THE DISTRIBUTIONAL IMPACT OF SOCIAL SPENDING ON IN-KIND AND CASH CHILD TRANSFERS IN CROATIA

Martina Pezer, Nora Mustać, Chrysa Leventi

Abstract

Social spending in Croatia is mainly based on social protection, public healthcare and education policies. There are two forms of investing in children through the social spending provided by central and local governments: cash and in-kind transfers. This paper describes the impacts of such social spending on households with children in Croatia and its capital, Zagreb. Making use of a microsimulation model, the income distribution of cash and in-kind transfers and their impacts on poverty and inequality are assessed. Compared to cash transfers, in-kind transfers, including local government subsidies, are relatively evenly distributed, income independent, and thus roughly equally important for the entire population. Their value greatly exceeds that of monetary transfers. Results demonstrate the progressive effect of transfers in kind on income distribution by reducing income inequality and poverty. This research seeks to emphasise the importance of using augmented income in the analysis of income inequality and poverty, instead of solely monetary disposable income.

Keywords: *income distribution, in-kind transfers, microsimulation, child poverty, income inequality*

JEL classification: *D31, H51, H52, I30*

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1. Introduction

Children can be characterised as a public good because of the positive effects that the state obtains in the long run by investing in them. It is also well-established that, child poverty and lack of equal opportunities have a strong impact on economic development. Therefore, investing in children is equivalent to investing in future human capital, and research contributing to a better understanding of the impact of social spending on children is vital.

There are two forms of public spending and investment in children or households with children – cash and in-kind transfers (Slesnick 1996). Cash transfers are usually provided to parents as child benefits (allowances) or tax reliefs. While transfers in kind directly impact children who use them, cash transfers can end up being spent by

parents who receive those transfers on non-child related causes (Currie and Gahvari 2007). In some countries, in-kind transfers such as health care or education are provided by the government, as in Europe, and financed by general taxation, while in other countries, e.g., in USA, such services may need to be purchased out of households' disposable income (Figari, Paulus, and Sutherland 2011).

Social transfers, both in cash and in kind tend to decrease income inequality (Förster and Verbist 2012). In Croatia, relevant research confirms that taxes and social spending reduce inequality. The 15% share of GDP spent on healthcare, and the 11% on the education system in 2019 in Croatia indicate the large share of GDP spent on in-kind transfers (Eurostat 2022a). However, indirect taxes tend to impede the social system in the task of reducing poverty in the case of households with children (Inchauste and Rubil 2017). Using 2018 data, Nguyen and Rubil (2021) confirm that the Croatian fiscal system contributes to the reduction of inequality while it tends to increase poverty. In general, research suggests that indirect taxes usually have a regressive effect (i.e., increase inequality), and transfers in kind a progressive effect (i.e., decrease inequality), (Verbist and Förster 2019; Christl et al. 2020; Inchauste and Rubil 2017).

In this paper, we look at the distribution of cash and in-kind transfers provided by the central and a local government unit (Zagreb) for households with children and assess their impact on poverty and income inequality. The main tool for the analysis is the Croatian microsimulation model miCROmod (Urban et al. 2022), a spin-off of the EU-wide microsimulation model EUROMOD (Sutherland and Figari 2013). We put the focus on in-kind transfers provided by the central government – education and healthcare systems. As distinct from previous research (e.g., Nguyen and Rubil 2021; Pezer, Urban, and Leventi 2022), this analysis combines local and central government cash and in-kind transfers, focusing on households with children. Furthermore, the methodological approach to the simulation of in-kind transfers provides more precise results and is based on new data sources. An additional contribution of this paper is that we have incorporated central government in-kind transfers to miCROmod.

After the introductory section, the second section describes the related literature on government spending on health care, education and social protection, or cash and in-kind transfers. The third section describes the data, methodology and policies in question. The fourth section presents the results of this work, and the final section concludes.

2. Related Literature

The socioeconomic status of children has an important role in their future outcomes. Children born and raised in low-income families have fewer opportunities to be educated and to find a job, and their health is poorer (Musić Milanović et al. 2020; Currie 2009). Family policies, governmental support and interventions tend to decrease child poverty. But the central factors in reducing child poverty are parental employment, sufficient incomes and gender equality (Nygård et al. 2019). Further, in promoting equal opportunities and fighting against social exclusion, access to childcare is a key determinant that prevents children from being socially disadvantaged. Investing in education and health care contributes to more equal opportunities for children, as there is ample evidence that social background plays a crucial role in pre-primary and tertiary education participation (Verbist and Förster 2019). In-kind transfers like education and health services, housing, transportation subsidies or school meals, are worth significantly more for low-income households. But some research findings indicate that poorer parents, if they have a choice, prefer cash instead of in-kind transfers due to a lack of awareness (Currie and Gahvari 2007). However, health systems and educational systems, vary widely among countries, as well as between Europe as a whole and the USA. Great controversies are waged about whether the healthcare system needs to be private or public (Currie and Gahvari 2007).

Research indicates there is lower income inequality after in-kind transfers are included in the analysis (Evandrou et al. 1993). Thus, it is important to use full income instead of solely monetary disposable income in the analysis of income inequality and poverty since household income does not consist only of money transfers but of in-kind transfers as well (Rosen and Gayer 2010). It is important to focus on the distributional effects of generous in-kind public transfers, especially education and health care (Koutsampelas and Tsakloglou 2013). But, we cannot know whether transfers in money are valued as much as in-kind; in addition, in-kind transfers entail higher administrative costs (Rosen and Gayer 2010).

Using data for Greece in the mid-2000s, Koutsampelas and Tsakloglou (2013) show that income inequality declines sharply when the distribution includes both cash and non-cash incomes because younger and older individuals below the poverty line use in-kind services more. Christl et al. (2020) report that indirect taxes in Austria have a regressive effect, while in-kind transfers seem to have a

progressive effect. The authors include two kinds of redistribution – between different income groups and between generations. Their results indicate that indirect taxation tends to shift a household with a marginal income downwards, while in-kind transfers shift it upwards.

