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# The role of gender, education and family in the welfare organization: Disaggregating National Transfer Accounts

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ABSTRACT

In this paper, we extend the National Transfer Accounts (NTA) methodology to obtain the age profiles simultaneously disaggregated by gender, education level and family structure. We present the results for four countries (Austria, Spain, Finland and the UK), analysing the roles of these three dimensions in the both inter and intragenerational distribution of resources. We find interesting differences across countries, some of them related to the degree and age direction of the familiarization of different welfare state regimes. Finland excels as the country with the highest level of public transfers, and in particular for the elderly and for parents of working ages. In Austria, public transfers are also generous for children and the elderly, and there are substantial family benefits. In the UK and Spain, public transfers are much lower and family-related allowances are almost insignificant. Consequently, in Spain, private transfers from parents to children are the highest, while in the UK asset reallocations play a significant role in financing elderly consumption. Overall, our analysis provides interesting insights on how gender, redistribution policies and family structure interact with the welfare organization.

## Introduction

Ageing is one of the main challenges that current societies must face in the near future. Changes in population age structure will force countries to re-think certain social structures created under very different demographic conditions. Tackling this challenge successfully requires rigorous analyses of the generational economy (Lee and Mason, 2011), in order to understand how different generations interact in economic terms. Societies are made up of individuals of different ages and, consequently, with different economic behaviour, interacting among them. For example, children need to consume, but are not able to produce the necessary resources to finance that need. Something similar occurs on the other extreme of the lifecycle with the elderly. In the middle, during working ages, individuals keep their need to consume, but can also earn income, mainly through the labour market. Overall, it is clear that there is a need for mechanisms to redistribute resources over the lifecycle. There are three main mechanisms. First, the markets, which allow, for example, for savings (from working to retirement ages). Second, the family, which redistributes resources from adults to children, or even to the elderly. Finally, the public sector, which also has the power (very important in those countries with a strong welfare state) to reallocate resources from those individuals who earn income and can pay taxes, to those who have no earnings (the elderly, children or some working-age individuals with no jobs, for example), and thus, receive public transfers (retirement pensions, family or unemployment benefits, among others). It is worth noting that the three aforementioned reallocation devices allow not just for intertemporal (markets), but also for intergenerational redistribution (with family and public sector as intermediary institutions).

Overall, the generational economy studies all these economic relationships among different generations living together, and how they could be affected by eventual changes in societies' age structure, such as the ongoing ageing process. In this respect, National Transfer Accounts (NTA) entail substantial progress in the data availability. NTA is a methodology (UN, 2013) that adds the age dimension to National Accounts system indicators, consequently producing a thorough estimation of family transfers. It started at the beginning of this century as an international project led by the Universities of Berkeley and Hawaii, and currently involves more than 80 countries.

NTA is a rich dataset containing valuable information to evaluate intergenerational redistribution, and to understand how resources are produced, consumed, saved and shared by different generations living at

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a specific moment. It provides per capita (and aggregate) age profiles for the main economic variables in a given period: consumption (both public and private), income (from labour and from assets), savings and transfers, consistent with National Account aggregates. As mentioned above, the focus of standard NTA is on age, but some extensions of the initial method considering additional dimensions further enrich the scope for microanalysis. For example, the addition of non-market activities to the age profiles through time transfers (National Time Transfer Accounts, NTTA), allows for a complete picture of how resources are produced and shared among different generations (Donehower, 2018). A significant part of economic resources is generated and consumed outside markets and, hence, not captured in the National Accounts system. Time-use surveys conducted in many countries over the last few decades allow for the identification and quantification of these activities. In this regard, differentiating data by sex is crucial for a thorough understanding. Typically, women participate less in the labour market and thus have a lower contribution to national income. However, they deal with a higher share of the non-market activities, which are an additional and significant source of income and, thus, of wellbeing.

Another example of NTA extension is the estimation of age profiles disaggregated by level of education (Hammer, 2015; Abio et al., 2017), which gives us the chance to evaluate the impact of the educational transition that most countries faced in recent decades, simultaneously to the ageing process. Using NTA by level of education, Rentería et al. (2016) found that the improvement of education in Spain could significantly offset the negative effect of population ageing in this country.

As a result of the AGENTA project, nowadays homogeneous and comparative estimations of NTA by sex are available for 25 European countries referring to 2010.[1] In this paper, we extend the NTA methodology to consider, together with the disaggregation by sex and level of education, a new dimension: family structure. In this way, we aim to provide the necessary data for a comprehensive analysis of both inter and intragenerational distribution, taking into account, besides sex and education, the organization of individuals through family structures.[2] We are particularly interested in looking at the differences in age profiles according to two characteristics: couple formation (couples versus singles) and parenthood status (parents versus non-parents), in both cases keeping the disaggregation by sex and level of education. We thus intend to better understand how these three dimensions (sex, level of education and family type) interact in the wellbeing of individuals and, ultimately, of society as a whole.

This paper presents the disaggregated age profiles for four selected European countries: Austria, the UK, Finland and Spain. Selection is not random but aimed at having at least one country representing the four welfare state regimes usually differentiated in the literature.[3] Austria represents the Continental or conservative model, where the institutions follow the traditional norms and family plays a central role. In the UK, the Anglo-Saxon or liberal welfare state regime prevails, where the main role is given to the markets, while the public sector acts from a subsidiary perspective, guaranteeing only a social minimum for those in need. The Nordic or social-democratic welfare model is represented by Finland, which promotes full participation and employment and ensures protection at the highest standards for everybody, regardless of past contributions. It also has a more active role in fostering gender equality. Finally, Spain is an example of the so-called Mediterranean model, with an extended role of the family, but with important gaps in protection, which focus mainly on old age. Istenič et al. (2019) made an initial attempt to contribute to the characterization of welfare regimes using NTA estimates, which from the outset allow for a comprehensive measure of the degree of familiarization. We go further in this direction by disaggregating by family type.

The rest of the paper is structured as follows: Section 2 briefly describes the standard NTA methodology, the data needs and the methodological decisions taken in order to further disaggregate them simultaneously by sex, level of education and family type. Section 3 presents an overview of the estimated NTA age profiles, focused on differences in welfare organization across countries. In Section 4, the NTA age profiles disaggregated by sex, level of education and family structure are analysed. Finally, Section 5 concludes.

## Methodology and data

This section gives a brief summary of the standard NTA methodology (2.1) and explains the methodological issues involved in disaggregating NTA profiles beyond age and sex (2.2).

### *Standard NTA methodology*

The National Transfer Accounts method (UN, 2013) is designed to estimate age profiles of the main economic variables consistently with the System of National Accounts (SNA). The method starts from the following identity:

$$YL + YA + TGI + TFI = C + S + TGO + TFO \quad (1)$$

where *YL* and *YA* are labour and asset income, respectively; *C* is consumption; *S* is savings; *TGI* and *TFI* represent public and private transfers received (inflows), respectively, and *TGO* and *TFO* represent, respectively, paid (outflows) public and private transfers. In this way, the left-hand side of Equation [1] stands for income sources, while the right-hand side reflects uses. Reordering terms, the basic NTA flow identity is obtained:

$$C - YL = (TGI - TGO) + (TFI - TFO) + (YA - S) \quad (2)$$

Eq. (2) shows that the difference between consumption and labour income, called the lifecycle deficit (*LCD*), must be financed through the three sources on the right-hand side: net public transfers (*TG*), net private transfers (*TF*), and/or asset reallocations (*RA*). This equation holds for either the whole economy or a specific age group.

NTA estimations involve a complex and exhaustive process, exploiting different micro datasets to obtain individual (per capita) profiles. Each variable is not estimated as a whole but rather decomposed into different categories. For example, consumption is first divided into public and private, and different categories are distinguished and estimated separately in each case (education, health, and other consumption). Labour income is estimated separately for employees and self-employed, obtaining a different age profile in each case.

All the age profiles estimated are adjusted to match the corresponding aggregate in SNA[4]. Additionally, in some cases complementary

[1] See the web page (http://www.agenta-project.eu/en/index.htm) to obtain detailed information about the project, and the AGENTA data explorer to access NTA data (http://dataexplorer.wittgensteincentre.org/nta/).

[2] Patxot et al. (2012) discuss the literature and provide a first attempt to measure backward and forward intergenational transfers using NTA estimates.

[3] The traditional typology identifying three regimes (Continental, Anglo-Saxon and Nordic) was initially established by Esping-Andersen (1990), and was later completed to consider Mediterranean countries differentially (Ferrera, 1996).

[4] To get some insight on the relevance of this adjustment process, we report here the values of the adjustment factors of some of the main NTA variables. In the case of labour income – earnings, the adjustment factor is 1.065, 1.237, 1.005 and 0.857 in Austria, Spain, Finland and the UK, respectively. In the case of public old-age pensions in cash, it is 1.015, 1.094, 1.036 and 1.034 in Austria, Spain, Finland and the UK, respectively. In the case of other private consumption, it is 1.003, 1.122, 0.856 and 1.000 in Austria, Spain, Finland and the UK, respectively. Note that the adjustment factor is applied to all ages so that it does not affect the shape of the profile and hence has a limited impact on the results.

information is used to estimate the age profiles in a more accurate way. For example, in the case of transfers, NTA provides additional data to that collected by National Accounts aggregates. In particular, NTA distinguishes between public and private transfers which, at an aggregate level, should tend to zero, but become crucial from an age perspective. NTA provides the first systematic method to estimate private transfers and, as such, provides a sound measure of the degree of familiarization of the welfare systems, i.e. the extent to which the family takes care of the dependent relative to the government. More specifically, inter-household transfers are taken from the micro surveys collecting them, while intra-household transfers are estimated as a residual of the individual's budget constraint. Total net public transfers in a given economy, at the aggregate level, are the difference between those received (inflows) and paid (outflows) by individuals from and to the government, respectively. Disaggregated by age, transfer inflows and outflows are essential to understand how the public sector redistributes resources among ages by collecting taxes and contributions (mainly from working ages) and giving transfers (mostly to economically dependent ages). NTA estimates age profiles for different categories of taxes and contributions paid by individuals (*TGO* in Eq. 2) as well as transfers received (*TGI*), both in cash (different types of pensions, family benefits, etc.) and in kind (health, education, and other).

With respect to private transfers, at the aggregate level (for the whole economy) they again tend to be zero, because some individuals receive while others give (only the balance with the rest of the world remains). However, again the age profiles provide valuable information about how resources move among different generations within the country. The method estimates age profiles for private transfers occurring within the same household (intra-household) and between different households (inter-household).

Standard NTA methodology systematically introduces age into economic variables, while some countries have obtained the age profiles also differentiated for women and men. This methodological improvement was consolidated in the AGENTA project, where comparable estimations for 25 European countries in 2010 were obtained, further disaggregated by sex. Moreover, AGENTA adapted the standard NTA methodology to the specific characteristics of microdata availability in European countries (Istenič et al., 2016). As our estimations refer to four European countries previously considered in AGENTA (Austria, Spain, Finland and the UK), and for the same year (2010), we start from this specific methodology and extend it to obtain estimations further disaggregated, simultaneously, by level of education and family type. Therefore, AGENTA estimates can be used as a benchmark for comparison. We follow the same methodology and use the same data sources whenever feasible.

