26	13	24	61
France	Women	12	7	23	59
	Men	16	7	23	60
	Total	28	14	23	59
Germany	Women	9	9	25	58
	Men	17	6	26	62
	Total	26	15	25	60
Italy	Women	10	7	26	60
	Men	11	8	28	60
	Total	21	15	27	60
Slovenia	Women	17	7	24	59
	Men	14	6	25	59
	Total	28	13	24	59
Spain	Women	14	5	24	62
	Men	10	6	27	61
	Total	24	11	25	62
United Kingdom	Women	8	8	23	58
	Men	14	5	24	61
	Total	22	13	23	60

Source: Authors' own calculations

Note: Information on the “Young (LCD)” cannot be provided, as individuals aged 15 years and younger are not included in the time use surveys.

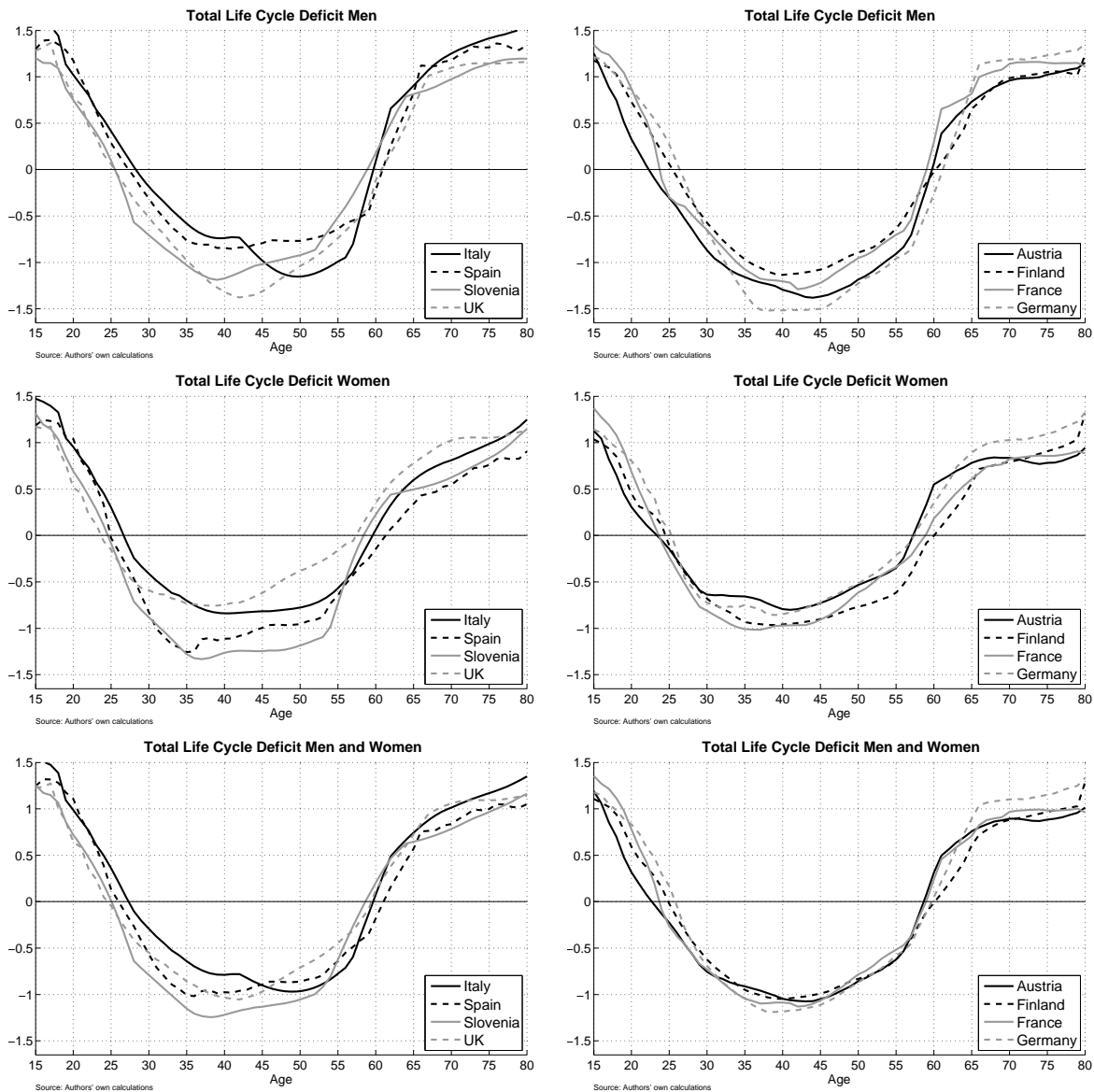


Figure 9: The Life Cycle Deficit for Market and Non-Market Production relative to the EU-SILC Sample Average of Income from Paid Work

6 Conclusions

The current welfare system consists to a large degree of transfers from the active population to the young and in particular to inactive elderly persons. Faced with population ageing the funding of this system is under pressure in virtually all European countries. However, the consequences of population ageing for the overall economic development and in particular for public finances not only depend on the extent of demographic change, but are to a large extent determined by the design of the economic life cycle, i.e. by the relation between the age of individuals and their economic activities. In this paper we compare several European countries using indicators for the economic dependency of the population in young and in old age. As our analysis is based on data from the National Transfer Accounts project we include in our analysis those countries that are also members of this project and which have created an NTA dataset: Austria, Germany, Hungary, Italy, France, Finland, Slovenia, Spain, Sweden and the UK.

In contrast to the commonly used demographic dependency ratios that apply fixed age limits to separate the life cycle stages of dependency and the working age, we introduce economic dependency ratios that are built on data of age-specific averages of consumption and labour income extended by the time used for unpaid work. Our measure of economic dependency - the life cycle deficit - is defined as the difference between consumption and labour income. This measure is positive in childhood and in old age, and negative in working age. The life cycle stages of economic dependency are characterized by a positive life cycle deficit, and working ages by a negative life cycle deficit, i.e. a life cycle surplus. The aggregate life cycle deficit is calculated as the total life cycle deficit of the young, respectively the old population in relation to total labour income. Analogously we calculate the aggregate life cycle surplus as the total life cycle surplus relative to labour income.