In Germany, to reduce the risk of poverty for families with children, child benefits should be reformed, especially for children in single-parent families who face a relatively high poverty risk (Hufkens et al. 2019). The results of Nygård et al. (2019) based on an aggregate social spending analysis of 22 European countries show that spending on transfers in kind is more efficient in restraining child poverty than spending on cash transfers. Furthermore, the efficiency of public spending on households with children declined over the period 2006-2015. Förster and Verbist (2012) found that the inclusion of in-kind transfers in the analysis reduces child poverty by one quarter, whereas poverty among children enrolled in childcare is more than halved.

Forms of family support provided through government transfers in Croatia are various: the child benefit, tax allowance for dependent children, benefits for newborns, maternity and parental leave, but also social assistance and housing benefits whose amounts and entitlement depend on the presence of children in the family. Other cash and in-kind transfers include a variety of benefits provided at the local government level, such as extended stay at school and school meals, as well as education and health care provided by the central government.

Nguyen and Rubil (2021) conclude that, based on 2018 data, the fiscal system in Croatia reduces inequalities but increases poverty: only direct transfers (disability pensions and benefits, child benefits and guaranteed minimum benefit) reduce poverty, especially for households with three or more children. Previous comparative research on child poverty indicates that Croatian cash transfers to families are less potent than in some European countries (Pezer 2022). Pezer, Urban, and Leventi (2022) demonstrate how the inclusion of subsidies provided by local governments for kindergarten and transport greatly contributes to poverty reduction. Thus, it is expected that the extension of this research to include the highly valuable central government in-kind transfers, education and health care, will shed more light on the redistributive effects of the Croatian tax and benefit system for families with children.

3. Methodology and Policies in Question

The lack of data containing information about the in-kind transfer distribution, spending, users and other necessary information for analysis causes several methodological challenges in the relevant research. However, the use of tax-benefit microsimulation models such as EUROMOD, which allows for the inclusion of in-kind transfers when analysing changes in the income distribution, is a valuable tool for this sort of analysis (Christl et al. 2020; Paulus, Sutherland, and Tsakloglou 2010).

There are different approaches in the analysis of the in-kind transfers. The straightforward approach of assigning the transfer to an individual is used when the value of the provided transfer can be measured, most often in the case of education, childcare and social (subsidised) accommodation. Different approaches are used when the value and intensity of in-kind transfers are not visible. For example, individuals are grouped depending on common characteristics such as age or gender. The value is then determined by the cost of producing services for the same group receiving the same amount of transfers, although within that group there are individuals who do not use the service but know they have access to it, such as health services or care for the elderly and disabled (Tonkin et al. 2014; Koutsampelas and Tsakloglou 2013; Paulus, Sutherland, and Tsakloglou 2010; Inchauste and Rubil 2017).

Across OECD countries, public expenditure for in-kind transfers accounts for approximately 13% of GDP, but with important cross-country differences (Verbist and Förster 2019). In Croatia, spending on health care and education has increased since 2014 (Nguyen and Rubil 2021). The country's public education and healthcare expenditure account for 11% and 15%, respectively, while social protection, education and health care together account for 56% of total government expenditure (Table 1).

According to Table 1, expenditure for social protection in Croatia, primarily made in the form of cash transfers, amounts to 30% of total government expenditures. Most social protection is made up of public pensions. Health care and education total 26% of government expenditure, most of which are in-kind transfers. As can be seen from the previously presented data, in-kind transfers are a significant part of total government expenditure. Hence, one can assume they may also have a substantial role in reducing inequality and poverty.

Table 1. General government expenditure in Croatia, 2019

	In billion euros	In % of total
General public services	2.9	11
Defence	0.6	2
Public order and safety	1.2	5
Economic affairs	4.3	17
Environmental protection	0.6	2
Housing and community amenities	0.7	3
Health care	3.9	15
Recreation, culture and religion	0.8	3
Education	2.8	11
Social protection	7.7	30
Total	25.6	100

Source: Eurostat (2022a).

3.1. Public policies in question

Table 2 describes the public policies in question in this research. Central government cash transfers include the child benefit, maternity and parental leave benefits, the newborn grant, the guaranteed minimum benefit and the tax allowance for dependent children (unless otherwise stated). Central government in-kind transfers include health care and education. Local government cash transfers of the City of Zagreb (Croatian capital) are also simulated and include the housing benefit and the newborn grant. Local government subsidies of the City of Zagreb include the city transport and the kindergarten subsidy. [1]