*Building disaggregated NTA profiles by sex, education and family type*

A few studies have estimated NTA profiles taking into account the level of education (Hammer, 2015; Rentería et al., 2016; Abio et al., 2017). Gal et al. (2020) estimate NTA profiles for parents and non-parents at working ages and obtain an indicator of the transfer cost of parenthood. They find that, on average, for 14 EU countries, parents provide 1.9 times more transfers (including time transfers) than non-parents. In this paper we look at the whole lifecycle and consider a deeper classification of family types. We also consider education level simultaneously.

We distinguish three different levels of education: low-educated corresponds to levels ISCED 0–2 of UNESCO classification (individuals with no more than compulsory education); medium-educated corresponds to ISCED 3–4 (those with secondary, but not tertiary education); finally, high-educated corresponds to ISCED 5–8 (tertiary education). Regarding family type, we consider two characteristics: partnership (singles versus individuals living in a couple) and parenthood status (parents versus non-parents).

An important methodological issue that we need to bear in mind is the difficulty in reconciling the cross-sectional nature of NTA estimations with the longitudinal nature of the lifecycle. Age (and sex) profiles for a specific year reflect resource reallocations among the different cohorts living together at that moment. Although estimated for a given year, they also try to grasp how resources are transferred longitudinally over the lifecycle. This question is always present when building NTA profiles, but is especially important when incorporating further disaggregation than age and sex. It creates some methodological issues that need to be tackled when building NTA disaggregated by level of education and family type. First, to estimate NTA profiles by education, the question arises as to whether children need to be classified according to their own education level, as in Hammer (2015) and Rentería et al. (2016), or according to their parents' education (Abio et al., 2017). Each option has its advantages and shortcomings, and the choice depends on the purpose of the analysis. The profiles by education level we show in the results section follow the latter approach and include children in their parents' home with their parents' education level.

Second, to estimate NTA by family type, it is necessary to consider that family structure is not constant over the individual's lifecycle. Hence, the profiles we obtain disaggregated by family characteristics reflect different periods of the lifecycle. Moreover, the way household surveys are constructed does not always allow for a correct differentiation of the individual family characteristics we are interested in: partnership formation (distinguishing individuals living in a couple from singles) and parenthood status (differentiating parents from non-parents). In particular, the surveys do not permit us to know who is and who is not a parent after a certain age, when the children have left home (surveys only ask about people living in the same household). This problem can appear at any point in life for divorced parents not co-residing with their children, but is especially strong as people age and children leave home. To overcome this problem, we used the Survey of Health, Ageing and Retirement in Europe (SHARE), containing information on parenthood status, irrespective of household composition for the population 50+. From the information contained in SHARE, we derived an imputation method that allows us to identify parenthood status from age 60.[5]

Considering all the dimensions of the disaggregation performed in this study, individuals are classified according to their age as follows:

Children up to 16 years old are considered to be dependent children. They are all assumed to be enrolled in education and are classified into three groups conditional on the level of education of their parents. If they have two parents with different educational levels, we take the highest level of the two. Dependent children are not distinguished by sex.

Young adults from 17 to 25 years of age can be classified into different groups depending on their enrolment status. If they are enrolled in education, they can belong to the previous group of dependent children, as long as they live with their parents and they are not in a couple or are parents themselves. If any of these three conditions is not fulfilled, they are considered as independent students, in which case we cannot distinguish them by educational level (since we lack information about their parents' education and they have not yet completed their own education). For all enrolled young adults, whether or not dependent, we do not distinguish by sex either.

Young adults (aged 17–25) who are not enrolled in education are classified according to their gender, their own education level, and their family type. We consider four family types depending on partnership status (single or in a couple) and on parenthood status (with or without

[5] In particular, the probability of being a parent is estimated in SHARE using income, education level, partnership status and age group as explanatory variables. Using the estimated parameters, being a parent is predicted in the microdata surveys, using a control algorithm to ensure that the reported status is not contradicted. For details, see Abio et al. (2021a). Unfortunately, we could not apply this estimation to the UK, as this country is not reported in SHARE.

dependent children). In the case of single parents, we opted to combine males and females in the same category due to the low representativeness of this family type for males.

The rest of adults (ages 26 to 59) are classified in the same way as non-enrolled individuals in the age group 17–25: by gender, by own education level, and by family type, where again single parents are not distinguished by sex.

Elderly people include individuals from age 60, who are classified by sex, education level and family type. In this case, parenthood status refers to whether the individual has ever been a parent or has remained childless during his/her life. In the case of the UK, we do not differentiate old people by parenthood status due to the lack of data.

Table 1 summarizes the different types of individuals distinguished, and for which we estimate NTA profiles. Overall, considering the different characteristics, 25 types of disaggregated NTA age profiles are obtained. Four of these profiles are for (children and young adults) students up to age 25, without disaggregation by sex, and the other 21 are for adults aged 17+.

Below we describe how age profiles disaggregated by sex, level of education and family type are constructed, indicating the main deviations from the procedure used in AGENTA (only disaggregated by sex). It is important to highlight that an additional challenge we need to face is the increasingly smaller number of observations as more dimensions of disaggregation are introduced. For that reason, we opted to merge age in five years groups from age 30 on. For the youngest, however, we take the age groups that correspond to the main education periods (0–3, 4–7, 8–11, 12–16, 17–21, 22–25) and the remaining group 26–29. The last group, 80+, includes ages 80 and above. We took careful consideration of outliers and groups of observations with a small sample size. In addition, as in AGENTA, we reduced the random variation by using Friedman's Super Smoother,[6] which also takes into account the sample size to smooth profiles.

AGENTA mainly employs two data sources to estimate the age and sex distribution of aggregate NTA variables, both from Eurostat: the harmonized Household Budget Survey (HBS), used for private consumption[7] and the European Union Statistics on Income and Living Conditions (EU-SILC), to estimate the income-related variables. In this paper, we generally use the same data sources; however, to estimate the disaggregated profiles for private consumption we rely on national consumption surveys of the countries we analyse. National surveys usually include more detailed information, particularly at the personal level, and for all the age groups (harmonized HBS data are reported for 5-year age groups only). Both EU-SILC and national HBS contain enough information on the respondent's characteristics at both individual and household levels so that average per capita profiles by education level and family type can be estimated.

Table 2 describes the list of NTA variables for which we obtain age

**Table 1**
Classification of individuals by age, education level and family status.

| Type of individual | Education level | Ages |
|---|---|---|
| Dependent children | (Their parents:) Low, Medium, High | 0–25 |
| Independent students | Unknown | 17–25 |
| Single men, childless | (Own:) Low, Medium, High | 17–80+ |
| Men in a couple, childless | (Own:) Low, Medium, High | 17–80+ |
| Men in a couple, parent | (Own:) Low, Medium, High | 17–80+ |
| Single parents (men or women) | (Own:) Low, Medium, High | 17–80+ |
| Single women, childless | (Own:) Low, Medium, High | 17–80+ |
| Women in a couple, childless | (Own:) Low, Medium, High | 17–80+ |
| Women in a couple, parent | (Own:) Low, Medium, High | 17–80+ |

[6] See Luedicke (2015) for an explanation of this method.

[7] In the case of Austria, the profiles are derived from the national consumption survey, as this country is not present in Eurostat HBS.

**Table 2**
List of NTA variables and source of their profile.

| Variable name | | | | Variable description | Profile |
|---|---|---|---|---|---|
| YL | | | | Labour income | |
| | YLE | | | Labour income, earnings | EU-SILC |
| | YLS | | | Self-employment labour income | EU-SILC |
| C | | | | Consumption | |
| | CF | | | Private consumption | |
| | | CFE | | Private consumption, education | HBS |
| | | CFH | | Private consumption, health | HBS |
| | | CFX | | Private consumption, other than education and health | HBS |
| | CG | | | Public consumption | |
| | | CGE | | Public consumption, education | Eurostat/ UNESCO |
| | | CGH | | Public consumption, health | AGENTA/ INE-Spain |
| | | CGX | | Public consumption, other than education and health | |
| | | | TGSOAII | In-kind public transfers, social protection, old age | TGSOAIC |
| | | | TGSUII | In-kind public transfers, social protection, unemployment | TGSUIC |
| | | | TGSFII | In-kind public transfers, social protection, family and children | TGSFIC |
| | | | TGSHII | In-kind public transfers, social protection, housing | TGSHIC |
| | | | TGSDII | In-kind public transfers, social protection, sickness and disability | TGSOAIC |
| | | | TGSXII | In-kind public transfers, social protection, miscellaneous | —* |
| | | | TGXII | In-kind public transfers, other consumption | —* |
| TG | | | | Public transfers (net) | |
| | TGI | | | Public transfers, inflows (received) | |
| | | TGIC | | Public transfers, inflows, cash | |
| | | | TGEIC | Public transfers, inflows, education, cash | EU-SILC |
| | | | TGHIC | Public transfers, inflows, health, cash | EU-SILC |
| | | | TGSOAIC | Public transfers, inflows, old age social protection, cash | EU-SILC |
| | | | TGSUIC | Public transfers, inflows, unemployment, cash | EU-SILC |
| | | | TGSFIC | Public transfers, inflows, family and children, cash | EU-SILC |
| | | | TGSHIC | Public transfers, inflows, housing, cash | EU-SILC |
| | | | TGSXIC | Public transfers, inflows, other social protection, cash | EU-SILC |
| | | | TGXCI | Other public transfers, inflows, cash | —* |
| | | TGII | = CG | Public transfers, inflows, in-kind | |
| | TGO | | | Public transfers, outflows | |
| | | TGF | | Taxes | |
| | | | TGFYA | Taxes on asset income | YAF |
| | | | TGFYL | Taxes on labour income | YL |
| | | | TGFC | Taxes on consumption | CF |
| | | | TGFX | Taxes, other than on consumption, labour and asset income | —* |
| | | TGP | | Social contributions | |
| | | | TGPYL | Social contributions on labour income | YL |
| | | | TGPPEN | Social contributions on pensions | TGSOAIC |
| | | TGX | | Other current transfers | —* |
| TF | | | | Private transfers | |
| | TFB | | | | EU-SILC |

(continued on next page)

**Table 2** (*continued*)

| Variable name | | | | Variable description | Profile |
|---|---|---|---|---|---|
| | | | | Private transfers, inter-household | |
| | TFW | | | Private transfers, intra-household | NTA |
| YA | | | | Asset income | |
| | YAF | | | Private asset income | |
| | | YPF | | Private property income | |
| | | | YMF | Private interest | EU-SILC |
| | | | YPFX | Other property income | EU-SILC |
| | | YKF | | Private capital income | |
| | | | YKFH | Returns to capital from own-occupied housing | EU-SILC |
| | | | YKFB | Returns to capital from mixed income | YLS |
| | | | YKFC | Capital income from corporations | EU-SILC |
| | YAG | | | Public asset income | TGO |
| S | | | | Savings | |
| | SF | | | Private savings | NTA |
| | SG | | | Public savings | TGO |

*A uniform profile by age is assumed.

profiles. Variables in the first column are the main variables that appear in Equations [1] and [2] above. The next columns show the decomposition of these main variables into more disaggregated ones. In the case of public transfers (*TG*), the total or net amount corresponds to the difference between transfers received (or public transfer inflows, *TGI* in the equations) and transfers paid to the public sector (public transfer outflows, *TGO*). For the rest, variables on the left are always the sum of its components appearing below and to the right in the following columns. The last column shows the source from which the age profiles have been estimated for the corresponding variable. For example, private consumption (CF) is decomposed into three categories: education (CFE), health (CFH) and other (CFX), and the age profiles for these three variables are obtained from the (national) Household Budget Survey.