In a first step we calculate the LCD (life cycle deficit) and LCS (life cycle surplus) based on NTA data, using age group averages for labour income and consumption and the country-specific population from the NTA base year. Our results clearly indicate that the ages until which people stay (in young age), respectively become (in old age), on average economically dependent differ across Europe and are quite different as compared to the fixed age limits applied in demographic dependency ratios. When using the life cycle deficit as indicator people stay economically dependent about 10 years longer as compared to the demographic youth dependency ratio (that relates the share of people below age 15 to those between age 15 and below age 65). On the contrary, in older ages individuals become economically dependent already several years before the age of

65 that is commonly used for calculating the old age dependency ratio (that relates the share of people above age 65 to those between age 15 and below age 65). We find large differences across countries: The aggregate life cycle deficit in young age ranges from 19 percent in Austria to 26 percent in Finland, whereas the aggregate life cycle deficit in old age ranges from 21 percent in Spain to 32 percent in Germany. Regarding the ages where people on average consume less than they produce, Slovenia and Sweden constitute two extreme cases: While people generate an economic surplus until around age 63 in Sweden, people become economically dependent already at age 56 in Slovenia. Sweden therefore stands out having a life cycle surplus for 37 years (from age 25 to age 62) as compared to 31 years for Slovenia (from age 24 to age 55). However, in both countries the life cycle surplus amounts to 41 percent of labour income, a value that lies at least 8 percentage points above the value in all the other countries. The results on the aggregate life cycle deficit/surplus are obviously influenced by the shape of the age profiles as well as by the age structure of the population.

