What does the welfare state really do? The government in the system of inter-age reallocations

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Abstract

The welfare state has multiple roles in developed countries. Welfare programs redistribute income among overlapping generations in order to finance human capital investment and consumption of people in the inactive phases of their lifecycle from contributions of those in working age. Also, the welfare state alleviates poverty and mitigates inequality by transferring income from the relatively well-to-do to the poor. In this study we propose a cross-sectional framework to analyse redistribution by age and socio-economic status (SES) simultaneously and assess the relative importance of these two variables in explaining the access and contribution to public benefits. Our data from 2010 (based on EU-SILC and Household Budget Surveys) covers government transfers (cash and in-kind) and both direct and indirect taxes in 22 EU member states. We compare the importance of age and SES in explaining government transfers and taxes in a regression-analysis framework. We assess both causal importance (via comparison of coefficients) and dispersion importance (using the Shapley-value decomposition) of age and SES. Our results show that redistribution between age-groups is more important than redistribution by SES in all countries included in the study. The welfare state dominantly finances benefits for age groups in inactive age from resources collected from the well-to-do in working age. Our results suggest that poverty and inequalities mitigated by welfare states in EU countries are dominantly of demographic origin. Our results call for a revision of the image of the welfare state in general and questions traditional approaches to the analysis of welfare state efficiency.

Keywords: targeting of welfare benefits; Matthew-effect; intergenerational transfers; poverty; inequality; welfare state

1.Introduction

Conventional analysis of targeting of welfare state programs focuses on the role of benefits in redistributing income between the rich and the poor. Le Grand (1982) systematically analyzes the distribution of public expenditure on health, education, housing as well as public and private transportation and demonstrates the mistargeting of benefits. Since Le Grand's path-breaking work, measuring the distributional effects of welfare programs by income has become the subject of intensive research and indeed a statistical routine of national statistical services or international agencies, such as the OECD or Eurostat. The issue has resurfaced more recently in the context of the social investment research program, which advocates for a shift from passive income replacement programs to active human capital investments. Reflecting the importance of the issue, the Matthew-effects of social investment programs are the subject of numerous recent studies (Cantillon 2011, Vandenbroucke and Vleminckx 2011, Vaalavuo 2013, Kuitto 2016, Bonoli and Liechti 2019, Pavolini and van Lanckert 2019).

However, there is an alternative interpretation of the role of welfare state programs, emphasized by demographers and representatives of household economics, in which the welfare state is primarily a tool of financing the inactive sections of the lifecycle through resource reallocations flowing from people in their working age to children and elderly people. This type of modelling is based on the recognition that the largest chapters of social expenditures are assigned to specific sections of the lifecycle and have characteristic age profiles (see Barr 2001). Education is consumed by children and young adults. Health care is spent disproportionately on infants and older people. Pensions are paid to people living the last two or three decades of their lives. Long-term care spending is even more concentrated at the end of the lifecycle. Only smaller budgets, such as sick pay, unemployment benefits or expenses on active labor market policies are directed to working age people. This literature explains the existence of the institutions of the welfare state by their potential for efficiency enhancement. Market failure or family failure produce suboptimal outcomes and government intervenes in order to realize potentials (Becker and Murphy 1988, Kotlikoff and Spivak 1981, Cigno 1993, Boldrin & Montes 2005).

If the welfare state can be an inter-age as well as an inter-status project the analysis of targeting should be extended from one dimension (socio-economic status, SES) to two dimensions (SES and age). Below we will make this extension using data on EU countries. We apply multivariate regression techniques to separate the effects of age and SES and analyze which one is more important in explaining access to social benefits (including both cash and in-kind transfers) in different European welfare states covering 22 countries of the EU.

2. Data and methods

Our main data sources for the study of the distribution of welfare benefits and taxes by SES and age is the European Union Statistics on Income and Living Conditions (EU SILC). As a complement the Household Budget Survey (HBS) and the European Health Interview Survey is used to provide data on consumption expenditure and consumption of health care services. The database includes data for year 2010. Our data covers 22 EU member states. Below we explain briefly how we measured welfare benefits received (section 2.1) and taxes paid by households (section 2.2). We continue the description of our methodology by describing the construction of the socio-economic status indicator (section 2.3.) and our approach used to measure the importance of age and SES in explaining access to social benefits (section 2.4).