Variables whose profiles are obtained from EU-SILC include labour income, in-cash public transfers, taxes on asset income, returns to capital from own-occupied housing and inter-household private transfers. From among these variables, only labour income and some in-cash public transfers (pension benefits, unemployment benefits, health cash and education cash) are reported at the personal level. The rest of the variables are reported at the household level and then allocated to household members using the standard NTA procedures.

Regarding public consumption (equal to in-kind public transfers), we need to resort to other data sources, as neither HBS nor EU-SILC provide this information. Data on public education expenditure and enrolment by education level from Eurostat and UNESCO are used to obtain a disaggregated profile of public expenditure in education (CGE) by enrolment status and by education level. We assume that, up to age 16, everyone is enrolled in education (except for early ages when education is not mandatory, for which we use the enrolment rate provided by Eurostat). For ages 17 to 25, we obtain different profiles for enrolled and non-enrolled individuals. Public education expenditure by age is assigned only to enrolled individuals, according to enrolment shares in each level and to their family status (whether they are dependent or independent children). In the case of dependent children, we obtain a separate profile for those who have low, medium, and high-educated parents. For ages above 25, we estimate a profile by age and education level that individuals aim to obtain.

In the case of public consumption of health (CGH), there is no available information that allows us to estimate a disaggregated profile by level of education and family type. The exception is Spain, where we could disaggregate public consumption of health by level of education, using national administrative data (provided by INE)[8] on the share of coverage of public health services by education, sex and age group. For the other three countries, the profile of public consumption of health is estimated using gender and age-specific shares taken from AGENTA.

Some variables for which an age profile could not be estimated from available data are assumed to have the same profile as another related variable for which it could be estimated. This is the case of taxes on asset income (TGFYA), on labour income (TGFYL), and on consumption (TGFC), social contributions (TGPYL and TGPPEN), return on capital from mixed income (YKFB), public asset income (YAG) and public saving (SG). The last column in Table 2 reports the pre-estimated age profile used in each case.

Intra-household private transfers (TFW) and private savings (SF) are not obtained from external data but following the NTA methodology. Intra-household transfers are estimated indirectly as the difference between age-specific disposable income and consumption, which has been calculated previously. Private saving is estimated as the final balancing item in NTA, obtained using Equation [1].[9]

## NTA profiles: An overview

Before the analysis of the NTA age profiles disaggregated by sex, level of education and family type, a more general picture is proposed, looking at the main NTA age profiles without disaggregation. In particular, we are interested in identifying potential similarities and differences among the four countries analysed, in light of the different welfare state regime predominating in each case. Fig. 1 shows the labour income profiles, expressed in annual euros per capita. Differences observed among the four countries are substantial and should be borne in mind when analysing the rest of the results, as they are used to normalize the NTA profiles.[10] As observed, labour income is considerably lower in Spain with respect to the rest of the countries. In particular, the average labour income for ages 30–49 (*YL 30–49*), is barely two thirds of Finland's and Austria's. It is also interesting to look at the differences in shape: in Spain, younger workers (16–21) earn a lower income than in the rest of the countries, due to their lower wages and, especially, lower participation and employment. Moreover, the labour income profile for central working ages is quite flat in Spain, while clearly inverted U-shaped in the rest of the countries. Finally, profiles drop after age 55 in all the countries, and the differences become smaller.

Consumption profiles are also considerably lower in Spain (Fig. 2). However, normalizing with national per capita YL 30–49, differences are substantially reduced. In fact, Spain becomes the country with the highest per capita consumption for ages 0–49, and particularly for young children (0–7) and ages 16–25, while it presents the lower profile in absolute terms. The UK shows the highest consumption for the elderly, while in Finland the sharp increase for the very old (80 + ) is especially striking.

Figs. 3 and 4 differentiate several categories of public and private consumption profiles, allowing the interpretation of the differences previously observed in Fig. 2. Private consumption is the main element responsible for the high total consumption profile in Spain. In particular, Spain has the highest consumption of private education until age 21, and also the highest level of private health until age 11. On the contrary, in Austria consumption of private education is practically zero at any age, and in Finland it is only relevant for young children (0–7). The UK also shows a certain level of consumption of private education, lower than in

[8] *Instituto Nacional de Estadística (*Spanish National Institute of Statistics).

[9] Further details about the estimation procedure can be found in Abio et al. (2021b).

[10] This is the usual procedure in NTA method, which proposes normalization of every age profile dividing by the average labour income for ages 30–49 to ease cross-country comparisons.

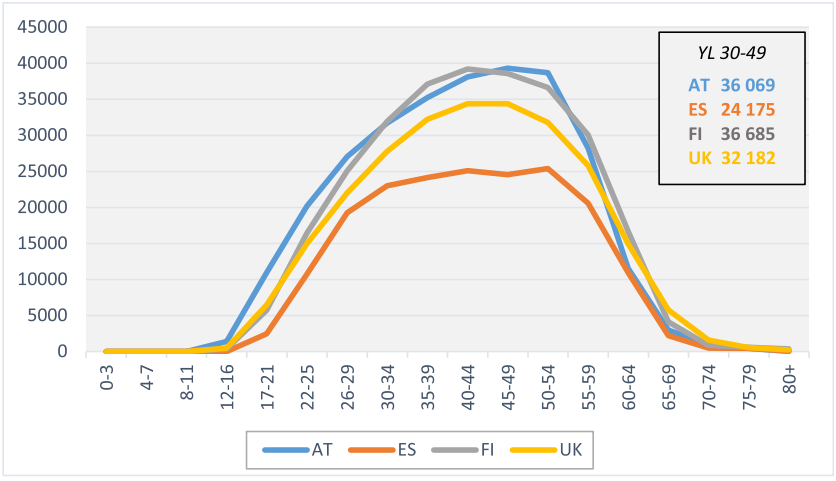


**Fig. 1.** Labour income profiles. Note: Values expressed in annual euros per capita. Source: Authors' calculations.

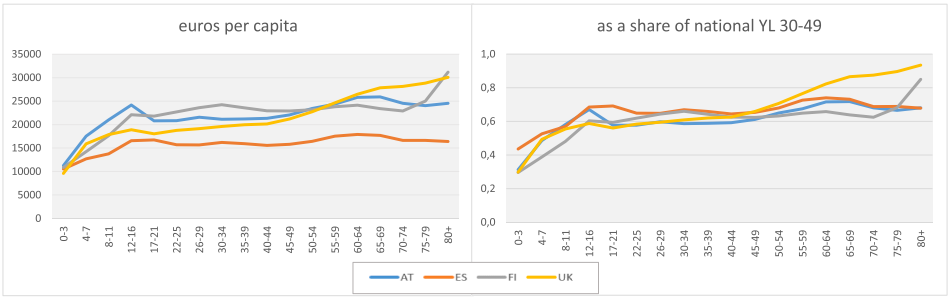


**Fig. 2.** Consumption age profiles. Source: Authors' calculations.

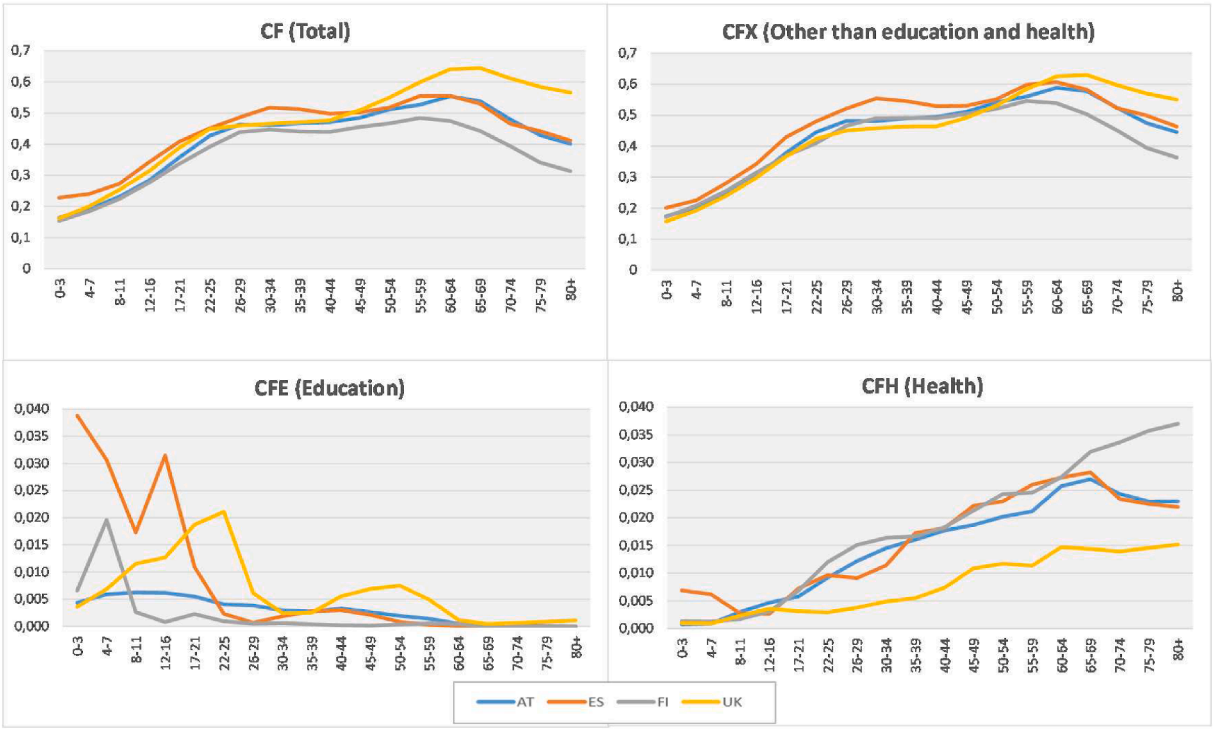


**Fig. 3.** Private consumption (CF) profiles, total and by main categories. Note: Values expressed in per capita terms, as a share of national YL 30–49. Source: Authors' calculations

