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## Keywords

– tax-benefit model, EUROMOD, welfare state, Austria, in-kind benefits

# Redistribution within the tax-benefit system in Austria

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The aim of this study is to analyze redistribution within the Austrian tax-benefit system. In this work we take a comprehensive view and include not only direct taxation and cash benefits, but also indirect taxes and in-kind transfers. We look at two kinds of redistribution: between the households belonging to different income groups, and between generations, taking the life-cycle perspective. Our analysis shows that indirect taxes, as known from the previous literature, have a regressive effect on the tax-benefit system. On the contrary, in-kind benefits seem to have a progressive effect. To analyse the impact of both, we extend our income concept by both, indirect taxes and in-kind benefits. If we look on the distributional impact, we find that the inequality-enhancing effect of indirect taxes is more than off-set by the inequality-reducing effect of in-kind benefits. The Gini coefficient increases from 0.24 to 0.26 due to indirect taxes, but when adding in-kind benefits, the Gini coefficient is reduced to 0.23. The overall effect of both, indirect taxes and in-kind benefits is progressive.

*JEL classification:* I38, H24, D31

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## 1. Introduction

The aim of this study is to analyze redistribution within the Austrian tax-benefit system. While there have been several approaches to look at the overall fiscal burden and redistribution in Austria, most of them miss one or more elements of the overall system, as described below in more detail. In this work we take a comprehensive view and include not only direct taxation and cash benefits, but also indirect taxes and in-kind transfers.

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We look at two kinds of redistribution: between the households belonging to different income groups, and between generations, taking the life-cycle perspective. Both approaches aim at building a complete picture. Finally, we compare the measures of inequality while including or excluding different components, which allows us to form policy conclusions about redistributive effects of each policy tool.

There is a wide political discussion regarding financing and distribution within the Austrian welfare state. On the one hand, some analyses looked at the progressivity of overall taxation (see, e.g., Humer and Moser, 2016), and came to a conclusion, that the overall tax system in Austria is not progressive at all. On the other hand, Budgetdienst (2019) had looked at the taxes and benefits, to show the overall redistribution within the system. Both of these studies, however, miss several components. Humer and Moser (2016) do not include any benefits, but only look at taxation. Budgetdienst (2019) includes taxation (however without indirect taxes) and cash benefits, but excludes in-kind transfers. Looking only at cash benefits and direct taxation, Budgetdienst (2019) reports that about 70 percent of household in Austria are net beneficiaries. Whether addition of in-kind benefits and indirect taxes changes the overall picture is *a priori* unclear. Indirect taxation would move the marginal household above which a household becomes a net payer down, but in-kind benefits move it up again.

Rocha-Akis et al. (2019) has also analyzed the redistribution in the Austrian social system, by including several components: direct and indirect taxation, cash benefits, health and education services, and housing assistance. However, Rocha-Akis et al. (2019) includes, in the main specification, pensions as primary income, and therefore does not analyze redistribution through this channel. The latter fact is, nevertheless, relevant for the overall redistribution, as a substantial part of the pension system in Austria is financed from general taxation. Thus, authors also include a robustness analysis while classifying pensions as transfers. In the basic calculation, without including in-kind transfers and indirect taxes,

about a half of households are net beneficiaries. Once the authors include indirect taxation and in-kind benefits, the lower 60% of households can be classified as net beneficiaries.

It is, however, important to look at the overall picture to fully comprehend the redistribution effects. While income tax has a progressive effect - i.e. the average burden on income increases with higher income - indirect taxes such as the value-added tax generally have a regressive effect, i.e. the lower the income the higher the average burden. These two types of taxes therefore have opposite effects, and including only one of them can lead to distorted results. Similarly, social security contributions, have the highest burdening effect in the middle range of the income distribution, as the payments are restricted by an upper bound (*Höchstsbeitragsgrundlage*). On the benefit side, pensions are an important part of the total gross income of private households, and their impact is different across the income distribution, in particular since the minimum pension (*Ausgleichszulage*) has a redistributive effect. Similarly, in-kind benefits such as schooling and health services provision contribute vastly to the income situation of households.

Table 1 shows the components of general government spending according to Classification of Functions of Government (COFOG) categories in 2018. Looking at the numbers in Table 1, it becomes clear that one cannot ignore the in-kind benefits. While (mostly) cash benefits for social protection sum to about 78 billion Euro, health and education total to almost 50 billion, and most of these form in-kind benefits, with a clear redistributive effect. Other large posts, such as general services and economic affairs will not be included in the analysis, as it is not straightforward how to assign them to individual households. We also exclude the smaller components, such as culture or housing, which although having a redistributive effect are of lower importance due to the size.

This paper is structured as follows. Next section briefly describes related literature on fiscal burden and redistribution. Section 3 describes the simulation models used in the study. Section 4 presents the results regarding redistribution between income groups.

Table 1: General government expenditure according to COFOG (2018)

	<b>In % of total</b>	<b>In million Euro</b>
General public services	12,2	22.881
Defence	1,2	2.251
Public order and safety	2,8	5.202
Economic affairs	12,0	22.606
Environmental protection	0,8	1.436
Housing and community amenities	0,7	1.233
Health	16,8	31.500
Recreation, culture and religion	2,4	4.470
Education	9,8	18.427
Social protection	41,4	77.641
<b>Sum</b>	<b>100,0</b>	<b>187.648</b>

Section 5 shows the results of the life-cycle approach. Section 6 describes the validation of the simulation results using alternative data source. Section 7 concludes the paper.

## 2. Related literature

A first comprehensive empirical analysis of fiscal burden was published by Pechman and Okner (1974) and considered tax burden in the United States, including taxes such as income, wealth and consumption. However, any analysis of fiscal burden should also include social security contributions, as stressed by e.g., Niehues (2013). Moreover, Atkinson and Bourguignon (2000) and Verbist et al. (2012) note that in-kind benefits, and indirect taxation must be taken into account, when analyzing the overall burden. One question that arises, is of incidence. The literature provides, however, little empirically-based information on the incidence of the taxes and social contributions considered within this study (Fullerton and Metcalf, 2002) but it is typically assumed that personal income tax and social security contributions are borne in full the employee (Pechman and Okner, 1974; Piketty and Saez, 2007; Rocha-Akis et al., 2019) and indirect taxes (value added tax, energy taxes, other consumption taxes) are passed on in full to the consumer. Additionally, social transfers are fully allocated to household income (Bach et al., 2016).

When it comes to the actual redistributive effects, several factors need to be taken into account. Figari and Paulus (2015), for instance, claim that these are dependent on the income concept and subsume that a narrow definition such as disposable income leads to an overestimation of the effect of cash tax-benefit instruments. Moreover, the effects depend on the actual mix of policy tools. Joumard et al. (2012) write that "taxes and transfers reduce inequality in disposable income relative to market income. The effect varies, however, across OECD countries. The redistributive impact of taxes and transfers depends on the size, mix and the progressivity of each component". In Germany, for instance, reduction in income inequality is mainly driven by the social security system, making up for more than the half of the reduction in inequality. Bach et al. (2015) observe that, "as far as there are equivalent insurance contributions for social security benefits, there is (...) no redistribution between individuals or generations over time".

Several studies looked more generally at the impact of different policy tools in reducing inequality within countries. Some studies find that benefits are more the more important source of inequality reduction (Immervoll et al., 2006; Mahler and Jesuit, 2006; Whiteford et al., 2008). Others, such as Jenkins (1995) and Jätti (1997) use factor decomposition as suggested by Shorrocks (1982, 1983), and conclude the opposite, namely, that taxes play a much more important role in reducing inequality in disposable incomes. Somehow reconciling the two views, Fuest et al. (2010), look at the redistribution in the European Union and argue that the contradicting conclusions are a result of different normative focus of the two approaches. Additionally, they notice that while taxes and social-security contributions are clearly correlated with income, it is less so for benefits, which nevertheless address other issues. This is particularly true for in-kind transfers.