Table 2. Description of benefits, 2021

Name of benefit	Description
Guaranteed minimum benefit (*zajamčena minimalna naknada*)	A cash benefit provided by the central government if the person has no (or insufficient) income to cover basic living needs. The amount depends on the income of recipients and the size and type of a household (e.g., up to HRK 1,600/EUR 212 monthly for parents with two children). The benefit was reformed in 2022.
Child benefit (*doplatak za djecu*)	A means-tested cash benefit received by households with children. The benefit amount depends on the household's income, number of children, disability etc. Basic benefit amount ranges from HRK 200 (EUR 27) to HRK 300 (EUR 40) monthly. Supplements for the third and the fourth child equal HRK 500 (EUR 66) monthly are also available.
Tax allowance for dependent children (*porezni odbitak za uzdržavanu djecu*)	A personal income tax allowance that progressively increases with each subsequent child.
Maternity and parental leave benefits (*naknada za rodiljni i roditeljski dopust*)	An income-replacement social benefit for employed and self-employed parents. The benefit amount depends on income received in the period before the maternity (parental) leave.
Maternity and parental allowance (*naknade za rodiljnu i roditeljsku brigu i poštedu od rada*)	Available to parents of a newborn child who are temporary workers, workers in agriculture, unemployed persons or inactive persons. Monthly benefit amount is HRK 2,328 (EUR 309).
Newborn grant (*novčana potpora za novorođeno dijete*)	A lump-sum cash benefit of HRK 2,328 (EUR 309) provided at central government level.
City of Zagreb's newborn grant (*novčana pomoć za opremu novorođenog djeteta*)	The benefit increases with the number of children. It equals HRK 1,800 (EUR 239) for the first child, HRK 3,600 (EUR 478) for the second child, and HRK 54,000 (EUR 7,167) for the third and subsequent children. The benefit was reformed in 2022.
City of Zagreb's transport subsidy (*subvencija za prijevoz*)	The benefit amount depends on recipients' economic status, age, household income and similar. Maximum subsidy equals HRK 250 (EUR 33) monthly. In general, low-income pensioners, students, and the unemployed receive full subsidies, while others pay reduced fees.
City of Zagreb's kindergarten subsidy (*subvencija za vrtiće*)	A subsidised amount of the economic cost of the kindergarten. The subsidy is equal to the difference between the economic price and the fee paid by parents; the maximum amount is HRK 2,000 (EUR 265) monthly.[2]
City of Zagreb's compensation for housing costs (*naknada za troškove stanovanja*)	The benefit received by beneficiaries of the *guaranteed minimum benefit*. It covers various housing costs such as rental, electricity, utility, heating, etc. Amount is equal to half of the maximum amount of the guaranteed minimum benefit.

3.2. Data

The analysis is conducted using EU-SILC microdata, which are based on the Croatian national SILC (*Anketa o dohotku stanovništva*), collected by the Croatian Bureau of Statistics, for the year 2019, with income data for 2018. The sample consists of 7,879 households and 19,547 individuals that are a representative sample for the Croatian population, but the analysis for households with children was conducted on an urban subsample (based on EU-SILC's variable for densely populated areas - cities) of 1,738 households and 4,068 individuals. This urban subsample was chosen to reflect better the impacts of simulated policies of the City of Zagreb since the survey does not contain exact information on people's places of residence. There are differences between the urban and rural populations in education level, age structure and other characteristics of interest in this analysis. Income data have been uprated to reflect 2021 values as the simulation was based on policy rules valid in 2021. Uprating incomes is performed by using factors based on available administrative statistics. Specific uprating factors are derived for each income source, reflecting the change in their average amount between the income data reference period (2018) and the target year (2021).

3.3 Methods and Assumptions

The main tool for our analysis is the Croatian microsimulation model of taxes and benefits miCROmod (Urban et al. 2022), a spin-off of the EU-wide microsimulation model EUROMOD (Sutherland and Figari 2013). Microsimulation models simulate social insurance contributions, taxes and benefits for individuals and households, and hence, their disposable income. Such models are an excellent tool for policy evaluation and various distributional analyses (Figari, Paulus, and Sutherland 2015). miCROmod consists of two modules: arithmetical (employed in this analysis) and behavioural (Urban, Bezeredi, and Pezer 2018; Bezeredi et al. 2019). The arithmetical module, miCROmodA, simulates central government cash transfers and taxes as well as the local government cash transfers and subsidies of the Croatian capital (Zagreb) and the three next biggest cities (Split, Rijeka and Osijek). For this analysis, miCROmodA is upgraded by incorporating healthcare and education in-kind transfers provided by the central government.

The main object of our analysis is households with children, with particular emphasis on the cash and in-kind transfers parents receive on account of children in their household. Children are defined as below 18 years of age but we also include young dependent adults, as in Pezer (2022). Young dependent adults are economically dependent adults up to 25 years of age (students, unemployed, disabled and similar). The analysis is conducted for households of up to three children due to the low number of households with more children in the subsample.[3]

Calculations are performed at the household level, using equivalised incomes. The modified OECD equivalence scale is used to account for economies of scale as a better estimate of a living standard than monetary incomes (OECD 2020).[4] We assume full benefit take-up and full tax compliance. However, kindergarten enrolment data is based on survey data as well as school/university enrolment. The child-contingent payments method is applied to capture the monetary amounts parents obtain for the children in their household from the tax-benefit system (Corak, Lietz, and Sutherland 2005; Figari, Paulus, and Sutherland 2011). This is a microsimulation technique which compares benefits received and taxes paid when children are present in the household, to a hypothetical situation when children are "removed" from the household, and thus calculate the net amount of payments obtained on account of children.

To account for perceptions of in-kind transfers and subsidies, several income concepts are used:

i)   post-SIC income (X) is equal to the sum of market incomes and pensions minus the social insurance contributions (SIC);

ii) Y0 is equal to X minus taxes (taking into account tax allowances) plus central government cash transfers

iii) Y1 is equal to Y0 plus local government cash transfers (disposable income)

iv) Y2 is equal to Y1 plus central government in-kind transfers

v)   Y3 is equal to Y2 plus local government subsidies (augmented income)

Child poverty is calculated using Foster-Greer-Thorbecke (FGT) indices (Foster, Greer, and Thorbecke 1984): comparing poverty headcount (share of children in households with incomes below the poverty line) and poverty gap (which takes into account how far households are from the poverty line). The poverty line is fixed at 60% of the median equivalised disposable household income. However, a changing poverty line for different income concepts is also used. Concentration curves are estimated using the DASP Stata Package (Araar and Duclos 2007).