As our focus is on cross-country differences with respect to age-specific production and consumption activities, we control for cross-country differences in the demographic structure and in a next step apply a standard population to calculate the aggregate life cycle deficit for each country. In addition, we also differentiate our analysis by gender. This gives us further insights on how country-specific differences in the aggregate life cycle deficit/surplus emerge, since cross-country differences in the labour force participation of women play an important role. Although we control for the population structure the aggregate life cycle deficit and surplus varies considerably across countries. The LCD for young people lies between 20% in Austria and 29% in Italy, in old age it amounts to values between 21% in Sweden and 30 % in Hungary. This indicates that the design of the economic life cycle plays an important role: The low value of the LCD in young age for Austria is driven by the early entry into the labour market, while the low value of the LCD in old age for Sweden can be explained by the late exit from the labour market.

Interesting are the gender differences in the life cycle surplus. The aggregate life cycle surplus (a measure for the resources which are produced but not consumed by the population in working age) ranges from 24 percent in Italy and the UK to 41 percent in Sweden. These differences can largely be explained by the differences in the share of total income which is generated by women. In Slovenia and Sweden the contribution of women to total labour income is among the highest within Europe, resulting in a LCS of 12% and 16% of total labour income for women in Sweden and Slovenia respectively. The low value for the UK is due to a low contribution of women and a high overall level of consumption relative to labour income. These large cross-country differences in women's

contribution to the LCS are in turn due to a large extent by the difference in the labour market behaviour of females with children. Moreover, this behavior is influenced by the prevailing family policies including monetary benefits as well as the provision of childcare.

The gender specific analysis of the life cycle deficit/surplus is incomplete if we ignore unpaid work. A full account of paid and unpaid work together is necessary to obtain a complete picture of the re-distribution of resources across age. Based on the multinational time use survey we investigate the age specific consumption and production of goods and services emerging through non-market production activities of households. For all countries and all age groups, the time devoted to these activities by females exceeds the corresponding values of males. The gender difference is particularly high in France, Spain and Italy.

Unpaid work peaks in childbearing age for women, reflecting the time which is devoted to childcare. For both, men and women, there is another peak in old age as part of the reduction in time devoted to paid work is replaced by household production. However, the measure for the consumption of goods and services emerging from non-market production activities generally increases with age, indicating that in most of the countries these goods and services are consumed by older age groups themselves. A larger transfer of goods and services through non-market production activities can be observed in Spain, Italy and Slovenia. In these three countries a quite high share of people in older age groups live with their children. In particular Slovenia is an interesting case since in addition to the peak of unpaid work in childbearing ages there is a quite pronounced peak around age 60 for non-market production activities. This is an indicator that these age groups provide considerable transfers through non-market production to younger age groups, thereby supporting the high labour participation of women.

Our results clearly indicate that a reform of the welfare system needs to take into account not only public transfers but also private transfers, in particular those that relate to services produced within the household for own consumption. An increase for instance in the female labour force participation - as commonly argued as a means to reduce the pressure on public finances in ageing populations - needs to be accompanied by substituting private intra household transfers accordingly. Our work provides an analysis on the aggregate level. For a deeper understanding of dynamic behavioural relationships at the individual level studies at the micro level are inevitable.

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A Appendix

Table A-1: The Generation and Use of Income

	Austria	Finland	France	Germany	Italy	Slovenia	Spain	Sweden	UK	Hungary
Net National Income in € p.c. (PPP)	22,654	20,509	19,827	22,294	17,259	14,594	17,905	22,264	21,289	9,905
Labour Income in %	76.6	75.7	76.8	73.7	73.7	85.7	79.7	75.5	75.0	81
Asset Income in %	23.4	24.3	23.2	26.3	26.3	14.3	20.3	24.5	25.0	19
+ Transfers from ROW p.c. in Euro	-216.2	-259.5	-381.7	-418.8	-257.0	69.6	-136.7	-423.5	-382.0	52
Disposable Income (DI)	22,438	20,249	19,445	21,875	17,002	14,663	17,768	21,841	20,907	9,957
Consumption in % of DI	87.5	94.6	95.3	88.8	100.5	93.9	96.8	83.2	98.2	95
Saving in % of DI	12.5	5.4	4.7	11.2	-0.5	6.1	3.2	16.8	1.8	5
Public Saving in % of DI	-2.3	-3.5	-8.2	-3.2	-5.1	-3.8	-8.8	1.8	-9.9	-9
Private Saving in & of DI	14.8	9.3	12.9	14.4	4.6	9.9	12.1	14.9	11.7	15
Consumption as Share of Labour Income	1.13	1.23	1.22	1.18	1.34	1.10	1.21	1.08	1.29	1.17

Note: Euro values adjusted for differences in purchasing power.