### 3. Methodology

To evaluate the impact of the tax and benefit system in Austria on the income distribution, we make use of EUROMOD, the tax-benefit microsimulation model for the European Union (see e.g. Sutherland and Figari (2013) or Sutherland (2007)). EUROMOD relies on micro-data representative of the household population of Austria and each other EU member state. Our simulations are based on EUROMOD 2015 tax-benefit system, using individual and household data from the European Union Survey of Income and Living Conditions (EU-SILC) 2015. All policies are adapted according to new legislation passed through the parliament.

We use EUROMOD to simulate direct taxes and cash benefits. However, a large part of income redistribution occurs through in-kind benefits, which are not included in standard microsimulation models. The largest share of the Austrian in-kind transfers is related to health care, followed by education and child care. Table 2 presents the main components of in-kind benefits in 2018. A total of 35 billion Euro has been provided in in-kind benefits. Most of it was ambulant health care, totalling at 22 billion. Childcare services totalled 2 billion. On top of that, schooling expenditure totalled 18 billion Euro, as mentioned in Table 1.

Table 2: In-kind social benefits in 2018 (in million Euro)

<b>Category</b>	<b>Million Euro</b>
Old age	1281.4
Accident insurance	461.2
Health care	22877.6
Unemployment	1393.5
Housing	256.8
Regional and local social assistance	6094.0
Childcare	2235.8
Other	686.0
<b>Sum</b>	<b>35286.3</b>

On the other hand, indirect taxes are also a substantial component in the country tax

system. Table 3 shows the broad categories of taxation. The largest category are social contributions at 59 billion. Taxes on production, however, are closely behind at 54 billion. Indirect taxes on products sum to slightly less than 42 billion, the VAT being the most important one at 29 billion. Other important indirect taxes are mineral oil tax (4,3 billion) and tobacco tax (1,9 billion). Direct taxes on production sum to 12 billion, the two most important being the employer contribution to the family equalization fund (FLAF) at 5,4 billion and the municipal payroll tax at 3,3 billion (not included in EUROMOD). Direct taxes on income sum to 49 billion, the most important ones being the income tax, the wage tax and the tax on income of corporations (which will be excluded from the analysis for the lack of direct connection to households). In sum, about 165 billion Euro have been collected in taxes and contributions in year 2018, out of which we are able to include 147 billion in the analysis.

Table 3: Taxes by source in 2018 (in million Euro)

<b>Category</b>	<b>Million Euro</b>
D.2 Taxes on production and imports	54,071
<i>D.21 Taxes on products</i>	41.742
<i>D.29 Other taxes on production</i>	12.329
D.51 Taxes on income	48.986
<i>C01 Income tax</i>	5.244
<i>C08 Wage tax</i>	28.344
<i>C05 Corporation tax</i>	9.676
D.59 Other current taxes	3.239
D.91 Capital taxes	83
D.61 Net social contributions	58.758
<b>Sum</b>	<b>165.138</b>

This highlights the importance of including both: indirect taxes, and in-kind benefits to a comprehensive analysis of the redistributive impact of the welfare state. Therefore, we extend EUROMOD in two ways. Firstly, we use the indirect taxation extension for



EUROMOD<sup>3</sup> to add also information on indirect taxes (such as value-added taxes and excises) on the tax side. Secondly, on the benefit side, in-kind benefits are not modeled in EUROMOD. Therefore, we add detailed information about in-kind benefits for education and health to the model.

### 3.1. *EUROMOD*

Tax and benefit systems differ substantially across EU member states. Nevertheless, EUROMOD allows to aggregate all the benefits and taxes in each country in a comprehensive way. By taking advantage of this aggregation feature of EUROMOD, we aggregate the calculated outcome variables into several categories. On the expenditure side, we have detailed information about the following cash benefits received by every individual or household in the survey. The benefit aggregation follows the Eurostat definitions (ESSPROS & SILC):

- family and child benefits, such as benefits related to education, child-care, families, maternity and parental-leave benefits;
- health and health-related benefits and pensions, which include accident, caring, disability and health benefits, as well as disability and health pensions;
- housing benefits, which include housing, heating and municipality benefits;
- old-age and age-related benefits and pensions, which include old-age, survivors and early-retirement benefits, civil servant, minimum, old-age, survivors and early retirement pensions;
- work-related benefits, which include unemployment and other work-related benefits;

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<sup>3</sup>see De Agostini et al. (2017).

- social-assistance benefits and pensions, which include social assistance and military benefits;

To get a better overview, which benefits are the driving force regarding redistribution across the income distribution, we decided to aggregate those benefits into the following three categories:

- **Unemployment benefits:** Covers all unemployment benefits (contributory, as well as non-contributory).
- **Pension benefits:** Covers all pension benefits (survivor pensions, old-age pensions, ...)
- **Other benefits:** Covers all the additional benefits, such as family benefits, health benefits, housing benefits and social assistance benefits.

Governments often use benefits to redistribute money to people or households in need. To finance those benefits, taxes are used, which are typically progressive. Social insurance contributions in Austria are based on gross income but have an upper bound, meaning that they are potentially regressive. At the same time, the income tax is based on several different tax levels, leading to a progressive income tax system. EUROMOD offers us detailed information on income taxes as well as on social security contributions on individual level. The following components are simulated in EUROMOD:

- Personal income tax
- Capital gains tax
- Employer social insurance contributions – including (employer) payroll taxes.
- Credited social insurance contributions – contributions paid by the government or social security institution on benefits

- Employee social insurance contributions
- Self-employed social insurance contributions
- Other social insurance contributions – contributions paid by individuals but not directly linked to employment or self-employment

For our distributional analysis, we aggregate those taxes according to their type into the following two categories:

- **Taxes on income:** Covers all taxes on income (labour income, capital income, property income and other specific taxes such as church, health, municipal, pension insurance, wealth and early retirement tax) that are simulated in EUROMOD.
- **Social insurance contributions:** Covers all social security contributions paid by the employer, the employee and the self-employed and all others.

### *3.2. Indirect Taxation*

To additionally account for indirect taxation, we use the EUROMOD extension to indirect taxation. This extension adds indirect taxation to the standard EUROMOD tax-benefit model. For a detailed overview, see De Agostini et al. (2017) and Spiritus and Decoster (2014). The approach of connecting EUROMOD with information on expenditures does not only allow for estimating the indirect tax burden of households in a detailed way, but also to simulate the impact of indirect tax reforms.

The methodology consists of two steps: First, information on household expenditures from the HBS (Household Budget Survey) from 2009/2010 are imputed. The Household Budget Survey is conducted every five years by Statistics Austria and is a sample survey where the statistical units of interest are private households. The expenditure data is derived from diaries filled in by respondents over a period of one month. Other kind of spending is collected by face-to-face interviews and covers a longer time periods. The survey

includes not only household final consumption expenditure on goods and services with considerable detail but also information on income and additional demographic and socio-economic characteristics. Expenditures are imputed in the EU-SILC data by estimating Engel curves for several commodity groups. Second, the imputed household expenditures are used to calculate various types of indirect taxes, such as VAT, ad-valorem excises and other excises to include indirect taxation to the tax-benefit system in EUROMOD.

The methodology distinguishes between durable and non-durable goods. For durable goods, a probit model first estimates the probability of a household having durable expenditures, depending on the households income, as well as the characteristics of the household head (such as age, gender, labour market status, education etc.), as well as household characteristics (car and computer ownership, number of children etc.). Conditional on having positive durable expenditures, a linear regression model with the same covariates are used to estimate the amount of durable expenditures. The amount of non-durable expenditures is estimated in the same way as non-durable expenditures, but unconditionally (there is no probit model in the first stage).