3.3.1. Simulation of central government in-kind transfers

We upgraded the miCROmodA model with two in-kind central government policies: health care and education, as these are the two most important in-kind transfers in Croatia. To do that, we match the average education costs per student to a particular household whose members are in education according to their level: primary, secondary and tertiary, and the cost of health care according to age and gender (see Table 3). The value of the transfer in kind for the user is equal to the average cost of production of that service (Paulus, Sutherland, and Tsakloglou 2010). Data for education is based on total government spending ("Financial Agency - FINA" 2022) for each stage of education (primary, secondary and tertiary) and divided by the number of students in each stage (Croatian Bureau of Statistics 2022b). These amounts are reduced by the amounts of Research and Development spending (Eurostat 2022a).[5]

The amount for healthcare spending is matched to users of that benefit (entire population) according to age and gender. Data for health care (Basic Health Insurance) is provided by the Croatian Bureau of Statistics (2022a). Health care includes in-patient care (direct provision); expenditures on medicines

Table 3. Costs of education per student, in HRK, 2019

Level of Education	Number of students	Total cost	Average cost per student
Primary	312,530	7,129,027,068	22,810.70
Secondary	146,277	3,525,747,634	24,103.23
Tertiary	145,178	4,831,555,230	33,280.22

Source: Authors' calculations based on data from Eurostat (2022a, 2022b); Croatian Bureau of Statistics (2022b); Financial Agency - FINA (2022).

Table 4. Average healthcare spending by age and sex, in HRK, 2019

Age	Total	Men	Women
TOTAL	5,522	5,286	5,744
0-4	3,576	3,880	3,255
5-9	1,532	1,707	1,347
10-14	1,744	1,770	1,716
15-19	2,401	2,188	2,626
20-24	2,600	2,135	3,093
25-29	3,295	2,380	4,264
30-34	3,439	2,495	4,421
35-39	3,059	2,485	3,655
40-45	3,662	3,209	4,128
45-49	5,177	4,782	5,576
50-54	5.919	5,837	5,998
55-59	6,001	6,312	5,709
60-64	5,865	6,365	5,406
65-69	7,730	8,601	6,983
70-74	13,079	15,187	11,511
75-79	12,442	14,899	10,838
80-84	12,643	15,008	11,339
85+	18,880	21,138	17,962

Source: Authors' calculations based on data from the Croatian Bureau of Statistics (2022a) and Eurostat (2022b).

Figure 1. Distribution of average equivalised value of health care and education by household (Croatia), 2021
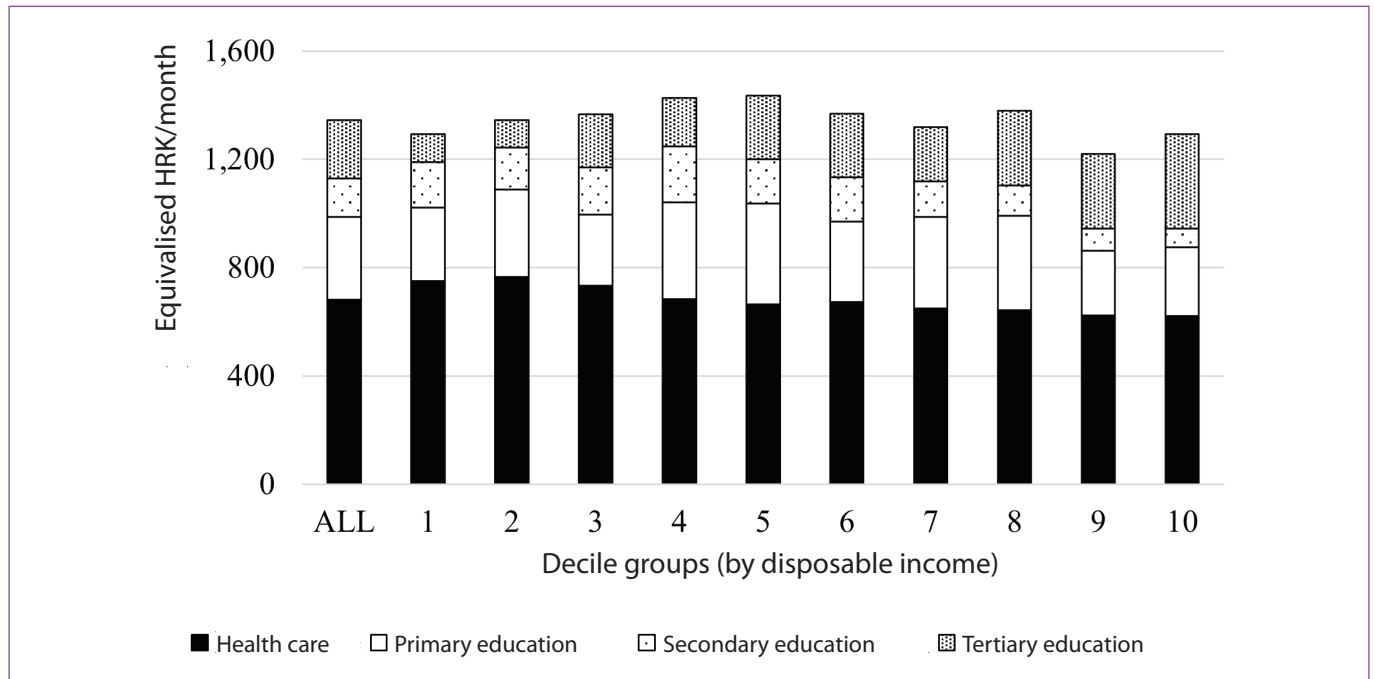
Source: Authors' calculations based on miCROmodA output.

Note: The figure displays the distribution of in-kind transfers across the entire sample.

prescribed to beneficiaries by primary healthcare doctors; out-patient care (direct provision); health protection financed by government ministries, and health protection financed by regional and local self-government units. The total amount spent on the healthcare system is divided into groups by age and gender according to the proportion of spending estimated for each group. Due to the unavailability of Croatian data, the proportion of spending for each group is based on the Austrian healthcare system, as presented in Christl et al. (2020).[6,7] The number of people in each five-year group of population is taken from Eurostat (2022b).