2.1.Welfare benefits

Cash benefits are recorded in several aggregate variables in EU-SILC such as old-age pensions, survivor benefits, sickness benefits, disability benefits, unemployment benefits, education-related benefits, family/children related allowances, social exclusion benefits and housing allowances. Allocating cash benefits among household members is sometimes less than straightforward. In the case of family benefits, social exclusion benefits and housing allowances EU-SILC only records household level data, so assumptions need to be made when calculating individual-level benefits. In other cases, conceptual problems of incidence require intervention by the researcher. In particular, in a country with extended and generous maternity and family benefit programs, the outcome of the analysis might be affected by the choice of such benefits being assigned to the child or the parent. As arguments can be advanced in favour of both methods, we investigate the robustness of our results to these incidence assumptions.

In contrast to cash benefits, consumption of welfare related public services in kind is not recorded in these surveys. We have to estimate the value and sometimes the very use of such services from external information sources. We used the assumption most frequently applied in the literature, which assumes that the value of a service equals the average cost of its provision (Verbist et al. 2012). As for education, including early childhood care and education, users can be identified in EU-SILC. The survey explicitly asks about attendance and the level of attendance by household member. We imputed public spending by attendee of the corresponding education and levels. For health care, we applied the "insurance value approach" (Verbist et al., 2012), which assumes that every individual receives a benefit determined by the average health care spending on their risk group, irrespective of the actual use of services. We employed data from the first wave of the European Health Interview Survey (EHIS), which records the number of days spent in hospital as well as the number of visits to a general practitioner or doctor.

Different types of welfare expenditure (cash benefits and in-kind benefits) were then adjusted to macro-aggregates of the National Accounts (Eurostat *gov_10a_exp*).

2.2. Revenues of the welfare state

On the taxation side, calculations on the revenues of the welfare system start with the assumption that the system raises as much funds as it spends: what is not covered by earmarked taxes, such as social contributions, is financed from what we call general taxes that are a composite of government revenues other than social contributions.

Taxes levied on labour income are reported in EU-SILC at the household level. Such direct taxes are divided between household members in the proportion of their labour income. Payment of indirect taxes (VAT and excise taxes) is first estimated using data from the HBS, which contains detailed information on household consumption of various goods and services. Individual VAT payments are calculated from individual consumption expenditure and VAT rates[1]. Individual consumption expenditure is derived from household aggregates using the OECD II equivalence scale. Excise tax, which is levied on consumption of tobacco, alcohol and fuel is estimated from HBS and EHIS data. In order to keep our set of incidence assumptions consistent, we assigned taxes levied on the consumption of children to them, the children, that is the actual consumers and not the parents.

Indirect taxes calculated in HBS were imputed to EU-SILC data to allow joint analysis of direct and indirect taxation. Similarly to other studies analyzing the redistributive effect of indirect

[1] Average VAT rates by main COICOP categories were taken from CPB (2013).

taxes, such as De Agostini et al. (2017) or Pestel & Sommer (2017) we used a regression-based method for the imputation. We constructed a model of VAT payments in the HBS based on overlapping socio-demographic variables[2] as explanatory variables and applied this model to predict the VAT payment of households in the EU-SILC. A similar method was used to impute units of alcohol and tobacco consumption from EHIS into EU-SILC in estimating the age and SES profiles of excise taxes. All tax items assigned to taxpayers were finally readjusted to the aggregates reported in National Tax Lists and the Excise Duty Tables of the Directorate-General for Taxation and Customs Union of the European Commission.

2.3. Measurement of socio-economic status (SES)

SES scores were constructed by combining information on education and occupation of household members, as well as information on material living standards and housing. Level of education was measured by the number of years spent at school[3]. As for occupation, the EU-SILC records the actual occupation (ISCO-88) in current main job (for those in active age) or in last main job (for the inactive). These codes were converted to International Socio-economic Index of Occupational Status (ISEI) scores using methods developed by Ganzeboom & Treiman (2010). Again, occupation at the household level was measured by the mean score of adult household members.

The measure of material deprivation is based on the nine items of EU-SILC assessing the financial stress facing a household and the durables it can afford. These items are the same as the ones used by Eurostat to construct the severe material deprivation indicators (see Guio, 2009). However, instead of adopting a cut-off, we add up the 0-1 indicators to arrive at a material deprivation score. Our housing scores are based on the Eurostat measures of household deprivation, such as having a leaking roof, damp walls, floors or foundations; no bath or shower in the dwelling; no indoor flushable toilet for sole use of the household; or the dwelling being too dark. These 0-1 indicators are added up to form an indicator of housing deprivation. A further variable measuring overcrowdedness is added based on the number of rooms relative to the number of inhabitants. Again, we followed the definition by Eurostat (2017). The composite indicator of a household's economic status has been constructed from the basic dimensions of education, occupation, material deprivation, and housing by principal component analysis.