After modelling total household expenditures in the way described above, sub-groups of non-durable expenditures are modeled accordingly. The model distinguishes between 15 groups: food and non-alcoholic beverages; alcoholic beverages; tobacco; clothing and footwear; home fuels, electricity and water; housing and rents; household goods and services; health; private transport; public transport; communication; recreation and culture; education; restaurants and hotels; other goods and services. Within these subgroups of non-durables, again probit models are introduced for those groups, where many zero expenditures are expected, such as alcohol, tobacco or public transport, but instead of household disposable income, household non-durable expenditures are used as predictor to estimate the household share within total non-durable household expenditures. Then the remaining non-durable expenditure categories are estimated accordingly.

The estimated expenditure functions (expenditure shares) are then used to estimate the expenditures in the EUROMOD data set, which is based on EU-SILC data on the basis of the households' disposable income and the other explanatory variables mentioned above. A more detailed description, as well as some additional aspects of the imputation are discussed in De Agostini et al. (2017).

### 3.3. In-kind benefits

The welfare state does not only redistribute through cash transfers, but it provides goods, from which the totality of the population benefits, and which also have redistributive effects. In the analysis, we include the two most important in-kind benefits: health and education provision.

#### 3.3.1. Education

Based on the statistics on costs of public education for different ages and types of schooling, we are able to match the costs to individual families, in which either the children or the adults are currently in education. Table 4 presents the yearly costs of education pro person in different types of schools. The costs have been taken from the last available data (2015) and adjusted to the price level of 2019.

Table 4: Yearly costs of education pro person in Euro in different school types

School	Level	Average Cost (2019)
Volksschule	Primary	8606
Hauptschule	Lower Secondary	12020
AHS Unterstufe	Lower Secondary	8798
Neue Mittelschule	Lower Secondary	13249
AHS Oberstufe	Upper Secondary	9883
BMS	Upper Secondary	13249
BHS	Upper Secondary	12951
Universität	Tertiary	13097

The costs are the lowest for primary education and the highest for the new *Neue*

*Mittelschule*, as well as in vocational secondary education (BMS). Additionally child-care costs and nurseries (*Horte*) are included.

### 3.3.2. Health services

Health data is taken from the Social Health Insurance and provided by Gesundheit Österreich GmbH (GÖG). It comprises information about spending per capita on acute health care divided by gender and in 5-year age groups. Data comes from 2015 and, similarly to education, has been adjusted for inflation. Table 5 shows the results. We match the health-care benefits to households on the basis of their age and gender composition.

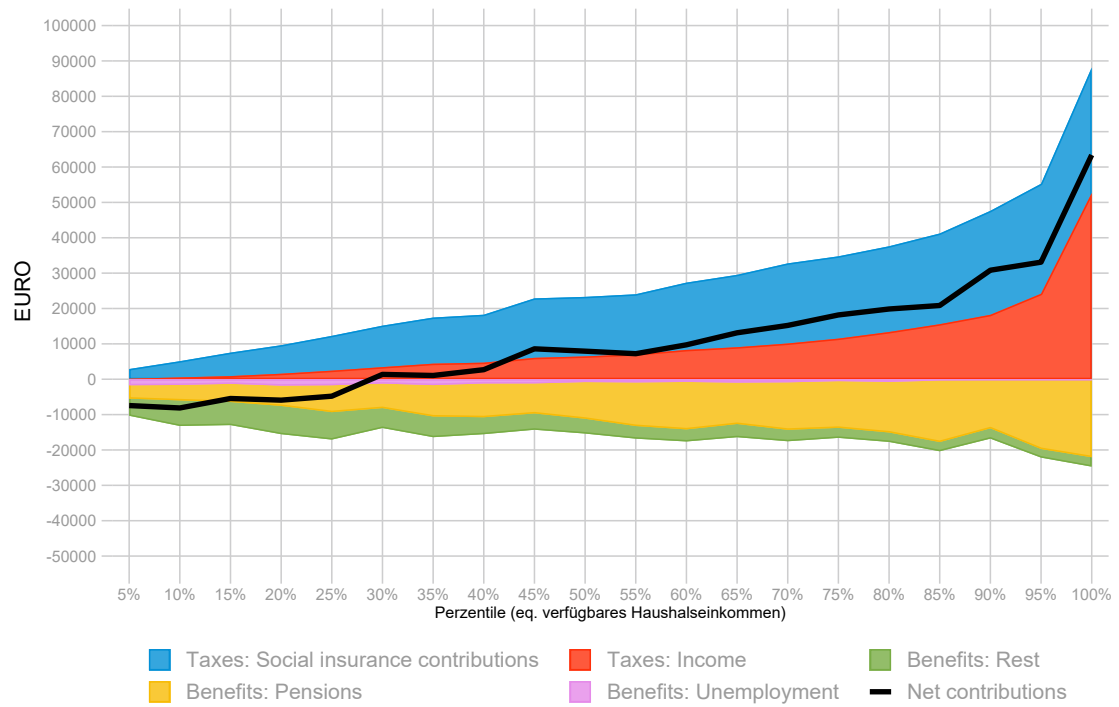
Table 5: Yearly costs of acute health care pro person in Euro (2019)

Age	Male	Female
0 4	1971	1663
5 9	961	748
10 14	955	921
15 19	1083	1303
20 24	1053	1502
25 29	1134	1969
30 34	1264	2181
35 39	1456	2080
40 44	1653	2037
45 49	2012	2353
50 54	2644	2813
55 59	3536	3306
60 64	4439	3815
65 69	5816	4918
70 74	7069	6051
75 79	8348	7225
80 84	9065	8028
85 89	9597	8414
90 +	9735	8391

## 4. Results: Net fiscal contributions

Figure 1 presents the net fiscal contributions of households, when we only include direct taxation and cash benefits, expressed in absolute terms. In this case, only about 30% of