Figure 1 illustrates the distribution of the simulated in-kind transfers across the entire sample. Average equivalised values across decile groups reveal their relatively uniform overall distribution. Health care is slightly more important for the decile groups below the median. This can be attributed to pensioners with higher healthcare costs and lower disposable income than the working-age population. Tertiary education values increase with income, while secondary education values decrease due to the population structure.

4. Results

This section summarises the main findings of our analysis for households with children in the urban subsample. Basic descriptive statistics are available

in Appendix Table A1. Results reveal that, on average, central government transfers are more generous, both cash and in-kind, than local government transfers. Central government support includes costly education and health care, as well as the child benefit and tax reductions due to the child tax allowance. The expansion of the analysis by the inclusion of in-kind transfers and subsidies to household incomes (measured with Y3) substantially increases median income, by 29% up from the disposable income (Y1).

How child-contingent support varies by income quintile and type is presented in Figure 2 in relative and absolute amounts (see also Appendix Table A2). In-kind child-contingent support is, on average, in absolute terms, 229% higher than cash payments. The most dominant transfer is education, with an average share in total child-contingent support of 56%. It is followed by central government cash payments. The lowest payments, on average, are from the means-tested housing benefit. The transport subsidy is highest for the lowest quintile group due to their entitlement to greater subsidy amounts, while the kindergarten subsidy increases with income in absolute terms due to a higher number of kindergarten users in higher-income groups.

The lowest absolute support is obtained in the second quintile group as these households, on average, obtain the lowest amount of child benefit, while at the same time their incomes are not high enough

to fully utilise the child tax allowance (Urban 2014; World Bank 2014).[8] While it can be observed that the share of the central government's cash child-contingent payments to a certain extent follows the income growth (most pronounced in Q2-Q4), the addition of in-kind transfers which are not income-dependent contributes to a fairer distribution of the overall

child-contingent support in relative terms, from a vertical equity perspective.

Variations of child-contingent support by the number of children in the household are also analysed. In absolute terms, per child, the differences between household types are not as pronounced, and they are mainly driven by the central government's