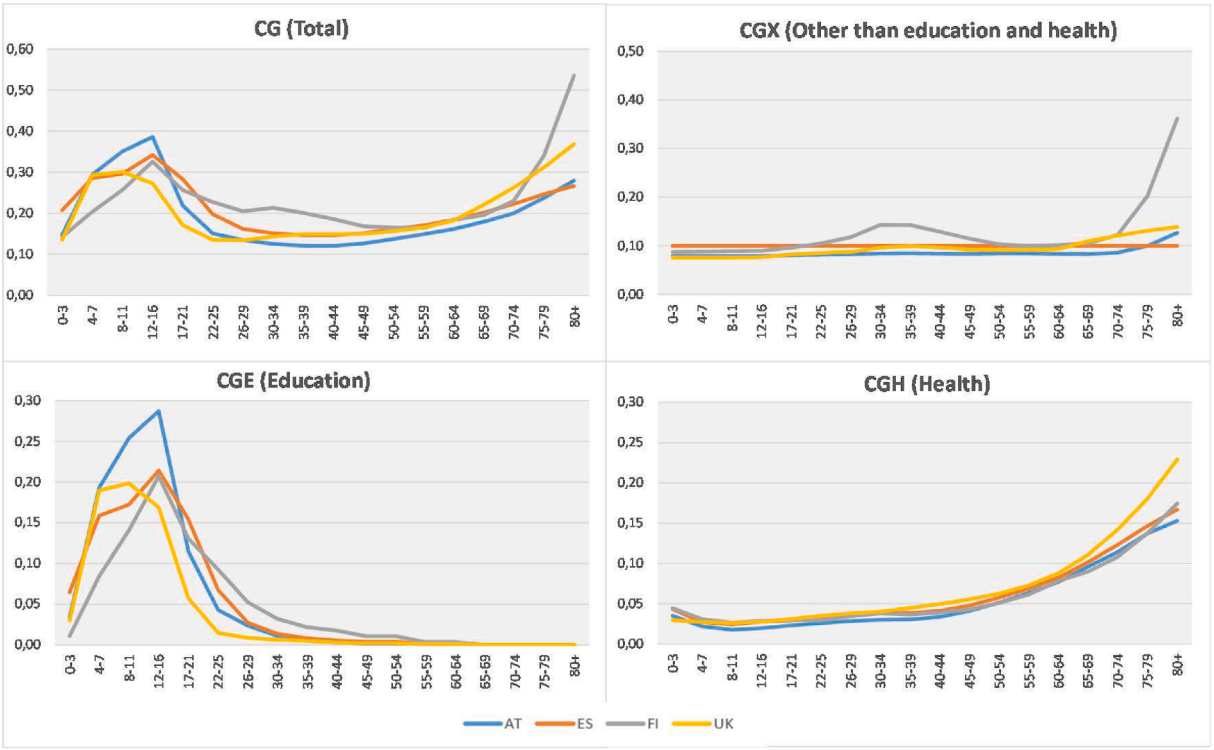


**Fig. 4.** Public consumption (CG) profiles, total and by main categories. Note: Values expressed in per capita terms, as a share of national YL 30–49. Public consumption (CG) is equivalent to public transfers in kind (TGII), as shown in Table 2. Source: Authors' calculations.

Spain for ages 0–21, but considerably higher from that age on. Regarding health, Austria, Finland and the UK show very similar profiles for the young. From age 17, the profile remains considerably lower in the UK. Another difference arises at older ages: while Austrian and Spanish profiles start to decrease, the Finnish profile increases sharply. In any case, note that health and education represent only a small part of total private consumption.

Regarding public consumption, Austria presents the highest profile of public education consumption, consistent with their low value for private education. On the contrary, Finland shows the lowest level until age 16. The profile of public consumption of health is similar in the four countries, and only after age 65 the UK deviates clearly from the rest, with a much more pronounced increase. It is worth mentioning the Finnish case, where total public consumption is significantly higher than in the rest of the countries for two age groups, 25–44 and 80+. In the first case, this consumption is linked to different family policies channelled through in-kind transfers. Interestingly, in the next section we will see that these transfers are almost equal by sex and level of education, consistent with the Nordic welfare state model where public transfers tend to be universal. For the very old (80 + ), the increase in public consumption is mainly explained by long-term care policies, highly developed in the social-democratic welfare regimes but much less in the rest.

Overall, it is observed that private consumption explains the high profile of total consumption in Spain and the UK, especially for young ages. On the contrary, Finland shows the lowest private consumption levels at any age, followed by Austria. In Finland, however, public consumption is the highest for parenting ages and the very old, and in Austria for ages 4–21. Somehow, these patterns show the differences in welfare state characteristics across countries. Regarding in-kind public transfers, Austria is a country with a welfare state strongly geared toward the wellbeing of children, while Finland shows a high commitment to parenting ages and the elderly. The UK shows significant expenditure providing health services to the old.

Indeed, the first overview about the welfare state role in the four countries given by in-kind transfers (public consumption) needs to be completed by looking at public transfers received in cash, displayed in Fig. 5 (total and differentiated by its three main components: old age, unemployment benefits and family allowances). Data are again normalized to the YL 30–49 in each country. Clearly, old-age pensions are the most important, and are particularly high in Austria. Finland ranks second for ages 65–75, and UK for 75 + . In Spain, the level of old-age pensions is the same as in Finland and the UK until age 69, but considerably lower for older ages. Unemployment and family benefits present significant differences between countries. On the one hand, unemployment benefits are highest in Spain and quite skewed to the young, mainly due to the high unemployment rates in this country in 2010 (19.9%), in the middle of the Great Recession. Finland shows the second highest profile, although in this case the cause is not the number of unemployed (8.4%), but the high level of the benefits, especially for older workers (their unemployment rate was even lower, 6.1%). Austria is the country with the lowest unemployment level (4.8% on average; 2.2% for the older workers), though it shows a higher profile of benefits than the UK, where unemployment is almost double (7.8% and 4.4%, respectively) but the generosity of the welfare system is clearly lower.

Finally, regarding family benefits, Austria shows the highest profile, followed closely by Finland, although in this second country benefits' hump starts at later ages and finishes earlier. Family benefits in the UK, and especially in Spain, are substantially lower. In the case of Spain they are very limited in level and concentrated in a narrow rank of ages (30–40). Overall, results show that, as far as public transfers in cash are concerned, Austria is the country with a stronger welfare state, especially for the elderly, followed by Finland.

Considering public transfers received both in kind (Fig. 4) and in cash (Fig. 5) together, some interesting features are observed. On the one hand, Austria is the country with the highest level of protection for both children (through education) and the elderly (mainly through old-age pensions). This country also provides coverage against

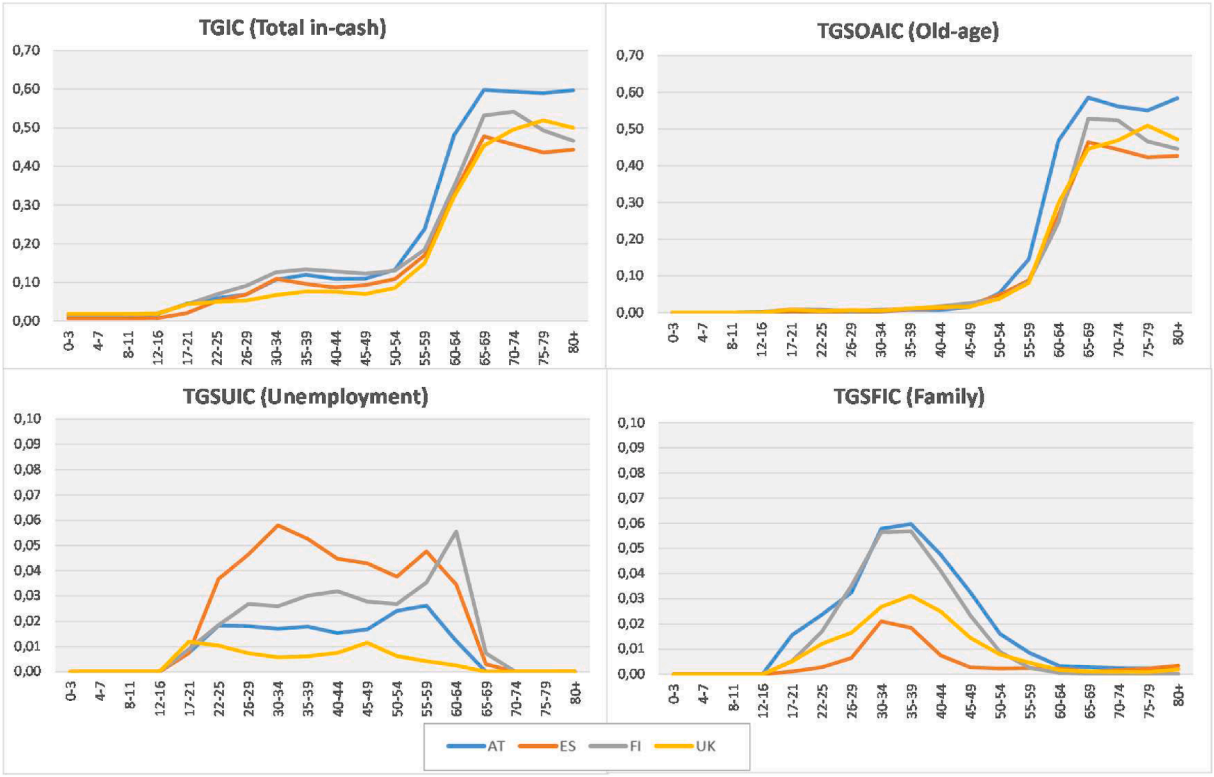


**Fig. 5.** Public transfer inflows in cash (TGIC), total and by main categories. Note: Values expressed in per capita terms, as a share of national YL 30–49. Source: Authors' calculations.

unemployment and generous family benefits, although for parenting ages Finland shows a higher level of protection, mainly through in-kind transfers. Finland also presents a very high level of in-kind transfers for the very old (80 + ), mainly due to long-term care programmes. Interestingly, Finland has the lowest level of in-kind transfers (in particular education) for young children. This is mainly due to the organization of childcare in this country, where direct aid to parents (long family leave, for example) is prioritized over early schooling. On the other hand, the UK shows considerable protection of the elderly (65 + ), mainly through health care and pensions. However, the level of protection is scarce for the rest of the ages. Finally, Spain shows the lowest level of social protection except for education.

It should be borne in mind that public transfers to individuals are mere resource reallocations. In other words, the public sector needs to collect those resources from the same society where later it puts them back. For that reason, not only are public transfers received by individuals (TGI) determinant to the welfare state system in a country, but so are taxes and contributions paid by individuals to the government (TGO), shown in Fig. 6. Age profiles of TGO are similar in shape to labour income profiles, as income is usually the primary tax base. However, some interesting cross-country differences can be observed. First, despite having a different size, Finland and Austria show a similar pattern of taxes and contributions paid: payments increasing during working ages then dropping significantly from age 55–60 on. In Spain, the profile is flatter and considerably lower during working ages, but it also falls after age 55. However the UK's TGO profile is the lowest for

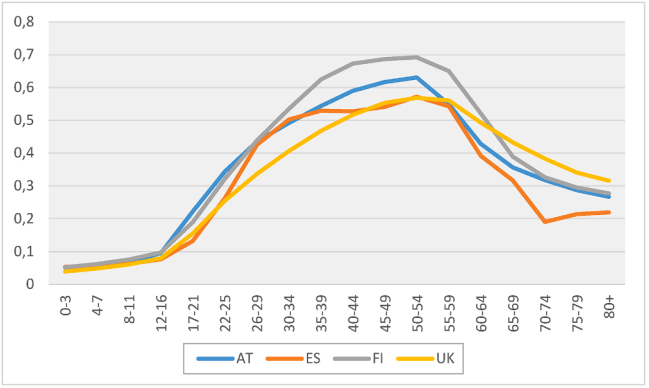


**Fig. 6.** Public transfer outflows (TGO) profiles. Note: Values expressed in per capita terms, as a share of national YL 30–49. Source: Authors' calculations.