Figure 1: Net fiscal contributions of the households

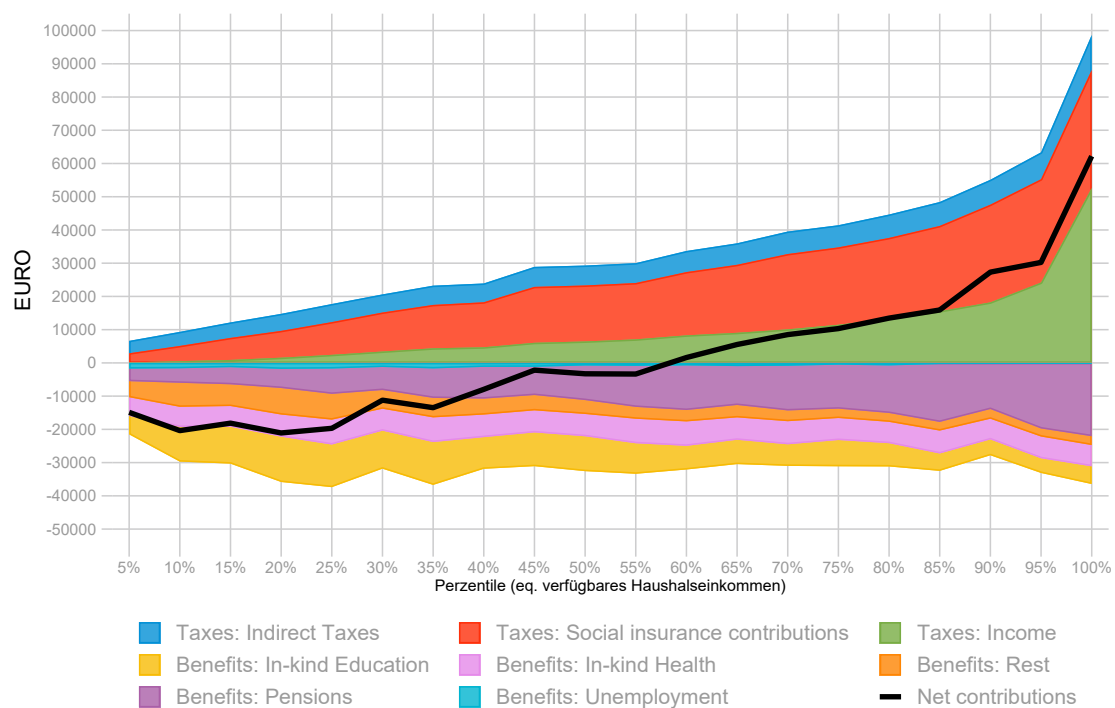


the households with the lowest incomes are net beneficiaries of the system. However, it is clear that this picture does not reflect the redistribution correctly, as much more is paid in taxes and contribution as is paid back in cash benefits, represented by a much larger area of the curve above the X axis compared to the area below. As can be seen, and according to expectations most of the progressive effect within direct contributions come from the income taxation. It is even more clear, when we consider Figure A.11 in the Appendix: the 95th percentile of households pays on average 26,000 Euro yearly in taxes; a household in 100th percentile it rises sharply to about 105,000. The cap on social security payments is visible, as the blue area does not become much larger at above about the 95th percentile of income distribution. Contrarily to income taxation the differences in payments are not high: about 30,000 a year for the 95th percentile, 36,000 for the 99th, and 42,000 for the 100th. On the benefit side, lower incomes come mostly from "other benefits" such as family and social assistance. At the upper level, more than 90 percent come from pension payments. Throughout the distribution, the cash benefits account for about 20,000 Euro per year, and only at the very top of the distribution they are higher at above 20,000 - for here pensions are higher.

Once we include indirect taxation and in-kind benefits, the situation changes dramatically. Now, only about 40% of households are net contributors, while the other 60% are net recipients. More interesting is the composition of the benefit curve. At the lower end of the income distribution, in-kind benefits play a much larger role, in particular in-kind benefits for education: a household in the 3rd decile receives more than twice as much compared to a household in the 9th decile: a yearly value of more than 12,000 Euro compared to about 5,000 in the upper part. This is mainly driven by the different household-structures in the deciles of the income distribution. On the other hand, health benefits are fairly constant across the income distribution (in absolute terms). In sum, between 30,000 and 40,000 Euro are redistributed in cash and in-kind benefits, and this number is fairly constant

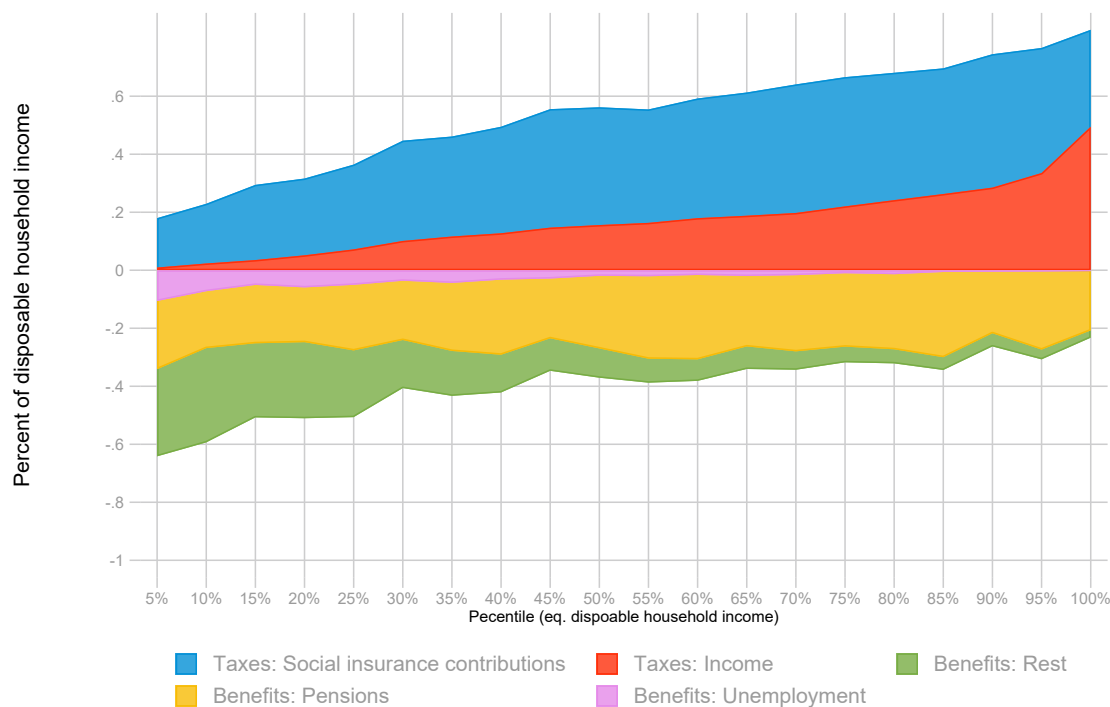


Figure 2: Net fiscal contributions of the households, including indirect taxes and in-kind benefits



across the distribution, and only slightly higher in the households between the 2nd and 4th decile, where more than average is received in education services.

Figure 3: Net fiscal contributions of the households in percent



Once we look at the relative impacts of taxes and benefits more conclusions can be drawn about the actual redistribution. Income taxation and social security contributions account for between less than 20 up to about 70 percent of disposable household income. While the social security payments remain fairly constant, income taxation raises from just above zero to more than 40 percent of disposable income of households. On the benefit side, households with the lowest incomes receive more than 60 percent of their income from transfers, mostly social assistance and family benefits. The latter are, however, less present in the first decile, in which many single households are represented.

Finally, we analyze the overall effect of redistribution including indirect taxes and in-kind benefits. Firstly, the tax and contribution system is progressive, yet only slightly.

Figure 4: Net fiscal contributions of the households in percent, including indirect taxes and in-kind benefits

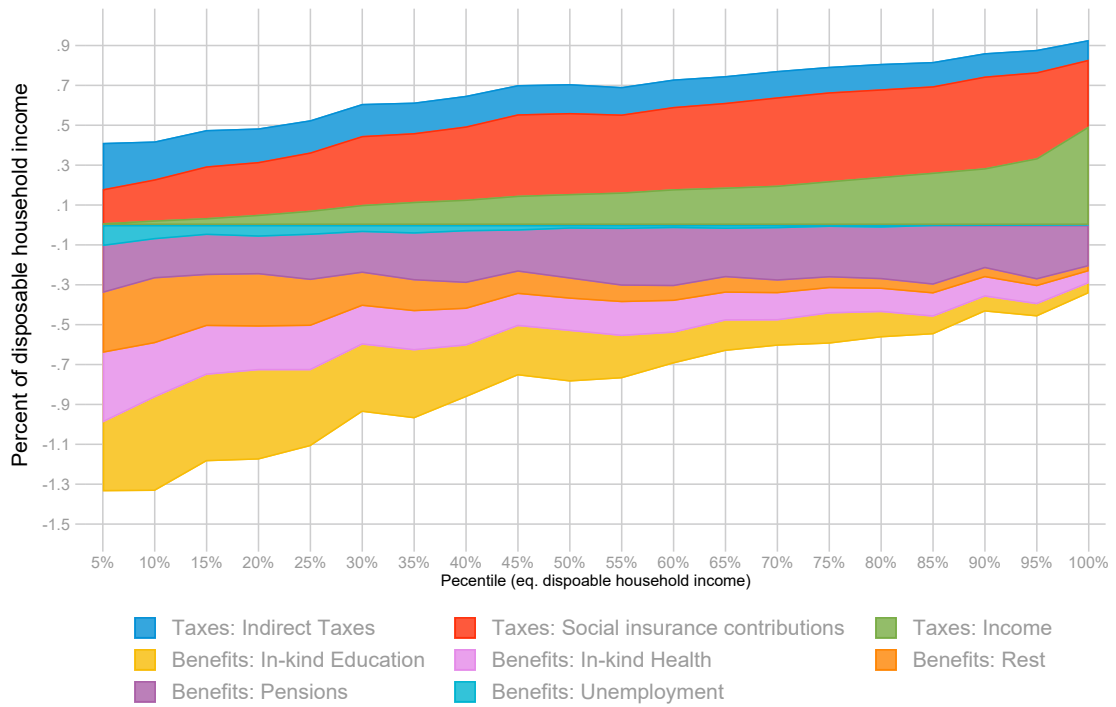


Table 6: The impact of indirect taxes and in-kind benefits on redistribution

	Gini	p90/p10	p75/p25	GE(1)
eq. hh earnings	0.3863	7.6160	2.6160	0.2727
eq. disposable hh income	0.2456	2.9290	1.7470	0.1097
- indirect taxes	0.2625	3.1760	1.8090	0.1244
- indirect taxes + in-kind (education)	0.2527	3.0860	1.7520	0.1156
- indirect taxes + in-kind (education and health)	0.2343	2.7530	1.6720	0.1001