2.4. The relative importance of age and socio-economic status

We apply an OLS regression framework to study the relative importance of age and SES in explaining the level of benefits received or taxes paid the individual in EU member states:

$$Y = \alpha + \sum_i \beta_{Ai} Age_i + \sum_j \beta_{Ij} Status_j + \varepsilon, \qquad (1)$$

where Y represent benefits, taxes or net benefits, respectively in separate runs; Age_i and $Status_j$ are categories for age and SES ($i, j = 2, ..., 10$) and the βs are regression coefficients.

[2] Variables used to predict household VAT payment: gender of household head, age of household head, percentage of household members below age 5, percentage of household members between age 6 and 14, percentage of household members aged 70 years or older, urbanization (densely populated, intermediate, thinly populated), region, household size, household type (six categories), highest education level of household head (less than upper secondary, upper secondary, tertiary), economic activity of household head (employed, unemployed, retired, inactive), occupation of household head (10 categories) and log household income.

[3] The original EU-SILC variable, which measures the highest attained level of education has been converted into years of schooling based on Table A1.1. from the OECD (2013).

We use categorized versions of age and SES in order to allow for non-linearities in the effects of the variables. We created 10 categories of equal size in both dimensions, so the distribution of SES categories is the same as the distribution of people in the age groups The statistical literature on importance of regressors in multivariate regressions differentiates between causal (or theoretical) importance and dispersion importance of a predictor variable (e.g. Achen, 1982; Grömping, 2015). *Causal or theoretical importance* is the change in the outcome variable in response to a unit change in the predictor variable. This can be measured using regression coefficients. *Dispersion importance* refers to the variance of the outcome variable explained by the regression equation that is attributable to a predictor variable.

3.Results

Our results are presented in Figure 1 and Figure 2. Figure 1 summarises regression coefficients of age and SES in regression models of welfare benefits, taxes and net benefits. As age and SES are measured as 10-category variables, nine coefficients are estimated for both in every model, measuring the difference to the reference category. As a summary indicator of the effect of age and SES we propose the standard deviation of the (standardised) regression coefficients estimated for the various categories of age and SES. If the standard deviation is high, then some of the regression coefficients are very different from the others, suggesting a more important effect of the variable. The first panel of Figure 1 compares the standard deviation of regression coefficients of age and SES in case of welfare benefits. The figure suggests that in all 22 countries in the study the effect of age is much larger than in case of SES. The difference is the smallest in case of Hungary, UK, Germany and Cyprus, but even in these countries regression coefficients of age are much larger than those of SES. In case of the taxes used to finance welfare benefits (Figure 1, panel 2) age and SES seem to play a more similar role. In case of Portugal and Romania regression coefficients of SES are actually larger than those of age, while in 10 other countries the standard deviation of coefficients of age and SES are similar. In case of Denmark and Sweden age is considerably more important than SES in case of taxes as well. In case of the resulting net benefits (Figure 1, panel 3) age is more important than SES in all countries, but the difference between the role of age and SES differs between countries. In Ireland, UK and France the difference is small, regression coefficients of age and SES are similar, while in case of Romania, Bulgaria and the Czech Republic age is much more important than SES.

Figure 2 shows our results regrading dispersion importance of age and SES. Here we use the Shapley-value decomposition, where the contribution of an explanatory variable to the explained variance of the dependent variable is equal to its marginal effect on the goodness-of-fit of the model (R^2). (see Israeli, 2007; Grömping, 2015). The basic picture is similar to the earlier results. In case of welfare benefits SES contributes only little to the model R^2 (between 2% and 17%), while age contributes between 83% (Portugal) and 98% (Latvia) of the variance explained by the model. In case of taxes used to finance welfare benefits the role of SES is more important, as status contributes between 18% (Sweden) and 63% (Portugal). In 16 countries SES contributes more than one third of the variance explained by the model. In case of net benefits however age shows higher contribution than SES in all 22 countries included in the study. The highest role for SES was found in Ireland and the UK where more the contribution of SES was higher than one third.