Table A-2: Selfdefined Economic Status of Women by Age - Percentages

Austria								
Age	Full-time	Part-time	Domestic Work	Educ.	Unempl.	Inactive/Miss.	Obs.	
<= 20	34.2	3.8	2.6	53.9	3.3	2.1	424	
21-30	37.9	16.0	20.6	18.3	5.2	2.1	733	
31-40	32.7	35.4	22.4	1.7	4.9	2.8	1007	
41-50	42.5	34.5	12.8	0.1	5.8	4.3	1250	
51-60	30.2	21.6	13.5	0.1	5.4	29.3	983	
60+	0.7	0.4	14.5	0.1	0.1	84.2	1646	
Germany								
Age	Full-time	Part-time	Domestic Work	Educ.	Unempl.	Inactive/Miss.	Obs.	
<= 20	26.6	1.9	1.3	65.4	3.3	1.5	711	
21-30	45.7	15.1	10.1	20.7	6.7	1.7	1256	
31-40	32.9	37.1	16.9	1.5	8.1	3.4	1702	
41-50	37.2	40.0	9.3	0.2	8.1	5.2	2487	
51-60	34.1	32.8	10.3	0.0	8.5	14.2	2393	
60+	2.3	2.6	5.4	0.0	0.7	89.0	3714	
Spain								
Age	Full-time	Part-time	Domestic Work	Educ.	Unempl.	Inactive/Miss.	Obs.	
<= 20	6.2	2.8	2.8	74.3	11.1	2.8	1001	
21-30	41.4	12.3	5.0	18.1	21.1	2.1	2100	
31-40	53.3	15.0	11.1	0.7	18.5	1.5	2695	
41-50	49.4	13.3	19.5	0.4	13.8	3.6	2937	
51-60	35.1	7.8	35.5	0.0	13.2	8.4	2450	
60+	2.7	1.2	48.9	0.0	1.0	46.3	4728	
Finland								
Age	Full-time	Part-time	Domestic Work	Educ.	Unempl.	Inactive/Miss.	Obs.	
<= 20	6.1	4.7	1.6	81.2	5.0	1.4	1034	
21-30	43.5	8.2	15.6	22.7	8.3	1.7	1198	
31-40	62.8	9.0	15.8	3.3	7.5	1.6	1430	
41-50	74.8	7.7	2.4	2.1	6.8	6.2	2147	
51-60	61.0	9.1	1.7	0.8	9.2	18.2	2224	
60+	5.9	3.1	0.3	0.0	0.9	89.8	2697	
France								
Age	Full-time	Part-time	Domestic Work	Educ.	Unempl.	Inactive/Miss.	Obs.	
<= 20	6.0	4.2	1.7	80.9	4.1	3.1	843	
21-30	48.6	17.1	5.3	13.8	10.8	4.4	1447	
31-40	53.6	23.4	8.9	0.7	7.5	5.9	1688	
41-50	54.8	24.8	5.8	0.5	7.1	7.0	1944	
51-60	39.7	17.6	7.9	0.0	7.4	27.3	1937	
60+	1.9	1.3	5.4	0.0	0.2	91.1	3087	