Unlike Humer and Moser (2016), we cannot say that the overall taxation is regressive, which is partly explained by use of different (more reliable) consumption data. Households in the lower deciles pay about 40 to 50 percent of their disposable income in taxes and contributions. Households in the upper deciles between 70 and 90 - this number includes employer social security contributions. It becomes clear, that most of the redistribution is happening on the benefits side, where the curves are much more progressive. In the lower part of the distribution more than 130 percent of the households' disposable income is redistributed. The largest part in in-kind benefits, that is health and education systems. For the richest households, only about 30 percent of disposable income comes from benefits, more than a half of this in form of pension payments.

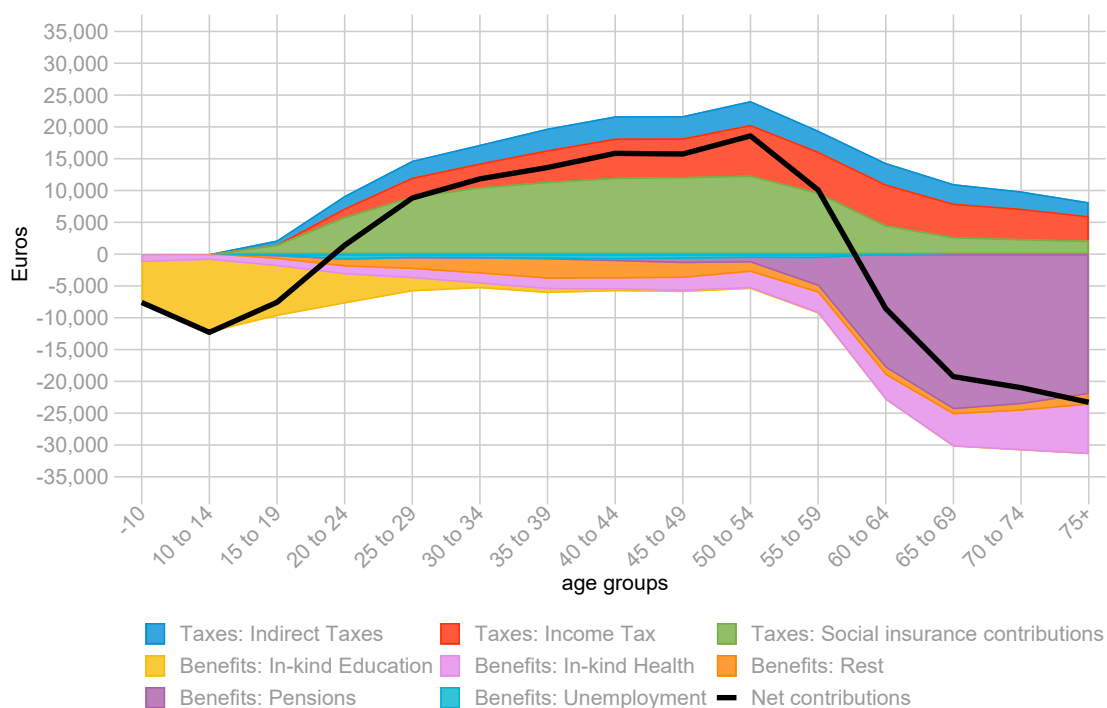
To quantify the redistributive impact of (indirect taxation and in-kind benefits in) the Austrian tax system, we have to come up with a new income concept, that includes both, in-kind benefits, as well as indirect taxes. To do so, we follow the approach of Figari and Paulus (2015) who suggest an extended income concept which takes into account indirect taxes, imputed rent and in-kind benefits. Unfortunately, we are not able to account for imputed rents.

Market Gini of equivalised household incomes is at 0.38 and is substantially reduced by the tax-benefit system. When we include direct taxes and cash benefits, Gini drops to 0.34. Table 6 also quantitatively shows, what has been visually clear: in-kind benefits and indirect taxes have an additional impact on redistribution. We can read, that the Gini

coefficient of disposable income (i.e., only including direct taxes and cash benefits) is at 0.24. If we include indirect taxes, inequality rises to 0.26 - consistently with the regressive character of indirect taxation. However, inequality is further reduced by inclusion of in-kind benefits to a level of 0.23 - that is lower than in the first place. Other inequality measures show similar picture. In-kind benefits contribute further to reduction of inequality within the redistribution system.

## 5. Results: Life-cycle perspective

Figure 5: Net fiscal contributions over the life-cycle



Instead of looking at the redistribution between different income groups, we can alternatively look at the redistribution between different cohorts, i.e., over the life cycle. As shown in Figures 5 through 7, there is substantial redistribution between the young and the old present in the current system. Young persons, below the age of 19, mostly receive

