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Does the Czech Tax and Benefit System Contribute to One of Europe's Lowest Levels of Relative Income Poverty and Inequality?

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The Czech Republic is home to one of the more equal societies in terms of household disposable income, and has the lowest level of relative poverty in Europe. This study shows that Czech market income is quite egalitarian, especially when pensions are included. It finds that the narrowly defined tax-benefit system (i.e., direct taxes and social benefits) does not actually change the poverty rate, and that indirect taxes increase it. It further provides the first estimates of the redistributive effectiveness and targeting of a number of social and tax policies.

Keywords: Czech Republic, expenditures, income, inequality, poverty

JEL Classification: C81, D12, D31, D63, I32, O52

International comparisons have long shown that the Czech Republic has some of the lowest income inequality and relative poverty rates in Europe (e.g., Decancq et al. 2013; Pryor 2014) and even worldwide (e.g., Galbraith and Kum 2005; Milanovic 1999; 2011; OECD 2011). According to the established at-risk-of-poverty measure based on disposable income, which defines the poverty line as disposable income at 60% of the country-specific median disposable income, the Czech Republic, at

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8.6%, has the lowest percentage of inhabitants at risk of poverty in the European Union (see Figure 1).[1] The share of the population at-risk-of-poverty is one of the most frequently used indicators of relative poverty in the European Union (EU), and it is one of the indicators in the Europe 2020 10-year strategy.[2] Furthermore, according to Eurostat (2014), the Czech Republic exhibited the third-lowest level of disposable income inequality in the EU in 2013, as measured by the Gini coefficient.

The authors start from this well-established observation and explore what stands behind the Czech Republic's outstanding performance in this area. Is it due to the particular structure of incomes from labor, capital, or pensions, or is it a result of the country's tax-benefit system? To answer this question, the redistributive effectiveness of Czech direct and indirect taxes and benefits is studied. This provides an insight into the various types of benefits and taxes, and investigates their individual redistributive contributions. The findings, which shed light on where the Czech Republic's extraordinarily low poverty and inequality rates come from, should be of interest to other European countries that are struggling to decrease their relative poverty and inequality in order to meet EU 2020 strategic goals.

Interactions between incomes, taxes, and benefits are analyzed using standard methods used by the OECD and academics such as Lustig and Higgins (2013). Stylized methods for the Czech institutional context are adjusted, and the best available individual data from the Czech Statistical Office's (2012, 2013) regular survey are used: the Survey of Income and Living Conditions (EU-SILC) for income, direct taxes, social benefits, and demographic information, and the Household Budget Survey (HBS) for expenditures and indirect taxes.

This is the first investigation of its kind for the Czech Republic, and it contributes to the existing literature in three ways. First, individual household-level data, both on incomes and on expenditures, are used from the most suitable data sources. Second, this enables the evaluation of the distributional impact of direct taxes and social benefits together with indirect taxes. Last but not least, the redistributive effectiveness of individual tax and benefit instruments is estimated.

The rest of the article is structured in the following way: The next section provides a brief overview of the relevant literature; the third section describes the methodology, followed by the results and a discussion. The article concludes with policy recommendations and a discussion of some possible avenues for further research.

LITERATURE REVIEW

Since the literature on measuring relative poverty and inequality is voluminous, the literature review is focused on selected areas that are closely related to the hypothesis of this article. The review begins by discussing Czech inequality in the international context, and then looks at research that focuses on the Czech Republic.

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[1] The at-risk-of-poverty indicator is defined in the following way: People at-risk-of-poverty are those living in a household with an equivalized disposable income below the risk-of-poverty threshold, which is set at 60% of the national median equivalized disposable income (after social transfers). The equivalized income is calculated by dividing the total household income by its size, as determined after applying the following weights: 1.0 to the first adult, 0.5 to each other household member aged 14 or over, and 0.3 to each household member aged under 14.

[2] One of the five Europe 2020 headline target indicators is to reduce poverty by lifting at least 20 million people out of the risk of poverty or social exclusion by the year 2020.

Decancq et al. (2013) provide a thorough overview of inequality issues as well as existing research related to poverty concepts, measurement, and data in the European Union. There are several ways of measuring poverty, most of which are determined by the definition of the poverty line (for details, see Decancq et al. 2013). Some measures use administrative or statutory poverty lines: poverty lines linked to minimum income levels as defined by country-specific social assistance systems. Poverty lines can also be defined subjectively by a survey asking respondents what the minimum income is with which their household can make ends meet. The most widely used poverty lines in the EU countries are statistical poverty lines, which are defined as a function of some underlying income distribution, typically as a percentage of the median income in a population. The EU at-risk-of-poverty indicator defines the poverty line as 60 % of the median equivalized disposable income.