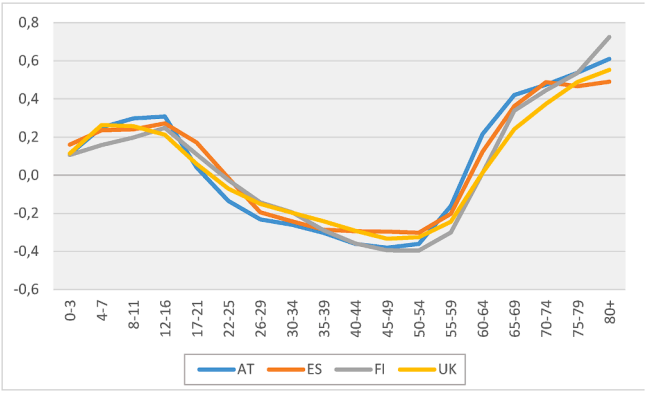


**Fig. 7.** Net Public Transfers (TG) profiles. Note: Values expressed in per capita terms, as a share of national YL 30–49. Source: Authors' calculations.

most working ages, while it is the highest for ages 65+,[11] implying a lower intergenerational redistribution than that observed in the other three countries.

Fig. 7 shows the net public transfers (TG) profile. Interestingly, despite the differences shown in inflows and outflows, the age pattern looks quite similar in all the countries studied.[12] The TG profile shows the difference between the public transfers received (both in-cash and in-kind) and paid on average by individuals of each age. From this figure, some changes arise regarding the picture observed when looking exclusively at public transfers received by individuals. Austria continues to be the country with the highest level of social protection of children and the elderly. However, Finland shows a significant protection of the elderly, although relatively lower than in Spain for ages below 80 (from this age on, the in-kind public transfers directed at long-term care programmes in Finland soar). Spain also shows considerable protection of children and youth (almost exclusively through education), while this is the lowest in Finland (as aforementioned, other forms of social protection of children –mainly aimed at their parents– prevail over education). The first noteworthy feature in Fig. 7 is that negative net public transfers in Finland are primarily concentrated in the middle-aged and older workers (40–65). Although younger workers (22–39) also pay taxes and contributions, they simultaneously receive significant inflows both in kind and in cash (as shown in previous Figs. 4 and 5). Overall, it seems that the Finnish welfare state tends to redistribute income in favour of parenting ages, besides the elderly and children. Something similar seems to be happening in Austria and the UK too, although to a lesser extent. In Spain, however, this is not observed. This aspect will be further discussed in the next section, presenting results differentiated by parenthood status. A second interesting finding from Fig. 7 refers specifically to the UK. This country shows a significant level of public transfers to the elderly, especially related to health care (as shown in Fig. 4). However, due to the relatively high level of taxes and contributions they pay (Fig. 6), British elders are the least protected in the pool of countries analysed (only those aged 75 + are less protected in Spain).

The level and composition of public transfers are indeed the determining components of national welfare state systems. However, a thorough analysis of welfare also requires consideration of how private reallocations work in each country. As stated in Eq. [2], LCD can be financed through public (TG) and private transfers (TF), as well as through asset reallocations (RA). Fig. 8 reveals appealing features about how private and public reallocations interact in the different countries analysed. It displays, for different age groups, the share of per capita consumption financed through labour income, private transfers, and public transfers. For the latter, we distinguish inflows (transfers received) and outflows (taxes paid) to give a more accurate picture and to ease the cross-country comparison. The first panel shows results for the two extremes of the lifecycle (economically dependent ages), children and the elderly, while the second one refers to working ages, split into three subgroups (26–29, 30–44 and 45–64). For young children, Austria stands out as the country where consumption is more dependent on net public transfers, while Spain and Finland are at the other extreme. However, it is worth mentioning an interesting difference between these last two countries: children in Spain receive and pay low public transfers, while in Finland they receive more, although they also pay more. This is probably a sign that the Finnish public sector is reallocating resources not only between ages but also at the intragenerational level.

For ages 17–25, labour income is the main financing resource for consumption in Austria (73% of their consumption). At the other extreme, Spanish youth have the lowest labour income (40% of their

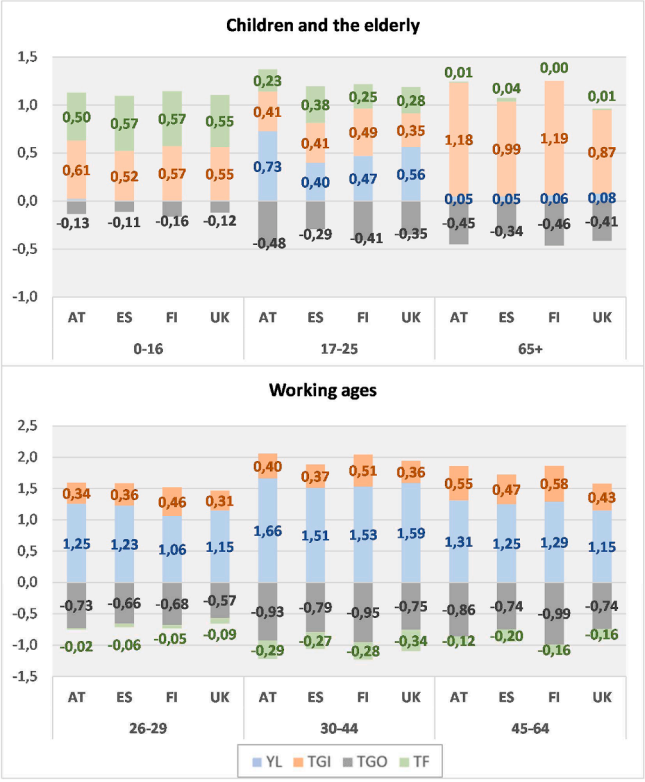


**Fig. 8.** How consumption (C) is financed by age groups: labour income (YL), public transfers (TGI and TGO), and private transfers (TF) as a share of consumption of the same age group. Note: values in average per capita terms by age group. Source: Authors' calculations.

consumption). Hence, they depend to a greater extent on private transfers (38%) and even on public transfers. Net TG is significantly positive for this age group in Spain, while it is zero in the UK and negative in Austria. Finland also shows a positive TG for this age group, although significantly lower.

The picture is completely different when looking at the elderly, where labour income and private transfers practically disappear, and public transfers become the primary source to finance their consumption. In this case, we verify that countries with the highest public benefits (Finland and Austria) also present the highest taxes paid. In the UK, however, old-age individuals pay higher taxes than Spain, while they receive less public transfers. Hence, we can infer that the public transfer system to the elderly is considerably weaker in these two countries.

As expected, at working ages labour income is the most important source of consumption funding. During their working ages, individuals also receive some public transfers, although taxes paid are always higher. Net private transfers are negative at that age. However, some interesting differences across ages and countries can be observed. First, Austria always shows the highest share of labour income in consumption funding, which is highest in the middle age group (30–44). Second, public transfers received in all four countries increase with age, while transfers paid decline for ages 45–64 with respect to 30–44 except in Finland. It is precisely in Finland where the public sector seems to play the most important role in reallocation. In this country public transfers (both paid and received) are highest except for younger workers (26–29), who pay more taxes in Austria although they receive less public transfers. On the opposite side, in that order, are the UK and Spain, where both transfers received and taxes paid are the lowest.

As for private transfers, they start to appear timidly at ages 26–29, becoming significant after age 30, coinciding with the parenthood period and the need to share resources with children. Interestingly, in the UK private transfers are the highest for ages 30–44 (34% of the same

[11] This is explained, as we will see later, by a higher asset income at old ages in the UK, a characteristic of the liberal welfare state.

[12] Normalization with respect to average labour income for ages 30–49 also hides some of the differences in absolute values, but it is necessary for a meaningful cross-country comparison.

age group's consumption), precisely where public transfers were the lowest. Also notable is the decline in private transfers observed for ages 45–64 as compared to ages 30–44. As children grow and become economically independent, private transfers made by parents decline. Austria is an outstanding example: the age group 17–25 finances 73% of their consumption with labour income, and therefore they do not need too much help from their parents, probably in the age group 45–64, who reduced private transfers to 12% (from 29% for ages 30–44). This decline is also visible in the rest of the countries, but to a lesser extent. The other extreme is Spain, where private transfers only decline from 28% to 20% of consumption for ages 45–64. The low level of the youth's labour income is the first reason, but late parenthood in this country is probably also part of the explanation.[13]

This general overview comparing age redistribution through public and private transfers across countries is completed in the next section. The analysis of the disaggregated profiles will shed light on a comprehensive understanding of the organization of the welfare system across countries, taking into account, on the one hand, the different roles of men and women and, on the other hand, family structures. Moreover, we will look at the possible influence of the level of education.

## Disaggregated NTA profiles: The role of gender, education and family structure

Figs. A.1–A.10 in the Appendix show the detail of the main NTA per capita profiles obtained for Austria, Spain, Finland, and the UK, disaggregated simultaneously by sex, education level, and family type. For the latter, we look at two characteristics: partnership (couples vs. singles) and parenthood status (parents vs. non-parents). Again, to ease cross-country comparability, all variables are normalized dividing their value by the average per capita labour income at ages 30 to 49 (YL 30–49) in the corresponding country, as usual in NTA.

It is worth recalling that single parents are not distinguished by sex due to the low representativeness of this type of family for men and some age groups (on average more than 85% of single parents with dependent children are women in the countries considered, and in the case of single fathers they represent only around one per cent of the male population at ages 17–59). Note, also, that dependent children (0–25) are distinguished by their parents' education level but not by sex, while independent students (17–25) are neither distinguished by sex nor by education level.

Labour income (Fig. A.1) is always higher for men due to gender differences in wages and in labour force participation and employment. Finland shows the lowest differences by sex, while the UK has the highest. Looking at educational attainment, as expected, labour income grows with education, the huge increase for highly educated men in the UK being notable.

Looking at family types, fathers tend to have higher income than childless men in Austria and Finland, while this is true only for medium-educated men in Spain and for the highly educated in the UK. In the case of women, the opposite occurs: mothers have lower labour income as compared to childless women in all countries, the difference being lower in Spain and Finland, and higher in Austria. These observations confirm the lower labour market participation of women, and especially of mothers, even if highly educated. Indeed, in Austria there is a high percentage of women working part time, especially after a child is born.