Figure 6: Net fiscal contributions over the life-cycle, Females

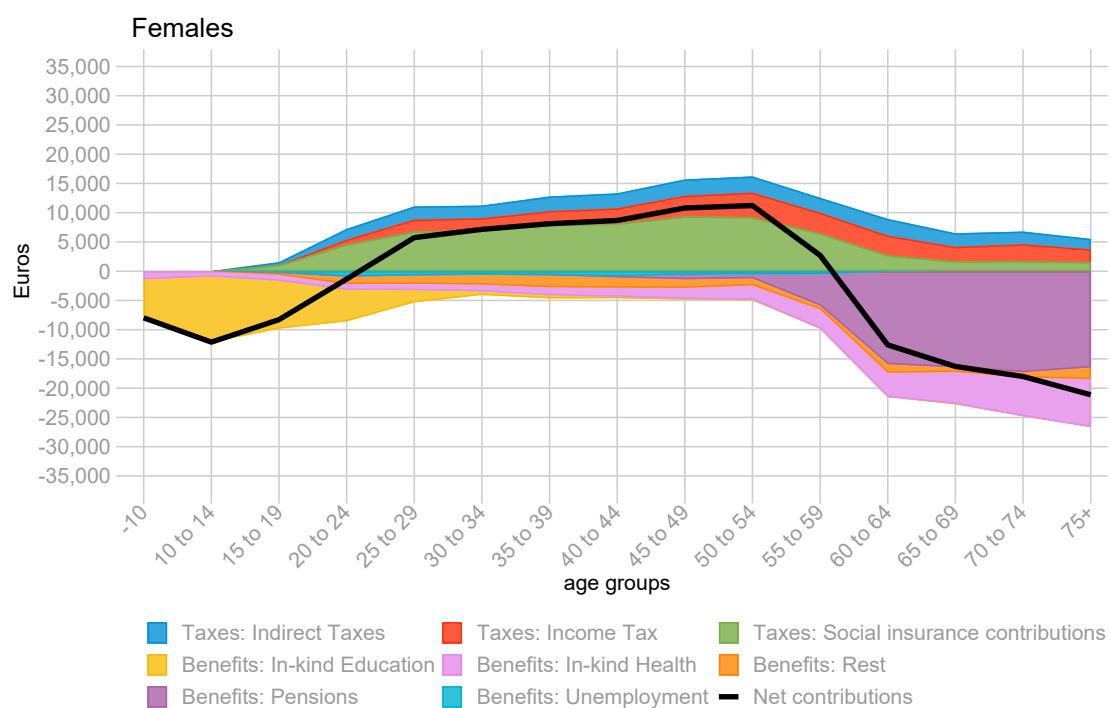
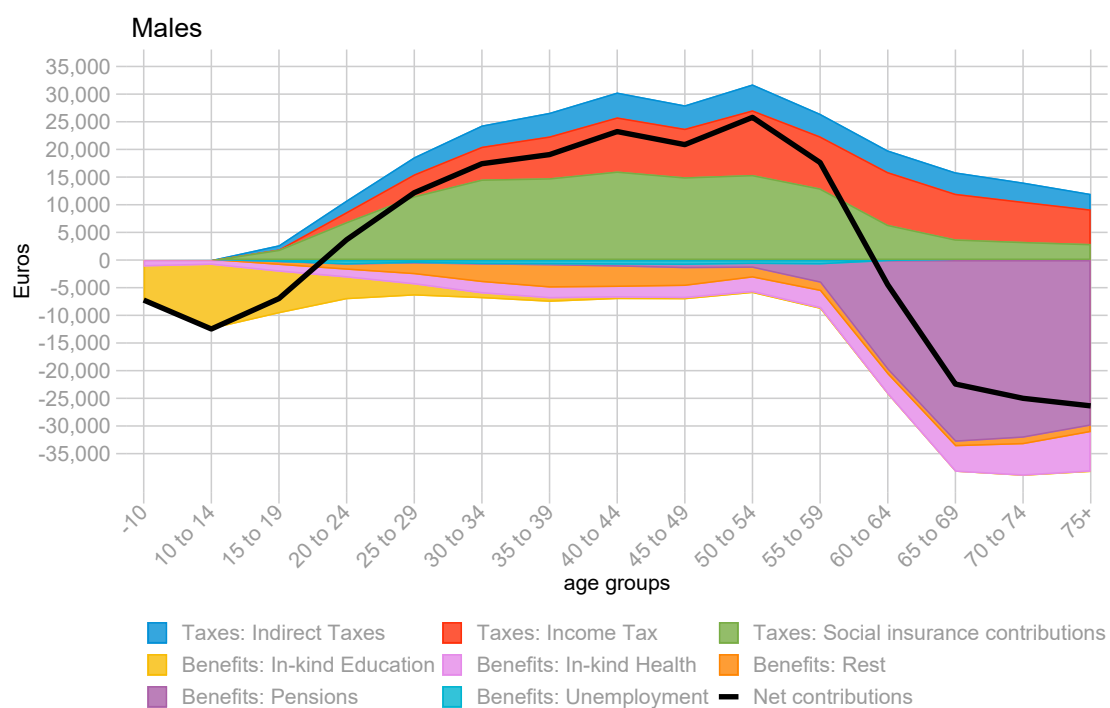


Figure 7: Net fiscal contributions over the life-cycle, Males



in-kind education benefits. Starting at the age of 20 and continuing until the age between 60 and 64, the working-age population contributes to the system, mostly in form of social security payments. Those payment rise constantly until about an age of 55 at which time they start to drop again. Also income taxation payments is the highest for this age class.

When it comes to differences between the genders, Figures 6 and 7 show that females both contribute and receive much less from the system compared to males. During the peak of income levels, at about the age of 55, females contribute on average with about 15,000 per year, while for males this figure is 30,000. This fact has to do with long periods of part-time work of females with children. On the other hand, also the old-age benefits of females are much lower - at about 20,000 compared to 30,000 for males. Here the discrepancy is lower, because of the minimum pension scheme (*Ausgleichszulage*). On the taxation side, one can also observe the importance of the size of pension benefits between the genders: female pension receivers pay much lower income tax, while income tax paid by male pension receivers is almost at the levels of income tax during the working life.

## 6. Validation

To check the validity of our results, and to be sure to give a comparative picture of the reality, we compare our results with external data from the national accounts. The NTA (National Transfer Accounts) approach measures net contributions in a slightly different way. Net contributions, called net public transfers in the NTA framework are defined as the difference between public transfer inflows and outflows. Inflows of the public sector from a household perspective include in-kind transfers and cash transfers. Cash transfer are benefits directly received from the state. Public transfer outflows measure the flows from the private sector to the public sector. They include taxes (on asset income, labour income and consumption), social contributions and other revenues paid by the private sector to the government.



There are reasons why the NTA approach can lead to different results: First, the data year is different, therefore wage growth, changes in the population structure or policy changes can potentially influence the life-cycle contributions. Additionally, inflation should lead to higher monetary values in general. Second, our approach does not cover all in-kind benefits, while the NTA approach does. But on the other hand, we are also not able to cover all taxes paid by the private sector. Still, similar net fiscal impacts ensure, that the taxes left out are comparable in size with the in-kind benefits that we do not cover in our approach.