Among others, Decancq et al. (2013) show that the Czech Republic has the lowest (9%) percentage of inhabitants in relative income poverty (measured by the at-risk-of-poverty indicator) among the EU countries. They also find that this percentage fell two percentage-points between 2005 and 2009, and that other poverty indicators decreased significantly in the same period. Pryor (2014) focuses on income inequality in Eastern and Central European countries. He uses comparable inequality data from the Luxembourg Income Study, holds constant the number of general causal determinants of inequality, and shows that inequality in those countries is significantly lower than in countries where a market economy has long held sway. He calls for more research into the income distribution in the region, to which this article is a response. International cross-country evidence on the effects of tax and benefits on inequality is primarily provided by the World Bank, the OECD, and Eurostat, although independent initiatives, such as the Commitment to Equity (Lustig and Higgins 2013), with its focus on poor countries, and the Institute for Fiscal Studies, including the work of O'Dea and Preston (2012) on public services, have also made important contributions in terms of both methodology and results.[3] Lustig and Higgins (2013) offer a systematic approach applicable in almost any developed country. They propose a step-by-step guide to incidence analysis. They define the concept of pre- and post- net income transfers, discuss the methodological assumptions used to construct them, and explain how taxes, subsidies, and transfers should be allocated at the household level. The discussion in this article builds on their approach, which combines theoretical concepts and detailed individual-level data, focusing on the case of the Czech Republic.

A number of studies have focused on relative poverty and inequality in the Czech Republic, such as Hora, Kofroň, and Sirovátka (2008) and Sirovátka, Kofroň, and Jahoda (2011). These use the EU-SILC data to study social exclusion and the at-risk-of-poverty rate (indicators used by Eurostat), but only very marginally discuss the role of public policies. In an older but more complex study of relative income poverty, Sirovátka et al. (2002) discuss a methodology for carrying out an impact analysis of tax and benefits systems, but they do not themselves carry out such an analysis. By contrast, Schneider (2004) and Večerník (2006) report empirical results on the basis of individual-level data analysis, but neither includes direct taxes, and the latter focuses

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[3] Brada (2013) observes that labor's share of national income is not fixed, but rose after World War II and has fallen continuously since the late 1970s in most countries. In this article, income distribution is viewed from the perspective of tax policy and social support expenditures, rather than the distribution of national income between labor and capital, as distinguished by Brada (2013). Still, future researchers in this area would be well advised to focus on the distribution of income between the two factors and ideally combine this with the kind of analysis carried out in this article.

only on employees. Recently, important distributional household-level analyses by Dušek, Kalíšková, and Münich (2013) and Janský (2014) have focused separately on direct taxes and benefits and on indirect taxation, but as yet these have not been combined.

Since this article focuses on whether the Czech tax and benefit system contributes to one of Europe's lowest levels of relative income poverty and inequality, it intentionally does not address other impacts of the system—for example, on employment and incentives for economic activity. This does not imply that these impacts are unimportant, and policymakers should consider these dynamic effects and the risks of unemployment and inactivity traps together with distributional analyses such as ours. However, other studies have addressed these issues. Both Dušek, Kalíšková, and Münich (2013) and Galuščák and Pavel (2012) focus on work incentives, using data on social benefits and direct taxes. For example, the latter found that a non-negligible fraction of taxpayers face strong disincentives to work on the extensive margin. In particular, the effective participation tax rate exceeds 60% for 11% of working and 8% of nonworking taxpayers.

Some existing research has looked at the Czech and Slovak Republics together, both historically and today. Večerník (2011) reviews relevant literature in the former Czechoslovakia since the interwar period. Bartošová and Želinský (2013) use the EU-SILC data to compare relative poverty in the Czech and Slovak republics and discuss problems related to poverty measurement both before and after the two countries split in 1993. Želinský (2012) performs a similar analysis with the EU-SILC data and adds to it the households' descriptions of their level of equipment with utilities and durables, from the 1991 and 2001 censuses. He also highlights the case of the Czech capital, Prague, which has both the highest level of housing deprivation and the lowest level of durables and economic strain deprivation. Želinský and Řezanková (2014) use the EU-SILC data to evaluate how material deprivation has changed in recent years across different Czech households. Guzi (2014) combines information from the Czech Household Income Survey and the Labor Force Survey to investigate welfare dependencies in the Czech Republic. His estimates imply that individuals who receive relatively higher social benefits are less educated and have a higher incidence of long-term unemployment.