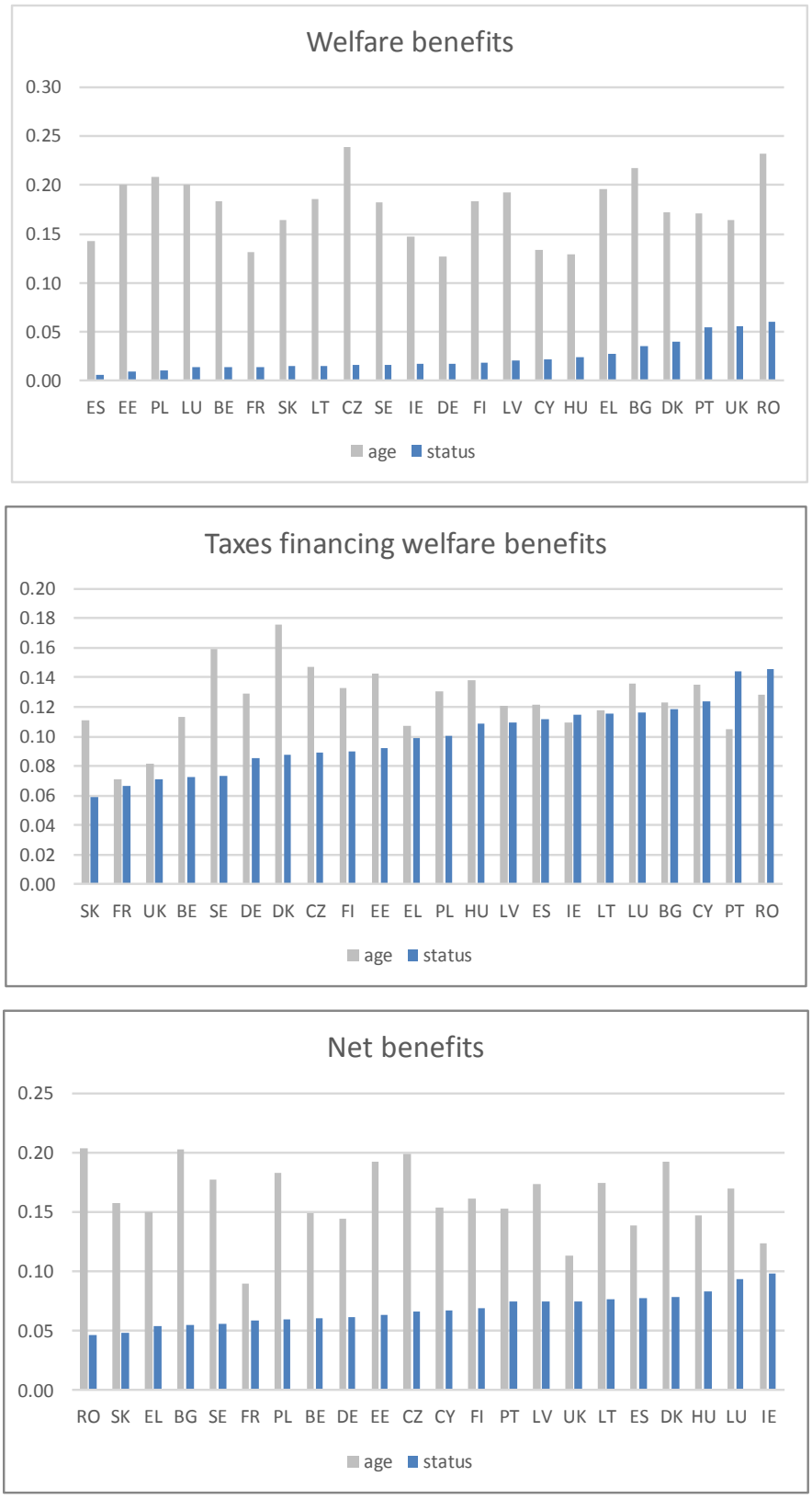
Several robustness checks were carried out. We tested whether results are robust to family benefits being assigned to the parent instead of the child. We also tested whether our results change if we include additional control variables in the regression model or if we add an

interaction effect of age and SES or if we use alternative indicators of SES. None of these changes modified our basic results.