Figure 8: Validation

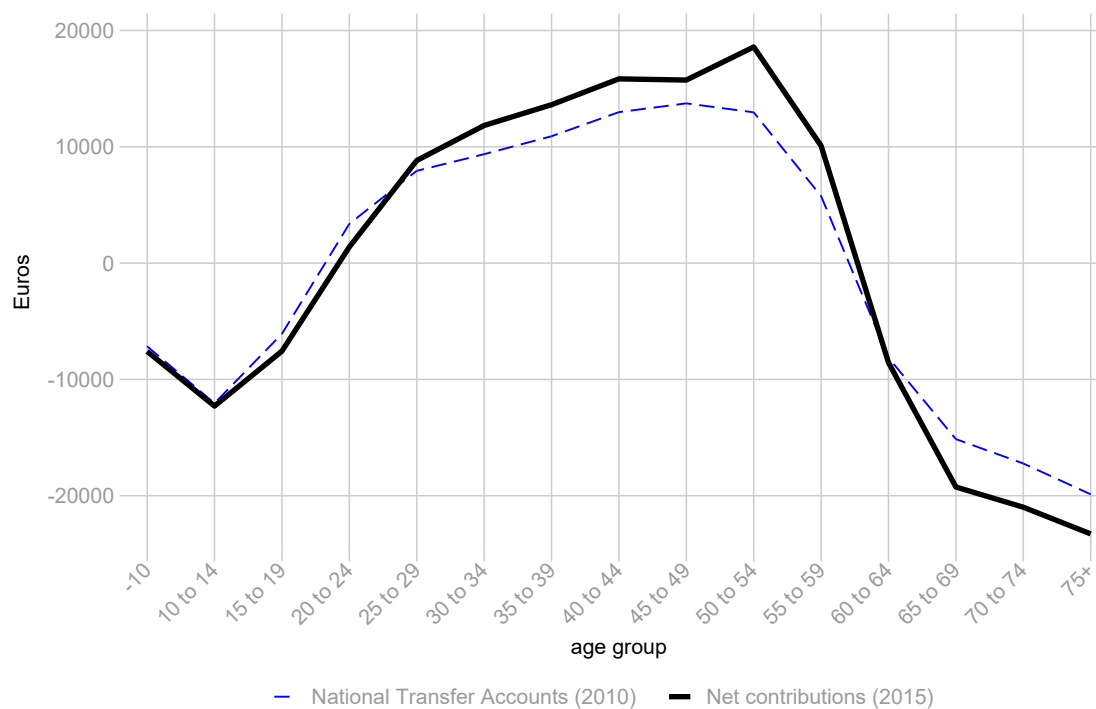


Figure 9: Validation, females

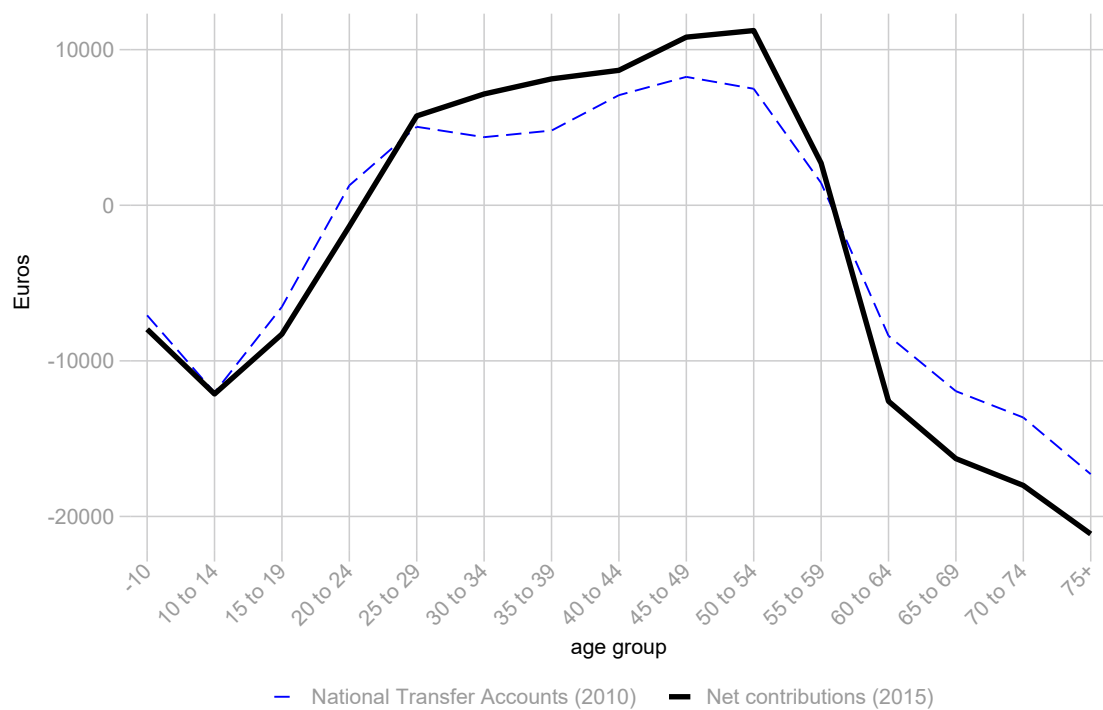
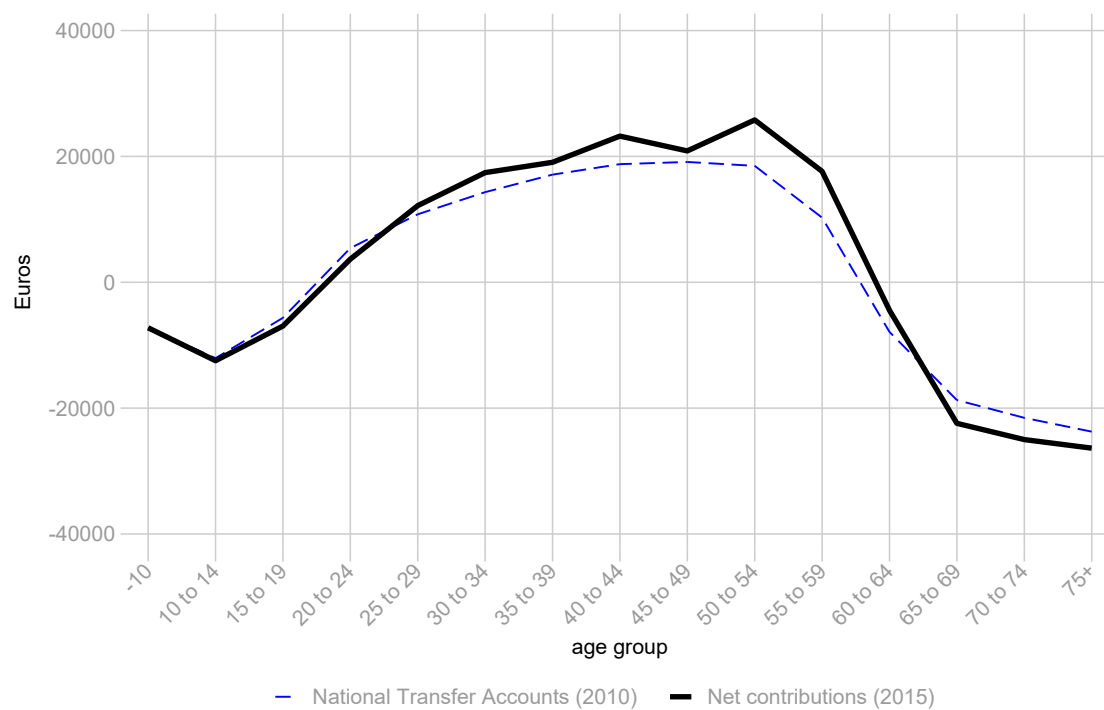


Figure 10: Validation, males



## 7. Conclusions

The aim of this paper is to analyze the redistribution within the Austrian tax-benefit system. So far, most approaches have been focusing on the standard income definitions that are typically related to disposable household income, where only parts of the redistributive effects of the Austrian tax and benefit system can be revealed. We follow an approach by Figari and Paulus (2015), who introduce a new concept of income that also takes into account indirect taxes as well as in-kind benefits on household level, which are two main sources of public expenditure and revenues.

Using EUROMOD, we are able to analyse the Austrian tax and benefit system regarding all cash benefits, as well as taxes and social security contributions. We use the EUROMOD extension for indirect taxes to add information on household expenditures and the implied indirect taxes paid on a household level. Additionally, we cover in-kind benefits for education and health which are the two main sources of in-kind benefits in Austria. Given the data limitations, we impute in-kind benefits for education by type of education, and health by age and gender.

We show the direct impact on the income distribution as well as on the net fiscal impact, depending on the income of the household. We find that while when using the traditional way of analysing the tax benefit system, about 30 percent are receiving more transfers than they pay in (direct) taxes. When we include indirect taxes, as well as in-kind benefits to our analysis, this number increases to almost 60 percent.

Our analysis shows that indirect taxes, as known from the previous literature, have a regressive effect on the tax-benefit system. On the contrary, in-kind benefit seem to have a progressive effect. To analyse the impact of both, we extend our income concept by both, indirect taxes and in-kind benefits. If we look on the distributional impact, we find that the inequality-enhancing effect of indirect taxes is more than off-set by the inequality-reducing effect of in-kind benefits. The Gini coefficient increases from 0.2456 to 0.2625 due

to indirect taxes, but when adding in-kind benefits, the Gini is reduced to 0.2343. The overall effect of both, indirect taxes and in-kind benefits is progressive.

Additionally, we look at the life-cycle impact of indirect taxes and in-kind benefits. Not surprisingly, we find that there is substantial redistribution from the working age to the young and the old in the current system. When it comes to differences between the genders over the life cycle, females both contribute in working-age and receive less from the system in old-age compared to males.

Our analysis highlights the importance of considering both, indirect taxation as well as in-kind benefits in a comprehensive analysis of the redistributive impact of the welfare state. Since in-kind benefits, as well as indirect taxes can vary substantially across countries, both might have a substantial impact on cross-country comparisons on the redistributive impact of the welfare states.