Večerník (2004) identifies who is poor in the Czech Republic, while other research focuses on specific groups or subtopics, such as the elderly (Rabušic 1998). This article treats the whole population, using representative data sets. Sirovátka and Mareš (2006) analyze the pattern of poverty and social exclusion in the Czech Republic and the impact of social policy on this pattern. Their analysis is mostly based on data from the Czech Survey on Social Conditions of Households from 2001. They contrast the low poverty rate with high material deprivation (and the concentration of poverty within specific population groups, such as the unemployed). They argue that social policy measures, in effect, reinforce this pattern: While the benefit system is highly redistributive and effectively eliminates income poverty among employed persons' households and among pensioners, the incomes of those outside paid employment are protected less effectively. They conclude that labor market policy measures are insufficient in scope and inadequate at targeting the groups that face the highest risks of labor market exclusion and poverty. Průša, Víšek, and Jahoda (2014) evaluate individual social policy tools using a similar approach to ours, but differ in a few respects. While they do not include either indirect taxes or as many income concepts, they do provide estimates for every year between 1988 and 2012.

The present article builds on the above research by providing the most complex empirical analysis of relative poverty and inequality in the Czech Republic. As far as the authors know, this is the first time that the question addressed in the article has been asked explicitly. The answer is relevant to other countries as well as to the Czech Republic, and others can learn from the analysis provided here as to why the Czech Republic has some of Europe's lowest levels of relative income poverty and inequality.

DATA AND METHODOLOGY

This section describes the data used and the methodological approach. The focus is on one country, the Czech Republic, and this makes it possible to employ the most detailed individual data available (e.g., consumption data), which are neither widely available nor directly comparable, even in Europe.[4] These data are combined with detailed information about tax and benefit policies in the Czech Republic.

Two microsimulation models are used—the TAXBEN model by Dušek, Kalíšková, and Münich (2013), which simulates direct taxes and benefits, and the QUAIDS model by Janský (2014), which simulates indirect taxes. These models are built on two datasets provided by the Czech Statistical Office—the Survey of Income and Living Conditions (EU-SILC) for the TAXBEN model, and the Household Budget Survey (HBS) for the QUAIDS model. The EU-SILC for the Czech Republic is an annual representative sample of almost 9,000 households comprising over 20,000 individuals. The HBS is a representative sample of approximately 3,000 Czech households collected on a yearly basis. Both the EU-SILC and the HBS are standard data sets that have been used in the past for similar purposes; they are discussed in detail by Dušek, Kalíšková, and Münich (2013) and Janský (2014), respectively. This article uses EU-SILC data collected in 2012 and HBS data collected in 2011, both of which report incomes and expenditures for the year 2011.

The data from both surveys are combined in order to analyze not only the impact of direct taxes and benefits (for which there is extensive literature, as discussed above), but also the impact of indirect taxes (value-added and excise duties).[5] The two data sets are merged by following the approach of Sutherland, Taylor, and Gomułka (2002), matching each household in the EU-SILC data with its closest match in the HBS data. In particular, matches are identified by the decile position of the net equivalized household income (i.e., exact matching on income deciles) and the similarity of the household characteristics (closest-neighbor matching on income within decile and other characteristics).[6] This matching enables us to impute indirect taxes to households in the EU-SILC data.

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[4] Even for income data and the simulation of direct taxes and benefits, an area much more intensively researched and with better data than consumption and indirect taxes, it is not straightforward to carry out advanced analysis for all or most member states of the EU in one research project. For example, a recent article by De Agostini, Paulus, and Tasseva (2015) on the effect of tax-benefit changes on income distribution in 2008–2014 uses data for only 10 countries, excluding the Czech Republic and several other EU member-states.

[5] This is not to imply that indirect taxes (or, for that matter, direct taxes or benefits) should be primarily designed to redistribute incomes and influence inequality (and this is not the government's main intention in imposing them), but rather to acknowledge that both direct and indirect taxes are important determiners of overall income redistribution and the resulting inequality. Exactly how indirect taxes interact with direct taxes and benefits, and how they influence inequality, is the question that this article aims to shed new light on. Policymakers should decide what the distributional objectives of the overall tax and benefit system are and adjust their policies accordingly—indirect taxes, since they are likely to affect inequality, are deemed to be a part of the analysis, as are any changes.