Figure 2. Structure of child-contingent support by income quintile groups and the number of children in household, monthly (Zagreb) 2021; as share in disposable income (upper panel), in absolute terms per child (lower panel)
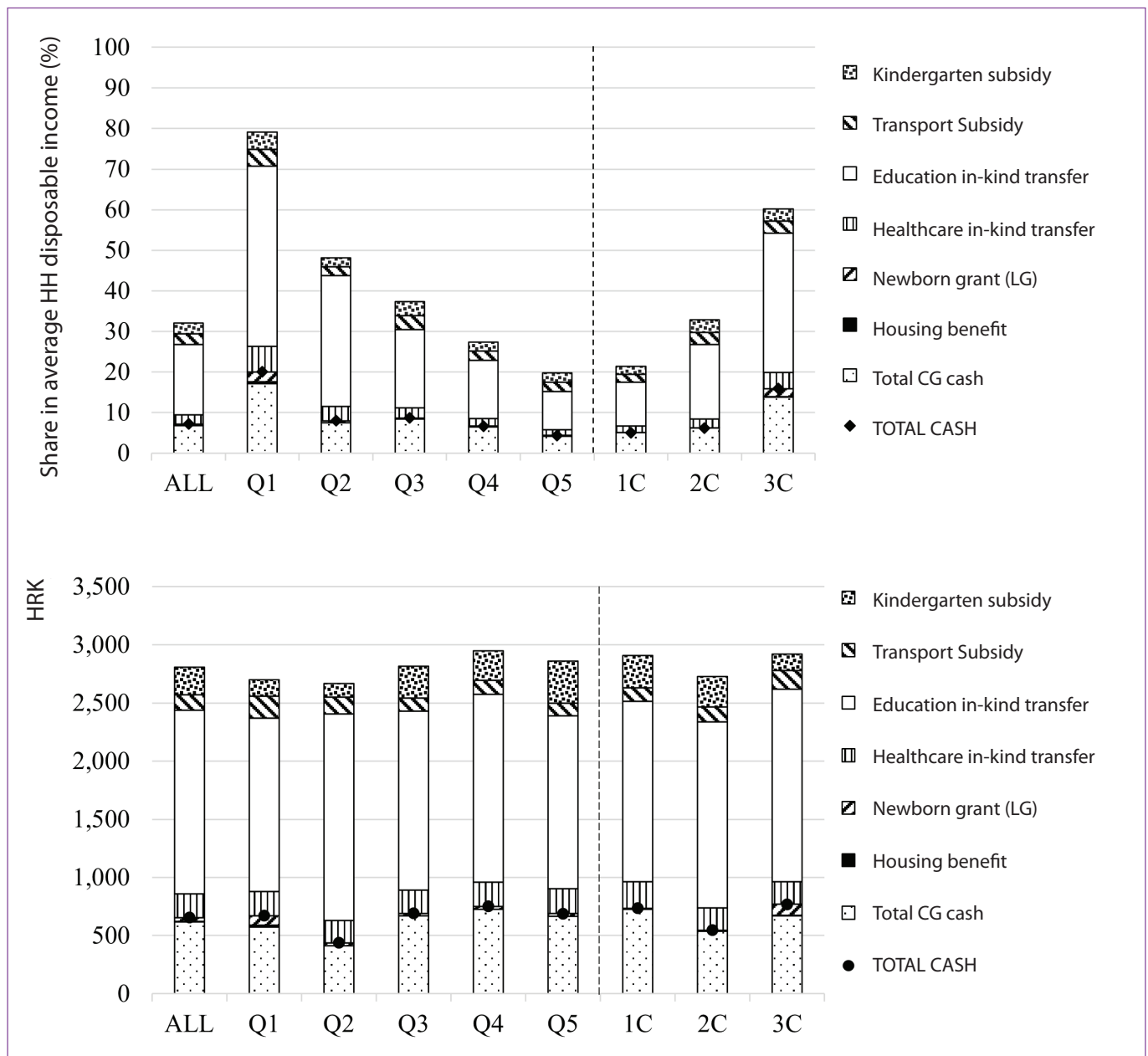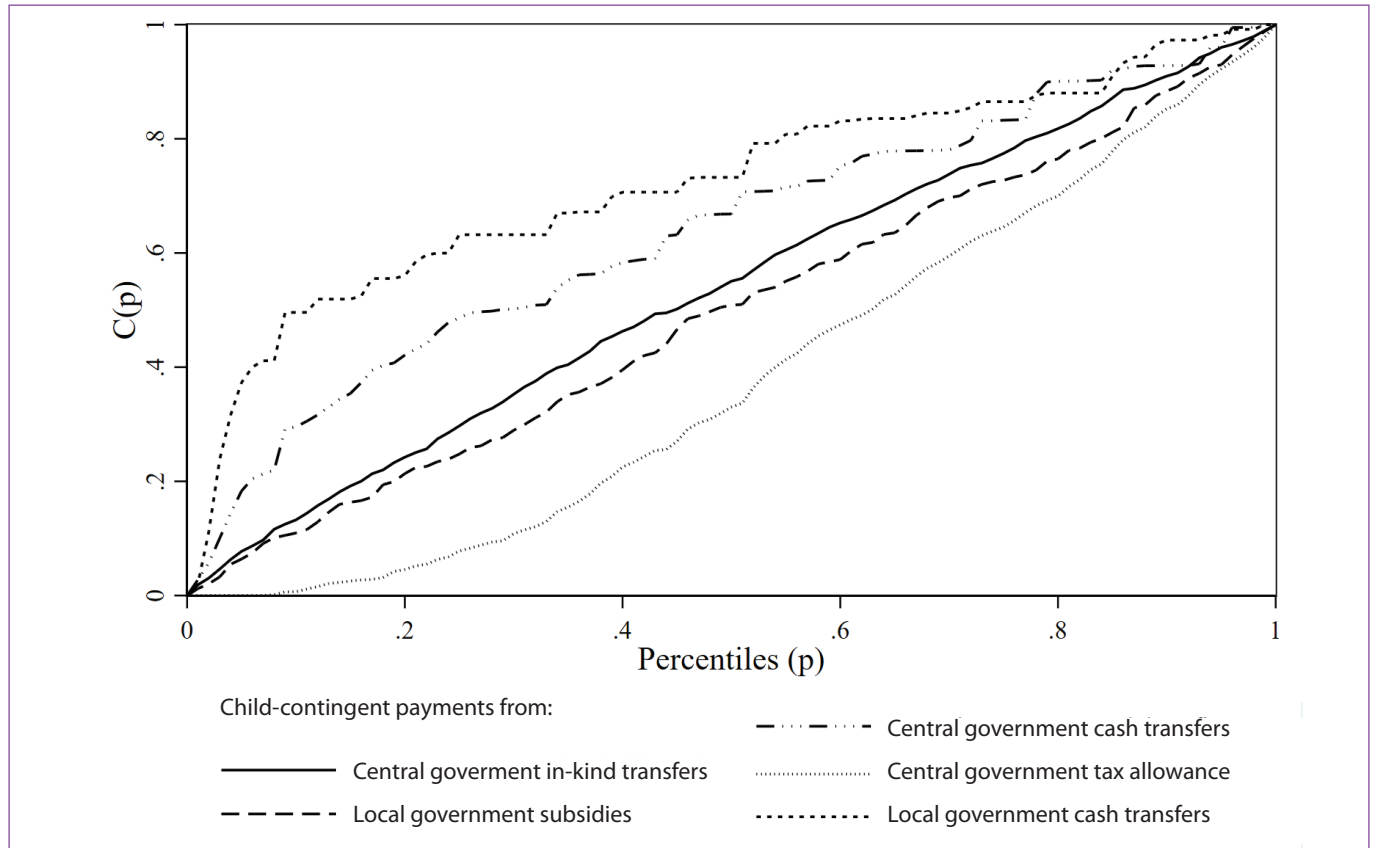

Source: Authors' calculations based on miCROmodA output.

Note: Tax reduction is included in Total CG cash. Qn denotes quintile groups which are formed according to post-SIC incomes of all households in the urban subsample, HH denotes household, CG denotes central government, LG denotes local government, nC denotes the number of children in a household (urban subsample).

policies. In relative terms, large families obtain greater support with a similar structure as smaller households.

Figure 3 depicts aggregate concentration curves for child-contingent payments from groups of tax-benefit policies that reveal which are "pro-poor" and "pro-rich". Local and central government in-kind benefits/subsidies are distributed relatively evenly across households, as their entitlement, in general, is

Figure 3. Aggregate concentration curves of child-contingent support, Zagreb, 2021

Child-contingent payments from:

— · · — · · — Central government cash transfers
————— Central goverment in-kind transfers
················ Central government tax allowance
— — — — Local government subsidies
·········· Local government cash transfers

Source: Authors' calculations with DASP based on miCROmodA output.

Note: Households are ranked by their equivalised pre-child-contingent payments income; analysis was conducted for the urban subsample.