Source: EU-SILC 2010

Table A-2: Selfdefined Economic Status of Women by Age - Percentages

Italy							
Age	Full-time	Part-time	Domestic Work	Educ.	Unempl.	Inactive/Miss.	Obs.
<= 20	5.1	2.2	2.7	78.3	9.6	2.1	1193
21-30	35.7	8.0	15.8	23.8	13.4	3.2	2539
31-40	45.6	13.5	27.4	1.2	8.9	3.4	3520
41-50	47.9	13.9	29.0	0.0	5.2	4.1	3821
51-60	34.1	7.1	37.5	0.0	3.7	17.7	3227
60+	2.3	0.5	31.6	0.0	0.2	65.5	6761
Sweden							
Age	Full-time	Part-time	Domestic Work	Educ.	Unempl.	Inactive/Miss.	Obs.
<= 20	9.7	13.5	0.6	60.6	9.2	6.4	798
21-30	44.0	18.8	3.2	24.0	5.2	4.7	879
31-40	56.7	28.8	2.4	5.4	3.8	2.9	1108
41-50	61.3	24.0	1.0	2.2	4.6	6.8	1361
51-60	55.7	25.2	1.2	0.3	4.2	13.3	1164
60+	6.2	5.1	0.7	0.0	0.8	87.2	1859
Slovenia							
Age	Full-time	Part-time	Domestic Work	Educ.	Unempl.	Inactive/Miss.	Obs.
<= 20	1.6	0.4	0.1	94.5	2.5	0.9	1101
21-30	44.2	4.1	0.5	36.9	13.7	0.6	2220
31-40	79.5	5.7	3.4	0.2	10.4	0.8	1839
41-50	76.7	4.4	4.3	0.2	10.6	3.9	2512
51-60	35.4	3.4	5.1	0.0	9.8	46.4	2260
60+	0.3	0.1	2.7	0.0	0.1	96.8	2988
United Kingdom							
Age	Full-time	Part-time	Domestic Work	Educ.	Unempl.	Inactive/Miss.	Obs.
<= 20	14.0	14.6	3.7	57.6	7.9	2.0	461
21-30	48.9	19.8	14.0	9.7	4.0	3.6	918
31-40	40.0	29.8	22.7	1.5	2.3	3.8	1173
41-50	47.2	30.0	11.1	0.7	2.4	8.6	1381
51-60	41.1	30.5	6.9	0.5	1.8	19.3	1269
60+	5.0	8.8	1.5	0.0	0.3	84.4	2764
Hungary							
Age	Full-time	Part-time	Domestic Work	Educ.	Unempl.	Inactive/Miss.	Obs.
<= 20	4.1	1.1	1.7	83.9	3.0	6.2	901
21-30	45.0	3.4	7.2	13.9	9.9	20.7	1443
31-40	57.2	5.1	9.3	0.0	9.8	18.6	1786
41-50	70.8	4.9	3.6	0.0	10.2	10.5	1705
51-60	49.9	4.1	2.0	0.0	5.5	38.5	2361
60+	1.5	1.0	0.8	0.0	0.0	96.6	3199