Incomes are uprated to correspond to 2013 levels, using the growth rate of average wages and pensions, and the Czech Statistical Office's consumer price index (for capital and rental incomes) between 2011 and 2013.[7] Simulated information on direct taxes and benefits from the TAXBEN model is used, as are indirect tax simulation results from the QUAIDS model, based on Czech legislation in 2013, instead of using the reported values of taxes and benefits from the EU-SILC and HBS data. The use of these uprated values of taxes and benefits provides more up-to-date data that match the aggregate values from the external administrative statistics quite well.

This also makes it possible to observe relative income poverty and inequality in the aftermath of the recent recession and related policy changes. The simulations include all direct and indirect taxes and most types of benefits: all state social support benefits (child allowance, parental allowance, housing benefit or allowance, birth grant) and two aid-in-material-need benefits (living allowance and housing supplement).[8] They also include two contributory benefits (maternity benefit and unemployment benefit).[9] The Czech benefit system is not described in detail, but readers are referred to Sirovátka, Kofroň, and Jahoda (2011) and Dušek, Kalíšková, and Münich (2013). Czech benefits are standard in the European context, and their counterparts can be found in most European countries.

Similarly to Lustig and Higgins (2013), the article defines several concepts of household income and apply standard indicators of relative poverty and income inequality to them. Specifically, six main types of household income are defined: market income, market income with pensions, net market income, disposable income, post-fiscal income, and final income. The *market income* includes all labor incomes (in super-gross terms), capital and rental incomes, and all household members' other incomes.[10] Adding old age and disability pensions this obtains the household's *market income with pensions*.

In contrast to Lustig and Higgins (2013), pensions are excluded from market income, perceiving them as social transfers rather than deferred income.[11] However, results are also presented for the market income with pensions, so as to illustrate the effect of pensions on income inequality and poverty. The *net market income* is constructed by subtracting all direct taxes and social security contributions paid (by employees, employers, and the self-employed). Next, the *disposable income* is calculated as the net market income plus all direct benefits (indicators based on disposable income are often used in international comparisons, and are also shown in Figure 1).

Households are further taxed by indirect taxes while spending their disposable income. The effect of these taxes is captured in the *post-fiscal income*. Finally, adding in-kind incomes brings us to the *final income*. All incomes are equivalized by the number of OECD equalized units used by Eurostat to reflect household size and composition.[12] These income concepts, inequality, and

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[7] A similar procedure of income uprating is used in the EUROMOD microsimulation model; see Navicke, Rastrigina, and Sutherland (2013), Rastrigina, Leventi, and Sutherland (2015), and Sutherland and Figari (2013), who "nowcast" indicators of poverty risk and at-risk-of-poverty together with very low work intensity.

[8] Aid-in-material-need benefits ("*pomoc v hmotné nouzi*") are benefits aimed at helping people with very low or no income who are objectively unable to increase their income on their own.

[9] The model does not include sickness benefits, because information about sickness is not available in either the EU-SILC or the HBS data.

[10] Other incomes include income from private pensions and life insurance policies, inheritance, lottery or competition prizes, and so on.

[11] The Czech Republic has a contributory pay-as-you-go public pension system, while private pension funds are very rare.
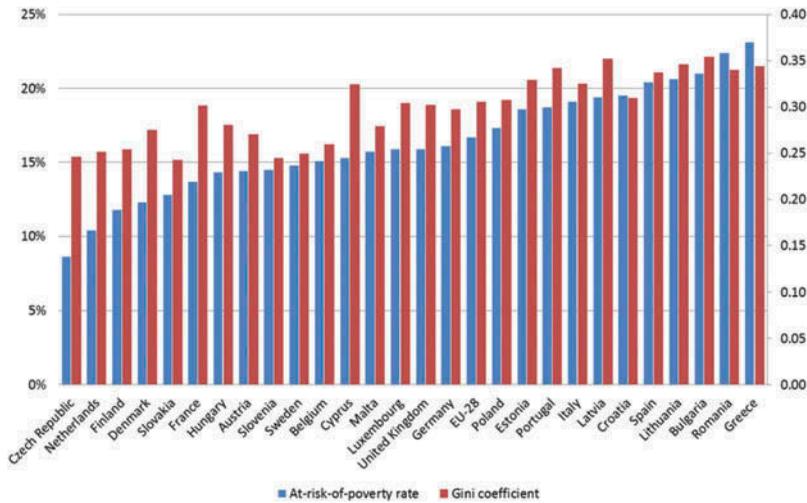
FIGURE 1 Relative Poverty and Income Inequality in the EU, 2013.
Source: Eurostat, At-risk-of-poverty rate by poverty threshold, age and sex; Gini coefficient of equivalized disposable income. Available online (/Eurostat 2014). http://ec.europa.eu/eurostat/statistics-explained/index.php/Main_Page
Note: Figure 1 reports the poverty and inequality indicators based on equivalized household disposable income in 2013. The at-risk-of-poverty rate is calculated for the 60% of median income threshold and is reported on the left vertical axis, while Gini coefficients are reported on the right vertical axis.