In the four countries, men in a couple have higher labour income than singles, while this is not necessarily true for women, depending on parenthood status and the country.[14] In general, but especially in Spain and Finland, women have more similar labour income by family type than men for all education levels.

In the case of dependent children aged 17–25, in general, they have low labour income (more relevant in Austria), which decreases with the education level of their parents, probably due to their lower participation rate linked to education decisions.

Overall, our results show that parenthood has a certain influence on the labour income profile, as Fig. 9 summarizes. In general, childless people predominate at younger ages, and their labour income is higher than that obtained by parents, while the reverse tends to occur for older workers. Nevertheless, the age at which that crossroads occurs and the difference between the two types of families vary across countries. Austria and the UK show the biggest difference in childless labour income compared to that of parents, lasting from age 17 to beyond 40. On the contrary, the differences between childless and parents' labour income are much lower in Finland and Spain, and they finish earlier (around age 35). From ages 35–40 to 60, parents show higher labour income than childless people, although in Austria differences are smaller than in the other countries.

Disaggregated consumption age profiles (Fig. A.2) show smaller differences than those observed in labour income in all dimensions (sex, education, and family type). Spain is the country with the highest differences in consumption by education level, whereas Finland shows the lowest. A common pattern in all countries is that parents have lower consumption than non-parents, especially at working ages. This is consistent with the fact that parents must share part of their private consumption expenditure with their children.

Comparing singles and couples, singles in Austria have higher consumption (the difference increasing with age). This could be explained to some extent by economies of scale (some expenditures are shared when living in a couple). However, this does not happen in the other three countries.

Overall, differences in consumption by family type reflect variations in private consumption, as public consumption is not distinguished by parenthood or partnership status. In the case of dependent children, there are differences by education level due to both private consumption and public expenditure on education.

As a result of differences in labour income and –to a lesser extent– consumption age profiles, the LCD differs substantially across all dimensions (Fig. A.3). The total profile is negative at most working ages, meaning that there is in fact a lifecycle surplus as labour income exceeds consumption during that period of life of the representative individual. However, focusing on the disaggregated profiles, interesting differences arise. First, women have a lower surplus (negative LCD), or even a deficit during their working ages, due to their lower labour income but a similar level of consumption. This brings up the recurring issue that National Accounts (or NTA) do not account for non-market activities, crucial in creating welfare, which are mainly performed by women. Indeed, this is a shortfall to deal with, and NTA has made progress in this respect by extending its methodology to estimate national time transfer accounts (NTTA), although this is beyond the scope of this paper.

Second, education level also significantly impacts the LCD profiles, similar to that previously observed for labour income. Higher education results in a higher surplus during working ages, the increase being especially important for the highest education level and in the UK, although it is also confirmed in the rest of the countries.

Third, regarding family structure, for working ages it is generally

[13] The mean age of women at birth of first child in Spain is 31, while around 29 in the UK, Finland and Austria.

[14] The kink that can be observed for young adult ages in the labour income profile is due to the fact that at ages 17–25 the adult profiles only include individuals who are not enrolled in education, while this is not the case from age 26 on. Enrolled young adults are included either in "dependent children" if they live with their parent(s) or "independent students" if they do not.

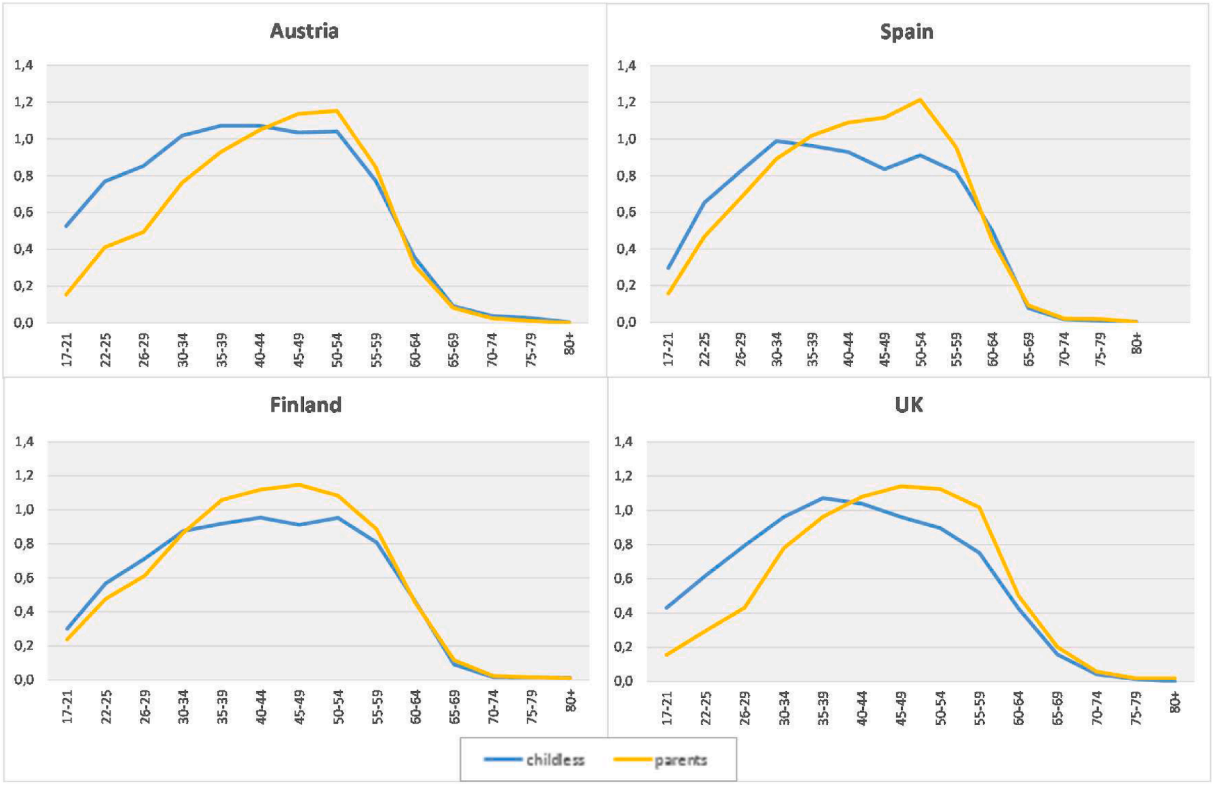


**Fig. 9.** Labour income (YL) profiles by parenthood status. Note: Values expressed in per capita terms, as a share of national YL 30–49. Source: Authors' calculations.

observed that men living in a couple are better off than singles (they have a higher surplus). However, the differences are much lower for women and for older ages (65 + ). By parenthood status, we observe that the lifecycle surplus for parents at working ages is higher than for childless people. Around age 55–60, when the LCD becomes positive (a deficit), it is lower for parents. This pattern is observed in all four

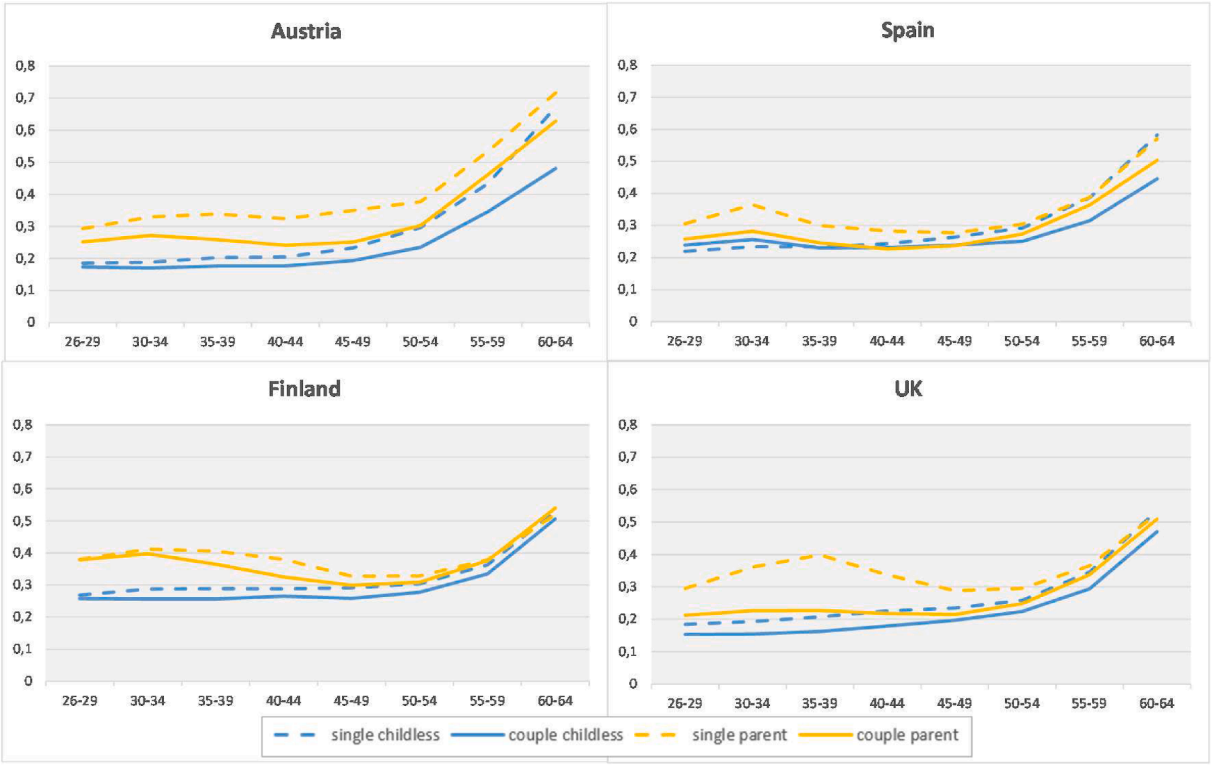


**Fig. 10.** Public transfer inflows (TGI) profiles by family type (ages 26–64). Note: Values expressed in per capita terms, as a share of national YL 30–49. Source: Authors' calculations.

countries, although in Austria differences between parents and the childless are lower than in the rest of the countries.

Overall, we found that sex, education, and family structures matter to some extent in determining the LCD profiles. Impact of sex and education is quite similar across countries (women and the less educated have less favourable LCD profiles). The effect of family organization is not so straightforward and presents some differences across ages. To explore the differences further, it is crucial to investigate the mechanisms to finance LCD, that is, mainly, public and private transfers. In other words, we need to go deeper into the organization of the welfare systems in each country.

Fig. A.4 shows the age profiles of total public transfers received by individuals (TGI). Those transfers can be in-cash (pensions, unemployment benefits, family allowances, etc.) or in-kind (education, health and long-term care, among others). As explained in Section 2, data availability has not allowed us to obtain disaggregated profiles for in-kind transfers, and therefore the observed differences in TGI are exclusively due to cash transfers. Our results show that, at working ages, public transfers received do not differ significantly by sex and education level, but some differences can be observed by family structure. To better observe this fact, Fig. 10 shows the age profiles of TGI only differentiated by partnership and parenthood status in each country, for ages 26–64. From this Figure, we see that receiving public transfers at working age depends mainly on being a parent. They are especially generous in Finland, while the opposite occurs in the UK and Spain, where public transfers are mainly targeted at single parents.