Table 5. Poverty analysis, Zagreb, 2021

Income concept	All		1 child		2 children		3 children	
	FGT(0)	FGT(1)	FGT(0)	FGT(1)	FGT(0)	FGT(1)	FGT(0)	FGT(1)
A) Poverty line: fixed, 60% median of household equivalised disposable income (Y1)								
X	19	8	16	4	10	3	31	18
Y0	14	5	11	3	6	2	26	12
Y1	13	4	11	3	6	2	26	11
Y2	2	0	2	0	1	0	3	0
Y3	1	0	2	0	0	0	0	0
B) Poverty line: moving, 60% median of household equivalised income								
Y0	14	5	11	3	6	2	26	12
Y2	7	1	7	1	2	0	15	2
Y3	6	1	7	1	2	0	12	1

Source: Authors' calculations.

not means-tested. With the lion's share of grants for newborn children, local government cash transfers are found to be pro-poor.[9] Central government cash policies are depicted separately for benefits (child benefit, guaranteed minimum benefit, newborn grant and parental benefits) and for the support obtained through tax reductions (due to the child tax allowance). The former are found to be pro-poor while the latter is by design pro-rich.

Poverty analysis is presented in Table 5. Child poverty headcount (FGT(0)) and poverty gap (FGT(1)) are compared for households with a different number of children and different income concepts. On average, households with three children are the poorest, while households with two children are the least poor. Central government transfers are estimated to be the most potent in child poverty reduction.

While keeping the poverty line fixed (Table 5, section A), it can be observed that child poverty diminishes when assessed for the augmented income (Y2 and Y3). Having in mind the high value of in-kind transfers and their uniform distribution, the addition of in-kind healthcare transfers and the education transfers significantly lowers child poverty. The value of these transfers is so high that it almost completely lifts all households out of poverty. However, a moving poverty line (Table 5, section B) reveals that with an increased poverty line half of the households remain below the poverty line compared to disposable income poverty.

In-kind transfers also contribute to income inequality reduction in Croatia as demonstrated in Table 6. If in-kind transfers are included in the analysis they decrease the Gini coefficient by 16% compared to the disposable income, which is slightly higher than the overall reduction of income inequality achieved through the tax and benefit system if disposable and post-SIC incomes are compared.

A similar magnitude of inequality reduction is confirmed with the S80/S20 ratio; accounting for in-kind transfers lowers this indicator by a non negligible 17%.

Table 6. Income inequality indicators, Zagreb, 2021

Income concept	Gini coefficient	S80/S20
Post-SIC income (X)	0.348	2.550
Disposable income (Y1)	0.306	2.145
Augmented income (Y3)	0.258	1.777

Source: Authors' calculations with DASP.

Note: Calculation for all households in the urban subsample.

5. Discussion and Conclusion

The paper analyses the impact of the Croatian tax-benefit system on households with children, with special emphasis on in-kind transfers, at both local and central government levels. The Croatian microsimulation model miCROmod is utilised and upgraded with the simulation of those transfers. The results suggest that transfers in kind have strong inequality- and poverty-reducing effects. This research emphasises the importance of using augmented income to analyse income inequality and poverty instead of solely monetary disposable income. It is important to point out that household income does not consist only of cash transfers but of in-kind transfers as well.

Our findings suggest that in Croatia, health care is almost evenly distributed among the entire population; education varies with income - tertiary education is more represented in higher-income households. Child-contingent support through in-kind transfers, including local government subsidies is also relatively evenly distributed and income independent and thus roughly equally important for the entire population. The value of in-kind transfers greatly exceeds that of monetary transfers. In general, in-kind transfers are estimated to decrease the Gini coefficient by 16% compared to disposable income inequality. Furthermore, adding in-kind healthcare and education transfers significantly lowers child poverty.

A certain amount of caution is called for when interpreting these results. The main issues, to do either with the quality and representativeness of survey data or with our simulations, are briefly discussed below. First, the unavailability of residence data does not allow for a more detailed simulation of a sub-sample of residents of Zagreb. Second, due to the lack of necessary information and the complexity of some policy rules, our simulations do not include the totality of transfers provided by the central and local governments. However, although not simulated, part of these benefits is still present in our input data, and hence used in the analysis. One of the non-simulated benefits is the parent educator benefit for parents of three (or more) children, which caused a lot of controversies and is subject to reform.[10]

A strength of this research, an advanced estimate of in-kind healthcare benefit, is also a limitation. To provide a more precise estimate compared to previous research, Austrian healthcare spending data was used. Making such data more broadly available is certainly one of the future tasks for the Croatian government, especially for the Croatian Ministry of Health. The ministry should provide research data for healthcare

spending for each population group according to age and gender.

Future research based on microsimulation may use simulated local and central government policies, in-kind and cash transfers, and also include indirect taxes. Such a comprehensive analysis would provide additional insights and reveal the full impact of the Croatian tax-benefit system. In addition, future research could involve more local units, with different fiscal capacities, to account for differences between cities and municipalities and economic disparities between different regions of the country.

Living in an era of pandemic, war and inflation is hard for every citizen of Europe and indeed of the whole world. Such global developments tend to disadvantage the most vulnerable parts of the population – children, the elderly and marginalised groups. Public finances are critical in protecting the standards of living of those populations. Croatia too is not spared from the effects of these events, which are likely to induce high risks of poverty and inequality. The latter might be exacerbated by emigration and by the demographic challenges the country is currently facing (ageing and natural decrease of the population). Unfavourable demographic conditions affect productivity, economic development, and, consequently, the state budget. Considering these challenges, additional funds would help fight child poverty and income inequality, but they are not a prerequisite. Even with current levels of funding, a long overdue child benefit reform could be implemented (Pezer 2023). Also, as shown by the Programme for International Student Assessment (PISA) and the European Health Interview Survey (EHIS), Croatia is lagging behind in terms of quality education and health care. Improvements in these fields can be expected via better management, anti-corruption strategies and digitalisation.

Our research is focused on Zagreb, the most prosperous territory of the country; but regional differences remain an issue in Croatia. Dobrotić and Matković (2023) emphasise that in addition to the formal right to receive a particular service, inter-territorial fiscal equalisation policies are essential for the resolution of the territorial fragmentation of social rights. The provision/availability of cash/in-kind transfers at a sub-national level must be addressed through structural reforms. A step forward could be the announced reform of the Croatian local governments by mergers of municipalities. If well-implemented, such a reform could enhance the availability of early childhood education and care, transport to schools and school supplies in the most disadvantaged regions of the country.