poverty measures are defined for all individuals in the sample, including individuals living in households with zero labor incomes.

Several standard indicators of income inequality and poverty are used, including the Gini coefficient, the at-risk-poverty rate, the average or total poverty gap, and coverage, targeting, and effectiveness indicators. The definitions of these indicators mostly follow Lustig and Higgins (2013), who also provide more details on the indicators, including mathematical formulae that are not included here because of space constraints.

The first indicator is the *Gini coefficient*, which is the most commonly used indicator of income inequality. It theoretically ranges between 0 and 1, where 1 represents complete inequality.

The second indicator is the *at-risk-of-poverty rate* (hereinafter referred to as the poverty rate). This is one of the indicators in the Europe 2020 Strategy and is a relative poverty indicator used by Eurostat. It is defined as the share of individuals with an equivalized income below the poverty line, which is set at 60% of the national median equivalized disposable income. In 2013, the Czech poverty line was CZK 20,504 per year—an average monthly equivalent of CZK 10,042.[13] The average monthly wage in the same year was CZK 25,078 and the average old age

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[13] The approximate exchange rates at the end of 2013 were 27.4 CZK/EUR and 19.9 CZK /USD.

pension CZK 10,970. This poverty line is used here in calculating the share of people at risk of poverty for different income types.

The third measure of income inequality and poverty is the poverty gap. While the poverty rate measures the share of the population living below the poverty line, it says nothing about how far below the poverty line those people are, nor how the tax and benefit system affects their position relative to the poverty line. Two other measures are employed to measure this. First, the average distance between the poverty line and the incomes of poor individuals is computed as the *average poverty gap;* this corresponds to the amount of money needed to bring the average poor individual up to the poverty line. To enable international comparisons, the average poverty gap is expressed as a percentage of poverty line income. Second, the sum of the monetary distance of all poor individuals from the poverty line is computed, to give the *total poverty gap*. These definitions of the poverty gap are commonly used in the literature (e.g., Lustig and Higgins 2013).

RESULTS

In what follows, the distribution of earnings in the Czech Republic and the redistributive effects of taxes and benefits are documented. This also reveals the targeting and effectiveness of benefits in decreasing inequality and relative poverty.

Constructing Final Income from Market Income

Income redistribution due to taxes and benefits is demonstrated in two ways: using distributions across income deciles, and using aggregate inequality and poverty measures.[14] Table 1 presents the composition of equivalized final household income by market income with pension income deciles. Pensions clearly constitute a substantial source of income for individuals in the first four income deciles. As is illustrated in the next section, pensions substantially affect the level of relative income poverty and inequality in the Czech population. While income tax increases incomes for the lowest income groups, payroll taxes (with very high tax rates earmarked for funding social security and health insurance) substantially reduce incomes in all deciles, including the lowest one.[15]

Benefits play a greater role among the lowest-income groups because several benefits are means-tested (birth grant, child allowance, housing benefit, living allowance, and housing supplement). On the other hand, parental allowance, maternity benefit, and unemployment benefit also increase individuals' incomes in higher-income groups, including the highest one. This is because these benefits are not means-tested; individuals in the highest-income groups are also eligible for them if they fulfill other criteria (such as being unemployed or taking care of young children). The average amount of VAT paid increases

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[14] One measure is used for poverty (the at-risk-of-poverty rate) and one for inequality (the Gini coefficient) because these two indicators are some of the most commonly used. The article does not provide space for a presentation of detailed robustness checks using alternative indicators, nor is it a suitable setting for a discussion of the insufficiencies of these two indicators, of which there are many; some of them are discussed in Cobham and Sumner (2013).

[15] Note that most Czech pensions are not subject to income tax, with the exception of the extraordinarily high pensions received by a negligibly small proportion of individuals.