At ages 26–64, individuals can basically receive two different kinds of public transfers in cash: family and child-related allowances and unemployment benefits. Fig. 11 shows both of them in each country, distinguishing between parents and non-parents. In Finland and Austria, family transfers are twice as high as in Spain and the UK. In Spain, unemployment benefits are clearly higher than in the other countries, mainly due to the high levels of unemployment in this country. As for the UK, unemployment benefits are very low, both for parents and for the childless. Summarizing, Finland and Austria show more consolidated welfare systems, redistributing resources according to family characteristics, while the UK and Spain are at the other extreme.

As for the elderly, sex and level of education do have a significant impact on public transfers received (Fig. A.4), while family structure is less relevant. This can be explained by the fact that old-age pensions are mainly dependent on labour income age profiles. As women and the less educated have lower income profiles, their old-age pensions are significantly lower than those of men and the more educated.

On the other side of the coin, to finance public transfers to individuals the public sector needs to collect taxes and contributions (TGO) (the disaggregated profiles are shown in Fig. A.5). On the one hand, as expected, TGO profiles are similar in shape to labour income profiles, as income is the main tax base. Hence, they are highest at working ages, and decline after age 50–60. On the other hand, also consistently with labour income profiles, men pay higher taxes than women, and the highly educated pay more than the less educated. Regarding family types, the childless pay more taxes than couples at younger ages, and the opposite occurs until age 60, although the differences are small in Austria. For couples, the TGO profile is higher than for singles at almost any age, except in the case of Austria, where the opposite occurs for most age groups, although the differences are small.

The analysis of the disaggregated NTA profiles and their impact on the welfare system must also take into account the redistribution through private transfers (Fig. A.7). TF are an important instrument for redistributing resources between generations, especially for children, as they can hardly recur to the market. For this age group, TF profiles are complementary to TG profiles. We found that sex and parenthood status are crucial in determining the TF profile. First, most TF are provided by men, while in some cases women hardly have a positive profile (they receive more transfers than they give). This is partially due to the NTA assumption to estimate intra-family transfers that the household head is the only donor. Even so, the difference by family structure is revealing, as shown in Fig. 12: parents are the main givers of private transfers. Spain shows the highest negative profiles of TF, because Spanish children have the relatively highest consumption (Fig. 2 in previous section

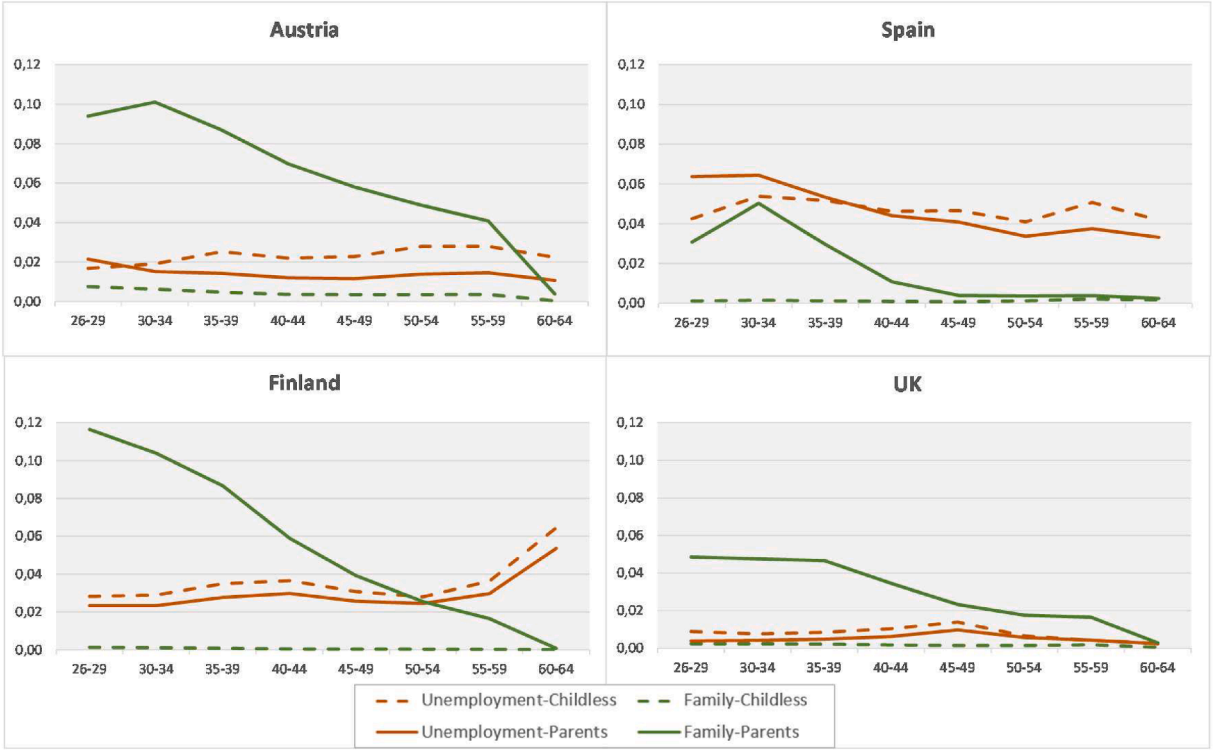


**Fig. 11.** Profiles of family transfers and unemployment benefits received by parenthood status (ages 26–64). Note: Values expressed in per capita terms, as a share of national YL 30–49. Source: Authors' calculations.

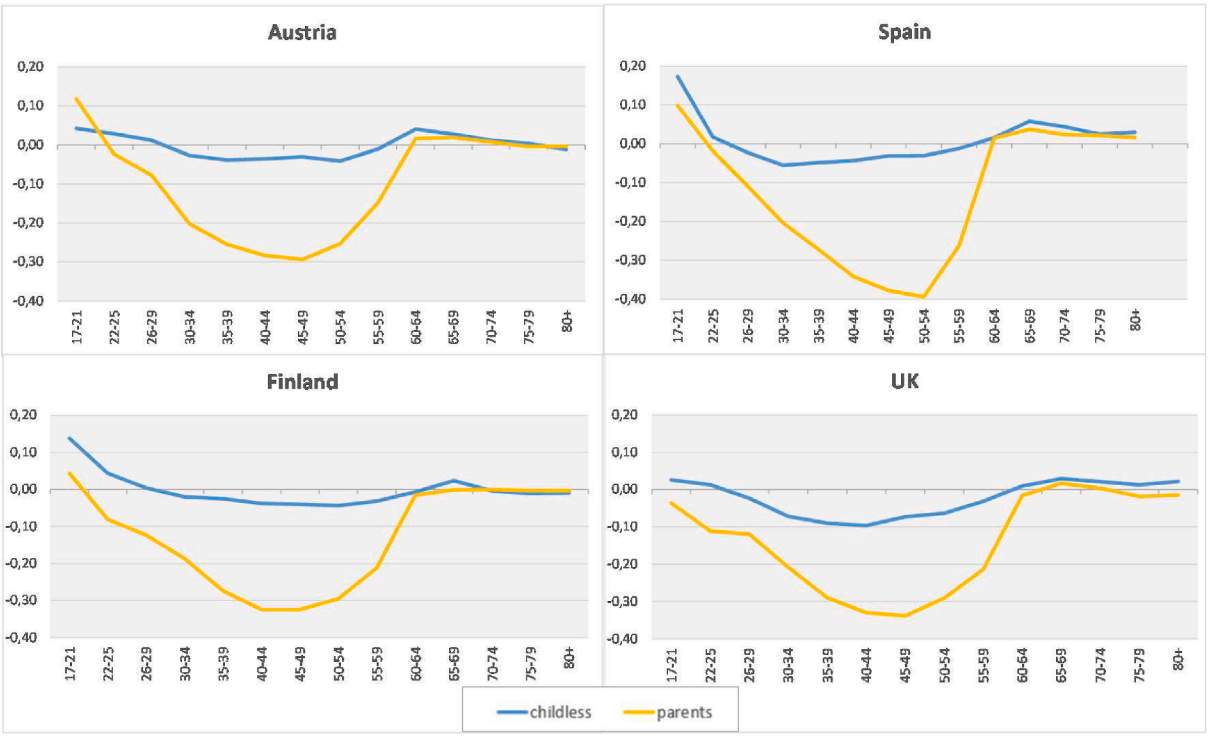


**Fig. 12.** Net private transfers (TF) profiles by parenthood status. *Note*: Values expressed in per capita terms, as a share of national YL 30–49. Source: Authors' calculations.

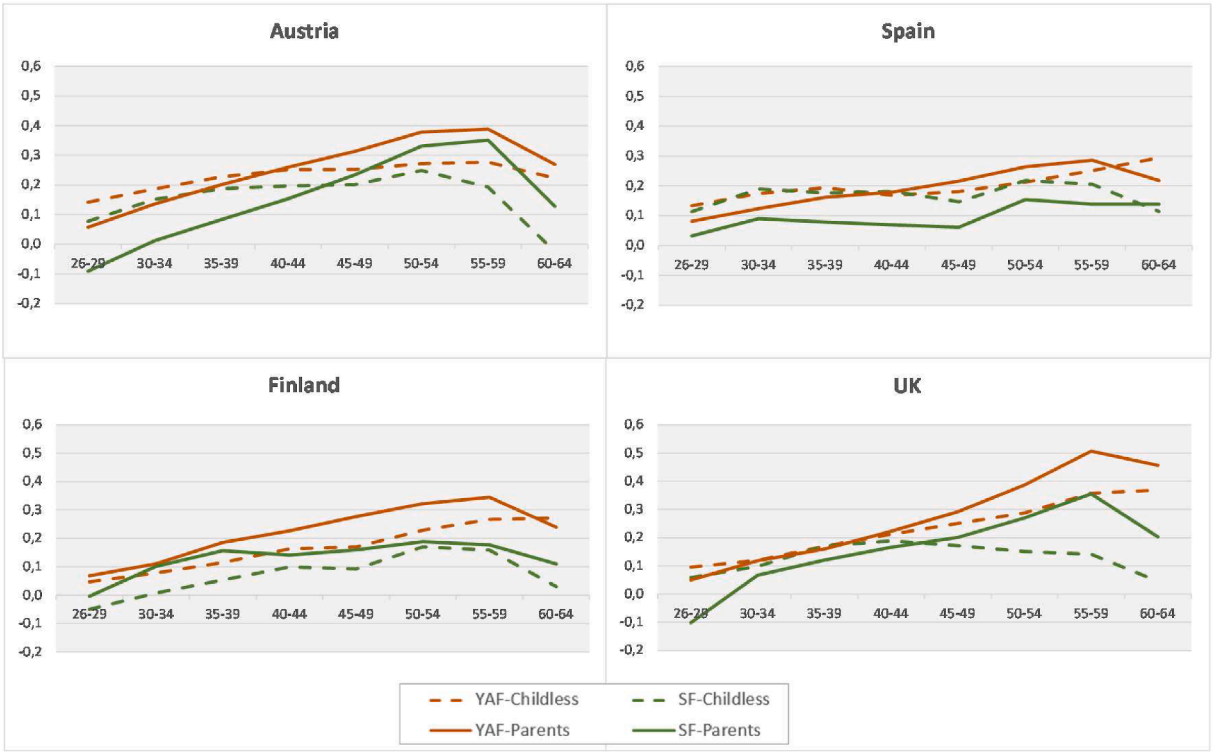


**Fig. 13.** Private asset income (YAF) and private saving (SF) profiles by parenthood status. Note: Values expressed in per capita terms, as a share of national YL 30–49. Source: Authors' calculations.

or Fig. A.2 in the Appendix), together with relatively lower TG. Moreover, the TF profile peaks at later ages than in the rest of the countries, probably reflecting the late parenthood and the high age at which children leave home.