Evidence-based policy-making is essential for fighting child poverty and income inequality. Analyses of this kind point to the gaps in the distribution of transfers and can be used to better understand the fiscal and distributional implications of potential policy reforms. Subject to data availability, various local or central government initiatives, such as the recently introduced provision of free meals for every schoolchild, can also be assessed with the use of microsimulation techniques. The importance of in-kind transfers is highlighted throughout the results of this analysis. While some of those transfers are costly and their value cannot be easily perceived or counted by beneficiaries, as is often the case with in-kind transfers such as health care and education, their importance should not be neglected. Guaranteeing high quality and wide accessibility for those benefits is essential to achieve the goal of equality of opportunity for every child and citizen.

Endnotes

1 Other Croatian cities have similar benefits to City of Zagreb, but they may differ in amounts, eligibility, conditions etc.

2 Explained in more detail in Urban et al. 2022.

3. In the urban subsample there are 1,281 childless households, 205 households with 1 child, 189 with 2 children, 51 with 3 children and 12 with 4+ children.

4. The modified OECD equivalence scale assigns the following weights to household members: 1 to the head of the household, 0.5 for every subsequent member older than 14, and 0.3 for every child up to 13 years of age.

5. The Research and Development (R&D) spending is not directly related to the benefit that the student has from the education service. The cost for R&D in Croatia averages around 1% of total government spending on higher education.

6. There are many similarities between the Austrian and Croatian healthcare systems, the most important of which are that the two systems are based on the same foundations. The healthcare system in Croatia began to develop in the 19th century within the Austro-Hungarian monarchy, and even today both systems are based on Bismarckian principles. The share of healthcare expenditures, as well as the share of expenditures for medicines, is very similar in both countries, and most importantly, the countries have similar age structures.

7. The proportion of spending by age resembles the OECD data under the System of Health Accounts (SHA) Framework available for Czechia, the Netherlands, and South Korea.

8. The recent change in the child benefit (in 2018) increased the entitlement threshold of the child benefit and improved its distribution, but the regressive tax allowance still raises some equity concerns.

9. While the grant is not means-tested, it is a pronatalist benefit. To a certain extent, lower-income households tend to have more children, and also first-time parents are usually younger, starting their careers with lower incomes. It should also be noted that equivalised incomes of households with more children are lower than those with fewer children, having the same employment income, and thus they will be in lower percentiles.

10. In 2021, the parent educator (cash for care) is the mother or father of the child (or the foster parent or similar). The youngest child must not be in the primary school education program, and the oldest child at the time of application must not be older than twenty-six years of age. The benefit was paid monthly in the amount of 65% of the average gross salary in Zagreb.

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APPENDIX

Appendix Table A1. Descriptive statistics, 2021, Zagreb, yearly amounts in HRK

Child-contingent support per capita from:	
child tax reduction	861
child benefit	208
social assistance benefits	60
health care	537
education	4,144
parental benefits	494
Total CG cash	1,623
Total CG in-kind	4,681
Total CG	**6,305**
housing benefit	7
LG grant for newborn children	88
kindergarten subsidy	621
city transport subsidy	349
Total LG cash	95
Total LG subsidies	970
Total LG	**1,065**
Total cash CG+LG	1,718
Total in-kind CG+LG	5,651
Total CG + LG	**7,369**

Median equivalised incomes (household level)	
X (post-SIC income)	70,214
Y0	70,559
Y1 (disposable income)	70,559
Y2	88,221
Y3 (augmented income)	91,296

Per capita incomes	
X (post-SIC income)	55,082
Y0	52,802
Y1 (disposable income)	52,987
Y2	63,694
Y3 (augmented income)	65,449

Appendix Table A2. Structure and amounts of child-contingent support by income quintile groups and the number of children in household, monthly, Zagreb, 2021 (per child)

A) Quintiles	ALL	Q1	Q2	Q3	Q4	Q5
Central government (CG):						
Tax reduction	328	27	184	384	460	509
Child benefit	79	292	134	16	1	0
Social assistance	23	53	25	14	16	12
Parental benefits*	188	203	72	257	249	145
Total CG cash	618	575	415	670	726	666
Healthcare in-kind benefit	204	209	191	198	209	214
Education in-kind benefit	1,578	1,488	1,775	1,540	1,617	1,486
TOTAL CG	2,401	2,272	2,381	2,409	2,551	2,366
Local government (LG):						
Housing benefit	3	16	0	0	0	0
Newborn grant	33	80	24	21	25	23
Total LG cash	36	96	24	21	25	23
Kindergarten subsidy	236	140	118	272	255	362
Transport subsidy	133	192	143	113	118	109
TOTAL LG	405	428	285	407	398	495
TOTAL:						
TOTAL CASH	654	671	439	692	751	690
TOTAL CASH + IN-KIND	2,806	2,700	2,666	2,816	2,949	2,860

B) Number of children	1 child	2 children	3 children
Central government (CG):			
Tax reduction	291	382	294
Child benefit	25	39	195
Social assistance	30	18	24
Parental benefits*	380	102	157
Total CG cash	726	540	670
Health in-kind benefit	228	192	194
Education in-kind benefit	1,551	1,597	1,656
TOTAL CG	2,505	2,329	2,520
Local government (LG):			
Housing benefit	0	1	4
Newborn grant	9	7	95
Total LG cash	9	8	99
Kindergarten subsidy	274	263	142
Transport subsidy	119	129	160
TOTAL LG	402	399	401
TOTAL:			
TOTAL CASH	734	548	769
TOTAL CASH + IN-KIND	2,906	2,728	2,921

Source: Authors' calculation based on miCROmod output.

Note: *includes central government's newborn grant.