4.Conclusion

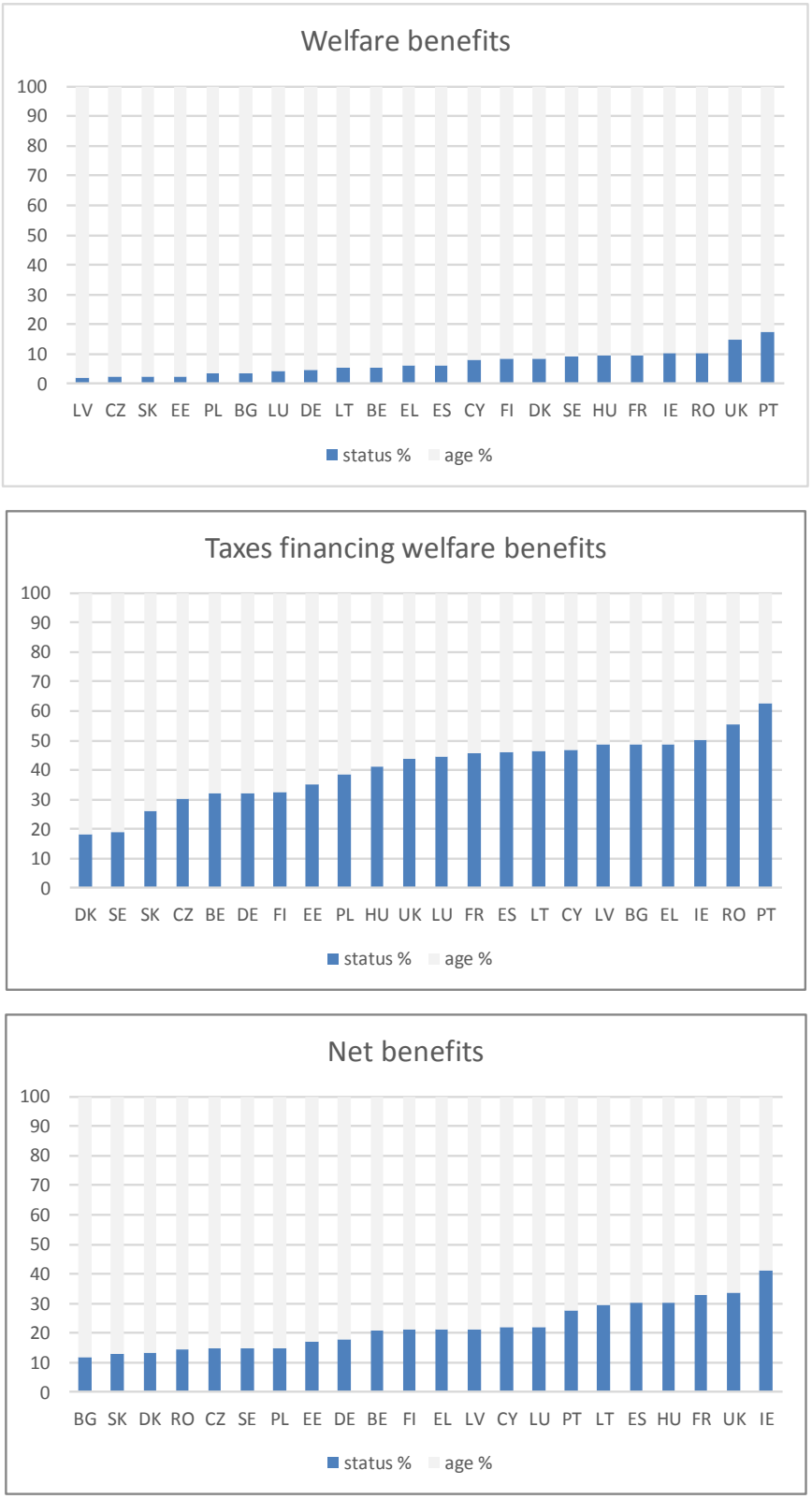
Our results show that age is much more important than SES in explaining accession to welfare benefits in all countries included in the study. Adding the revenue side of the system shows that status-related redistribution works through the tax system. Overall however, redistribution between age-groups turns out to be more important than redistribution between status-groups. The welfare state is better described as a system of inter-age resource reallocations than a public program mitigating poverty or equalizing income. Poverty and inequalities mitigated by welfare states in EU countries are dominantly of demographic origin. These results were obtained on a sample of 22 EU countries belonging to different welfare regimes. Countries where the role of SES was the most important (and the importance of age relatively the weakest) were Ireland and the UK belonging to the liberal welfare state type in Esping-Andersen's (1990) typology. This calls for the revision of both targeting analysis (targeting should also be measured by age not only by SES) and the way the welfare system is singled out as the sole actor held responsible for mitigating poverty and inequalities (although other forms of government activity have redistributive effects too in terms of SES).

Figure 1: Comparison of regression coefficients of age and SES (standard deviation of regression coefficients)



Note: As age and SES are measured as 10-category variables, nine coefficients are estimated for both in every model, measuring the difference to the reference category. We use the standard deviation of the (standardised) regression coefficients estimated for the various categories of age and SES as a summary indicator.

Figure 2: Comparison of R^2 accounted for by age and SES (%, Shapley method)



Note: Figure show % contributions to variance explained by the regression model (R^2). Contributions of age and SES sum to 100%.

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