To complete the analysis of the reallocation devices, Figs. A.9 and A.10 in the Appendix show the private asset income and private saving profiles, the two components of the asset-based reallocation in Equation 2. Similarly to labour income, private asset income is higher for men and

increases with education level, being especially high in the UK compared to the other countries. In terms of family type, men in couples have the highest levels. Fig. 13 shows different patterns by parenthood status. Interestingly, the UK shows a clearly distinct increasing trend by age, consistent with lower old-age public transfers. Looking at ages beyond 30 –where parenthood status is more clearly defined- parents tend to have more asset income. This could be partly due to a stronger bequest motive and/or to the fact observed above that they tend to have higher income.

## Discussion and final remarks

In this paper, we extended the NTA methodology to include sex, education level and family structure in the estimation of age profiles. In this way, we aimed to obtain the necessary data for a comprehensive analysis of both inter and intragenerational distribution of resources in society.

Our results show that sex, education, and family structures do matter in society's organization, as does age. First, as expected, labour income is always higher for men due to the existing gender gaps in wages and labour force participation. Moreover, labour income grows with education level. These patterns are present in the four countries analysed, although small differences can be observed between them. The role of family structures is not so straightforward. On the one hand, people living in couples show higher labour income profiles than singles, except in Austria, where the opposite occurs until age 40, although the two profiles are closer than in the rest of the countries. The differential trait in this country is the labour profile at younger ages (18–30), which is considerably higher than in the rest. On the other hand, parents tend to have a higher labour income than the childless, the differences being particularly high in Finland and lower in Austria.

Differences in consumption profiles are considerably smaller than those observed in labour income in any dimension. Consequently, the LCD profiles (difference between consumption and labour income) show similar patterns to those observed in labour income. Other interesting results are found when looking at the reallocation devices to finance LCD, including public and private transfers and asset-based reallocations. At working ages, receiving public transfers depends mainly on being a parent. Benefits are especially high in Finland compared to the rest of the countries, summing up both family allowances and unemployment benefits. Family allowances are also important in Austria, but not unemployment. On the contrary, in Spain and the UK family benefits are extremely low, although Spain shows high unemployment benefits.

For the elderly, patterns change as public transfers received are mainly retirement pensions, which depend to a great extent on past contributions. Hence, sex and education again play the main role, while family structure is less relevant.

Regarding private transfers, sex and parenthood status become the crucial dimensions. First, consistently with labour income profiles, men are the main givers of private transfers, as they are also the main earners of labour income. Second, parents give much more private transfers than childless people, as they need to share resources with their children.

The results point to the influence of the welfare regimes of each of the four countries analysed. First, Finland represents the Nordic or social-democratic welfare state model. This is characterized by promoting social protection together with full participation in the labour market, hence leading to high employment rates and a lower gender gap. Public policies in this country tend to ensure protection at the highest standards for everybody, independently of past contributions. These characteristics are reflected in the derived disaggregated NTA profiles, where we observe lower differences in labour income by sex and education level and a high level of public transfers received and of taxes and social contributions paid. Finland has the highest inflows and outflows of public transfers, meaning that, with respect to other countries, on average individuals pay and at the same time receive more transfers; but the resulting net amount of transfers is similar to the other countries considered. Finland has the highest differences in public transfers by education level, reflecting a high level of redistribution. It is also the country with the highest transfers to the elderly (especially public transfers) and with the lowest private asset income, in line with the more generous transfers expected at old ages. Moreover, Finnish parents receive generous public transfers in the form of family and children-related allowances. Regarding labour income, fathers earn more than childless men but the gap by parenthood status for women is much lower than in other countries, due to full employment policies. These policies also explain that women at old ages receive higher pension benefits, closer to men's, as compared to the other countries.

Second, Austria represents the Continental or conservative welfare model, where the institutions follow the traditional norms and family plays an important role. Public transfers are generous, especially family and children-related allowances, although public education after age 16 is low as compared to Finland or Spain. In Austria, fathers have more labour income than childless men, while mothers have much lower labour income with respect to childless women, due to a high presence of part-time employment for mothers. For this reason, mothers who live in a couple are net recipients of private transfers.

In Spain, representing the Mediterranean model, the extended role of the family achieves the most central consideration, but the welfare state is characterized by significant gaps in protection, being focused especially on old ages. Private transfers are the highest in this country, and are directed mostly toward children. Family-related allowances from the public sector are less important, leading to a higher participation of mothers in the labour market.

In the Anglo-Saxon or liberal welfare state regime the main role is given to the markets, and the public sector acts from a subsidiary perspective, guaranteeing a social minimum for all citizens. This is reflected in the profiles obtained for the UK, with large differences in labour income by sex and education level, leading to the highest variation in lifecycle deficits and to mothers in a couple being net recipients of private transfers throughout their lifetime. Public transfers, including retirement pensions, are less generous. Therefore, private asset income is higher, to compensate for the lower transfers, and the elderly need to rely to a great extent on their savings.

Our analysis contributes to the literature on welfare models by directly measuring the degree of familiarization of the welfare models and, hence, analysing its impact on redistribution by family status. Interestingly, our disaggregated profiles by parenthood status explain the size and direction of public and private transfers observed previously in NTA. Table 3 shows synthetic indicators summarizing the results in this respect. The indicators compute the total size of per capita public and private transfers (inflows, outflows and net transfers), with respect to the total size of per capita labour income. By measuring all magnitudes in per capita terms, the indicators are not affected by the demographic structure of the population. Calculations are done for total population and for parents and non-parents. The numerator is computed from the age of 26 to capture the differences between parents and non-parents. The total value of the indicator in the last column for each country shows as expected that the size of public sector (presented by both, TGO and TGI) is the highest in Finland, followed by Austria, the UK and Spain. Interestingly, in all countries except Spain, parents receive more public transfers (TGI), while their payments (TGO) can be higher (in Austria and the UK) or lower (Finland and Spain) than for non-parents. As a result, the net value of public transfers (TG) is higher for parents, although the differences with respect to non-parents are relatively small except in Austria.

Regarding private transfers (TF), the total size of outflows (TFO) is clearly higher than inflows (TFI), as it can be expected during the parenthood age. The differences in transfers given (TFO) by parenthood status are also sizable in all countries as expected. Interestingly, the total size of private transfers given during parenthood age does not show the order expected in the degree of familiarization of the welfare models. In Spain –the representative of the Mediterranean model- total TFO are

**Table 3**
The welfare state and the parenthood status: Summary indicators.

| | AT | | | ES | | | FI | | | UK | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | non-parents | parents | total | non-parents | parents | total | non-parents | parents | total | non-parents | parents | total |
| TGO | −70.5% | −77.0% | −74.4% | −69.5% | −64.1% | −66.3% | −81.5% | −81.1% | −81.2% | −69.4% | −75.8% | −72.4% |
| TGI | 75.9% | 92.6% | 85.8% | 76.1% | 73.2% | 74.4% | 87.5% | 90.1% | 89.0% | 73.3% | 80.2% | 76.5% |
| TFO | −8.8% | −28.9% | −20.7% | −12.3% | −34.5% | −25.5% | −11.9% | −34.5% | −25.4% | −15.5% | −38.1% | −26.2% |
| TFI | 7.4% | 8.5% | 8.1% | 11.8% | 11.7% | 11.8% | 9.0% | 12.4% | 11.0% | 11.3% | 14.5% | 12.8% |
| TG | 5.4% | 15.6% | 11.5% | 6.6% | 9.1% | 8.1% | 6.0% | 9.0% | 7.8% | 3.9% | 4.4% | 4.1% |
| TF | −1.3% | −20.4% | −12.6% | −0.5% | −22.8% | −13.7% | −2.9% | −22.1% | −14.4% | −4.2% | −23.6% | −13.4% |

*Note*: Each indicator measures the total size of each per capita magnitude (inflows, outflows, and net values of public and private transfers, as reported in Table 2), with respect to the total size of per capita labour income.
*Source:* Authors' calculations.

25.5% of total labour income, only slightly above 25.4% in Finland and slightly below 26.2% for the UK. Austria, the representative of conservative model, has the lowest value (20.7%). This is explained by the fact that the recourse to the family is not only affected by the size of the public sector, but also by the role played by the market. As seen above, the high level in the UK can be explained by the role of private education, while the small value in Austria is explained by their youth emancipating very early.

Overall, our results suggest that higher private transfers from parents are hardly compensated by higher transfers from the public sector in some countries, with a higher compensation in Austria.

The analysis developed in this paper has several applications. First, it brings together different comparative European data sources identifying gaps to be filled in order to be able to investigate the impact of the welfare state on income redistribution, at both intra and intergenerational levels. In this respect, it constitutes an extension of the NTA methodology exploring the potential of estimations at the micro level. Second, the cross-sectional profiles obtained can be used to estimate the lifetime contribution of individuals to their families and to the public coffers (see Spielauer et al., 2020b). Third, since the disaggregated profiles differ from the aggregate ones, these can improve the results of projection models investigating the impact of ageing on the sustainability of the economy and welfare state transfers, capturing also the effects of the education transition (see Spielauer et al., 2020a; Spielauer et al., 2020b).

Further research is needed in this direction to complement this analysis with disaggregated National Time Transfer Accounts (NTTA). This would allow us to have a comprehensive view of the degree of familiarization of the welfare models and, hence, its impact on gender equality and to investigate the extent to which the size of the welfare state and the role of the corresponding redistributive policy counteract the impact of explicit or implicit family policy measures.

## CRediT authorship contribution statement

**Gemma Abio:** Conceptualization, Data curation, Methodology, Software, Formal analysis, Writing – original draft, Validation. **Concepció Patxot:** Conceptualization, Data curation, Methodology, Software, Funding acquisition, Investigation, Supervision, Project administration, Resources, Validation, Writing - review & editing. **Guadalupe Souto:** Conceptualization, Data curation, Methodology, Software, Funding acquisition, Visualization, Project administration, Resources, Validation, Writing - review & editing. **Tanja Istenič:** Conceptualization, Data curation, Methodology, Software, Formal analysis, Investigation, Supervision, Validation, Writing - review & editing.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Appendix A. Supplementary data

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