Source: EU-SILC 2010

Table A-3: Activity Status of Women by Age of Youngest Co-Residing Child

Austria							
Age of Child	Fulltime	Parttime	Domestic Work	Educ.	Unempl.	Inactive/Missing	Obs.
0 - 1 Years	2.5	7.0	89.0	0.6	0.6	0.3	187
2-3 Years	3.9	35.1	55.6	0.4	4.5	0.4	219
4-5 Years	14.2	51.2	27.7	1.9	3.6	1.4	199
6-10 Years	26.5	47.6	18.8	0.9	6.2	0.0	427
11-15 Years	34.7	44.6	14.6	0.0	5.3	0.7	404
16+	43.2	33.6	18.1	0.2	4.4	0.5	662
no child	61.1	20.6	8.4	0.0	8.1	1.8	1618
Germany							
Age of Child	Fulltime	Parttime	Domestic Work	Educ.	Unempl.	Inactive/Missing	Obs.
0 - 1 Years	4.8	12.5	76.3	1.2	4.6	0.7	252
2-3 Years	17.1	39.6	35.2	1.0	7.1	0.0	395
4-5 Years	10.6	52.3	17.8	1.0	11.9	6.5	298
6-10 Years	14.3	57.6	16.7	2.0	8.3	1.0	753
11-15 Years	21.2	57.9	13.0	0.3	6.5	1.2	763
16+	33.1	45.5	12.2	0.1	6.7	2.5	1324
no child	58.6	22.1	6.4	0.0	9.9	3.0	3870
Spain							
Age of Child	Fulltime	Parttime	Domestic Work	Educ.	Unempl.	Inactive/Missing	Obs.
0 - 1 Years	44.4	14.8	19.2	0.2	19.3	2.2	416
2-3 Years	38.9	21.1	17.1	0.8	21.5	0.7	588
4-5 Years	45.8	16.9	18.8	0.1	18.1	0.2	502
6-10 Years	44.0	18.2	18.5	0.2	18.3	0.9	1132
11-15 Years	48.8	13.7	19.4	0.1	17.2	0.8	940
16+	39.3	11.3	33.8	0.1	13.8	1.6	2667
no child	54.7	10.6	12.4	0.0	20.0	2.3	3997
Finland							
Age of Child	Fulltime	Parttime	Domestic Work	Educ.	Unempl.	Inactive/Missing	Obs.
0 - 1 Years	13.5	0.7	83.1	0.6	0.9	1.2	277
2-3 Years	36.6	9.4	42.1	7.4	3.8	0.7	512
4-5 Years	70.6	9.6	5.3	3.6	10.6	0.3	327
6-10 Years	68.9	13.5	3.9	5.2	8.4	0.1	734
11-15 Years	81.5	6.1	1.9	2.7	7.4	0.3	801
16+	80.9	6.5	2.5	1.4	7.8	0.9	1207
no child	72.1	13.4	1.3	0.0	12.2	1.1	2968
France							
Age of Child	Fulltime	Parttime	Domestic Work	Educ.	Unempl.	Inactive/Missing	Obs.
0 - 1 Years	42.8	24.9	17.7	1.4	9.5	3.7	375
2-3 Years	44.7	28.7	18.6	0.4	6.3	1.3	433
4-5 Years	54.6	24.0	8.0	1.0	11.5	0.9	381
6-10 Years	50.4	33.8	8.2	0.5	6.9	0.2	786
11-15 Years	56.3	29.8	6.2	0.5	5.8	1.3	698
16+	55.8	24.0	10.0	0.2	8.8	1.2	1119
no child	60.4	19.3	5.6	0.0	11.6	3.1	2607