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## Appendix A. Additional Results

Figure A.11: Net fiscal contributions of the households - percentiles

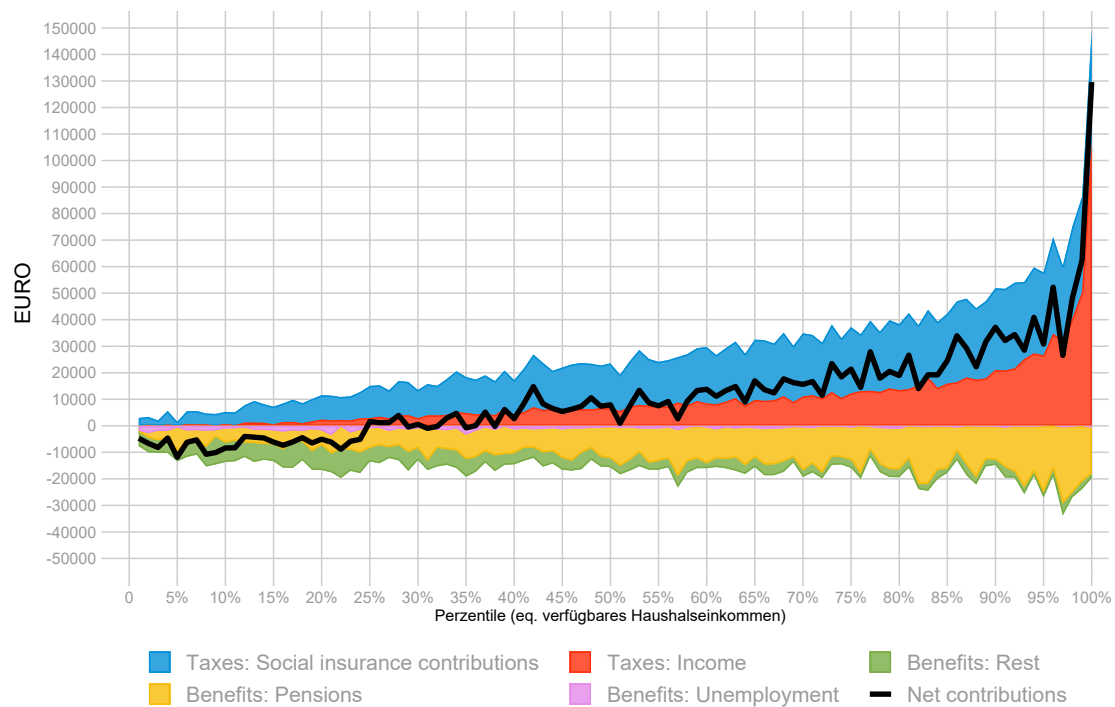


Figure A.12: Net fiscal contributions of the households, including indirect taxes and in-kind benefits - percentiles

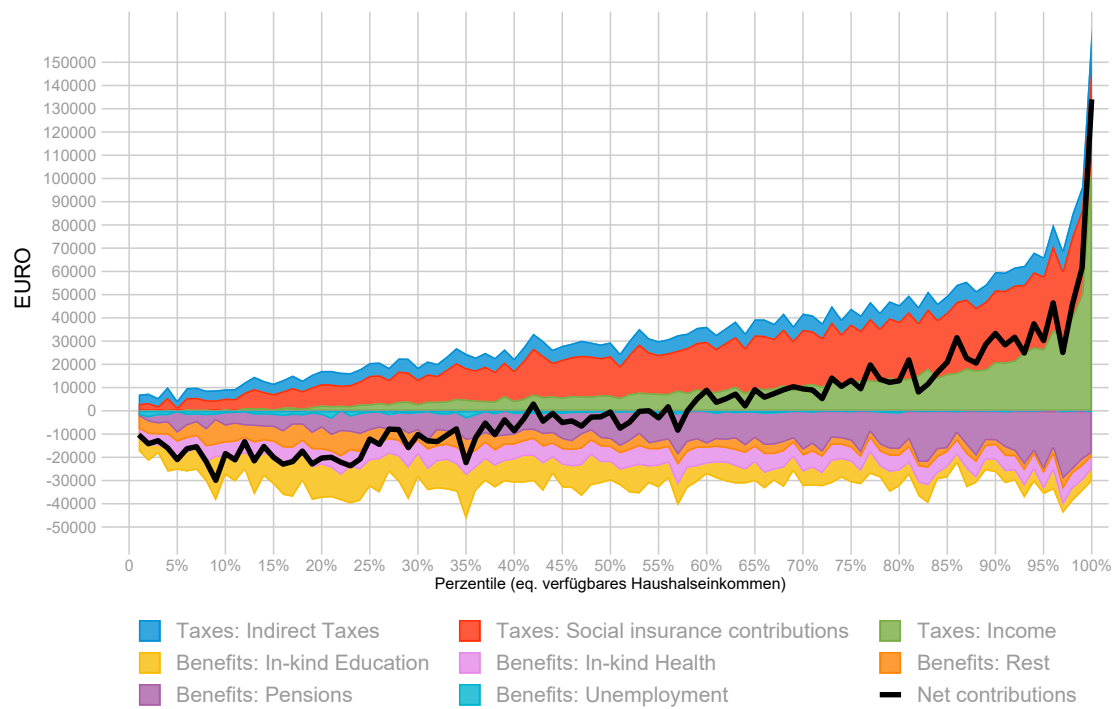


Figure A.13: Net fiscal contributions of the households in percent - percentiles

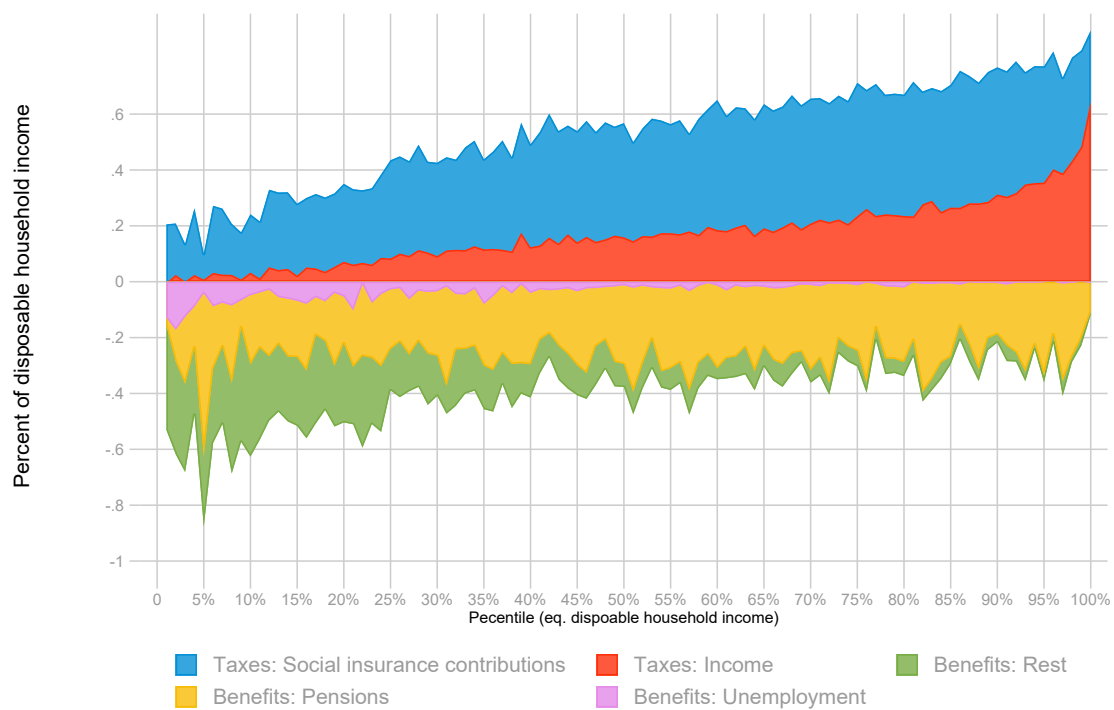


Figure A.14: Net fiscal contributions of the households in percent, including indirect taxes and in-kind benefits - percentiles