Source: EU-SILC 2010

Table A-3: Activity Status of Women by Age of Youngest Co-Residing Child

Hungary							
Age of Child	Fulltime	Parttime	Domestic Work	Educ.	Unempl.	Inactive/Missing	Obs.
0 - 1 Years	14.6	1.9	21.5	0.3	0.7	61.0	423
2-3 Years	54.4	7.3	10.3	0.0	11.5	16.6	326
4-5 Years	56.5	7.2	11.6	0.0	15.6	9.1	708
6-10 Years	72.8	5.3	4.5	0.0	15.1	2.3	671
11-15 Years	79.8	5.5	2.9	0.0	10.0	1.7	1654
16+	75.8	6.0	1.9	0.0	10.9	5.3	2071
no child	34.4	10.2	38.8	1.4	10.3	4.9	466
Italy							
Age of Child	Fulltime	Parttime	Domestic Work	Educ.	Unempl.	Inactive/Missing	Obs.
0 - 1 Years	34.9	15.7	37.1	0.9	9.2	2.1	749
2-3 Years	38.3	17.0	34.4	0.8	7.6	1.8	644
4-5 Years	35.2	18.6	39.3	0.0	5.2	1.7	1350
6-10 Years	41.2	16.6	35.4	0.0	4.6	2.2	1180
11-15 Years	37.5	9.4	45.6	0.0	3.9	3.6	3344
16+	55.1	8.8	17.8	0.0	13.7	4.5	4885
no child	54.4	23.3	14.5	4.8	2.7	0.3	337
Sweden							
Age of Child	Fulltime	Parttime	Domestic Work	Educ.	Unempl.	Inactive/Missing	Obs.
0 - 1 Years	43.3	37.3	2.6	11.7	4.1	1.0	335
2-3 Years	54.5	32.6	0.0	8.4	3.5	1.1	214
4-5 Years	56.0	30.6	0.8	6.2	5.2	1.1	468
6-10 Years	64.5	28.0	1.0	2.2	3.0	1.2	491
11-15 Years	67.7	20.7	1.1	1.1	4.3	5.0	834
16+	57.9	27.5	1.0	0.0	8.2	5.4	1974
no child	70.7	4.0	0.9	3.9	20.4	0.1	332
Slovenia							
Age of Child	Fulltime	Parttime	Domestic Work	Educ.	Unempl.	Inactive/Missing	Obs.
0 - 1 Years	68.2	13.1	2.0	3.6	12.8	0.3	485
2-3 Years	72.0	9.9	2.6	4.6	10.8	0.1	297
4-5 Years	78.7	3.7	3.5	0.2	13.9	0.0	660
6-10 Years	82.6	3.6	4.4	0.0	9.2	0.2	746
11-15 Years	75.0	4.2	7.4	0.0	12.7	0.7	2730
16+	71.4	5.7	3.7	0.0	18.1	1.1	1846
no child	22.9	25.6	44.3	3.6	1.7	2.0	309
United Kingdom							
Age of Child	Fulltime	Parttime	Domestic Work	Educ.	Unempl.	Inactive/Missing	Obs.
0 - 1 Years	22.9	25.6	44.3	3.6	1.7	2.0	309
2-3 Years	18.9	35.9	40.7	1.1	2.5	1.0	331
4-5 Years	22.7	39.2	31.7	3.2	1.9	1.4	281
6-10 Years	30.3	40.0	24.3	2.5	1.3	1.6	507
11-15 Years	44.7	37.3	14.2	1.4	1.7	0.8	472
16+	51.2	35.1	8.5	1.0	2.9	1.3	764
no child	62.8	26.3	3.7	0.0	5.6	1.6	2085

Source: EU-SILC 2010

Table A-4: The Aggregate “Time Use” Life Cycle Deficit and -Surplus by Gender

Country	Sex	LCD and LCS in % of Total Labour Income			Age Borders LCD positive	
		Young (LCD)	Working Age (LCS)	Old (LCD)	until:	from:
Austria 2008	Women	26	1	18		
	Men	3	0	26	53	
	Total	28	0	21		
Spain 2002	Women	33	0	22		
	Men	0	5	33	41	
	Total	29	0	26	80	
Finland 1999	Women	22	0	16		
	Men	4	0	24	61	
	Total	26	0	20		
France 1998	Women	28	0	19		
	Men	1	5	30	44	
	Total	24	1	22	77	
Germany 2001	Women	20	0	23	79	
	Men	3	2	28	50	
	Total	24	1	25	77	
Italy 2002	Women	31	1	23		
	Men	0	14			
	Total	22	6	28	80	
Slovenia 2000	Women	25	0	20	80	
	Men	2	1	27	67	
	Total	27	1	23	78	
UK 2000	Women	22	0	18	53	
	Men	2	1	26	63	
	Total	23	0	20	76	

Note: Information on the “Young (LCD)” cannot be provided, as individuals aged 15 years and younger are not included in the time use surveys.



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Project Information

Welfare, Wealth and Work for Europe

A European research consortium is working on the analytical foundations for a socio-ecological transition

Abstract

Europe needs a change: The financial crisis has exposed long neglected deficiencies in the present growth path, most visibly in unemployment and public debt. At the same time Europe has to cope with new challenges ranging from globalisation and demographic shifts to new technologies and ecological challenges. Under the title of Welfare, Wealth and Work for Europe – WWWforEurope – a European research consortium is laying the analytical foundations for a new development strategy that enables a socio-ecological transition to high levels of employment, social inclusion, gender equity and environmental sustainability. The four year research project within the 7th Framework Programme funded by the European Commission started in April 2012. The consortium brings together researchers from 33 scientific institutions in 12 European countries and is coordinated by the Austrian Institute of Economic Research (WIFO). Project coordinator is Karl Aiginger, director of WIFO.

For details on WWWforEurope see: www.foreurope.eu

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