TABLE 1
Composition of Final Equivalized Annual Income by Household Income Decile (in CZK)

	Income decile										Average
	1	2	3	4	5	6	7	8	9	10	
Income from labor	36,964	55,061	66,163	125,627	198,244	251,054	298,894	366,245	454,279	741,900	259,368
+ capital and rental income	254	436	568	964	1,235	1,604	1,482	1,494	3,843	7,488	1,936
+ other income	6,286	4,399	4,011	4,889	4,248	4,605	4,253	4,184	5,763	11,483	5,412
= Market income without pensions	**43,504**	**59,895**	**70,743**	**131,480**	**203,727**	**257,263**	**304,628**	**371,923**	**463,885**	**760,871**	**266,716**
+ pensions	36,748	87,208	105,103	75,856	42,993	30,601	28,053	21,404	17,288	18,093	46,325
= Market income	**80,252**	**147,103**	**175,845**	**207,336**	**246,721**	**287,864**	**332,681**	**393,327**	**481,172**	**778,964**	**313,041**
− income taxes	−4,133	−2,935	−1,613	−698	3,111	8,267	14,275	22,906	34,662	78,563	15,231
− payroll taxes	13,011	17,707	21,596	40,194	63,360	80,601	95,286	117,798	144,346	225,754	81,943
= Net market income	**71,375**	**132,330**	**155,862**	**167,840**	**180,249**	**198,996**	**223,120**	**252,623**	**302,164**	**474,647**	**215,867**
+ child allowance	3,648	1,473	770	654	120	115	71	66	42	0	697
+ parental allowance	8,647	4,070	4,675	5,155	6,104	5,213	3,371	2,238	1,683	2,911	4,408
+ housing benefit	6,517	1,027	479	377	138	200	7	47	15	3	883
+ birth grant	66	12	7	19	6	0	0	0	7	0	12
+ maternity benefit	454	264	529	473	663	1,239	761	1,551	1,098	1,090	812
+ unemployment benefit	2,895	855	589	869	931	1,224	1,144	538	545	381	998
+ living allowance	3,812	318	54	18	0	18	0	0	0	0	423
+ housing supplement	1,498	209	22	83	0	73	0	0	0	0	189
(+ total benefits)	32,226	10,758	9,519	9,408	9,433	9,489	6,202	5,248	4,256	5,068	10,167
= Disposable income	**103,601**	**143,088**	**165,381**	**177,248**	**189,683**	**208,485**	**229,322**	**257,870**	**306,420**	**479,715**	**226,035**
− VAT (standard rate)	7,511	10,896	12,466	13,700	13,676	15,302	16,318	17,178	21,371	29,748	15,813
− VAT (reduced rate)	3,934	4,847	4,703	4,447	4,297	4,644	4,766	4,946	5,257	5,980	4,782
− excise taxes	2,718	3,152	4,088	4,092	4,236	4,800	5,242	6,065	6,345	7,566	4,830
= Post-fiscal income	**89,438**	**124,193**	**144,123**	**155,009**	**167,474**	**183,739**	**202,996**	**229,680**	**273,446**	**436,422**	**200,610**
+ in kind income	2,716	3,101	3,555	5,090	6,374	7,515	9,371	11,356	12,936	19,123	8,112
= Final income	**92,154**	**127,294**	**147,679**	**160,100**	**173,847**	**191,254**	**212,366**	**241,037**	**286,382**	**455,545**	**208,722**

substantially across income deciles on goods subject to VAT at the standard rate, but is quite flat across the income deciles on goods subject to reduced-rate VAT.

Poverty and Inequality

First, the results for the income inequality indicator, the Gini coefficient, are presented. As can be seen in Table 2, the empirical point value of the Gini coefficient for market income with pensions is 0.33 (without pensions it is much larger at 0.46, which demonstrates the importance of pensions). Income inequality is further decreased by direct taxes to 0.27 and by benefits to 0.25. Indirect taxes move inequality back to 0.26.

Second, the focus turns to the poverty rate for the different income definitions introduced in the section on methodology. The at-risk-of-poverty rate for market income with pensions, defined above, is quite low, at 8.6% (Table 2). Excluding pension income leads to a substantial increase, to 28%. This is because most pensioners fall below the poverty line if their pensions are not included in their incomes. Interestingly, direct taxes do not decrease but, rather, increase the at-risk-of-poverty rate to 13.4%. The increase in Gini and decrease in at-risk-of-poverty rate caused by direct taxes are the result of income taxes having an overall progressive impact, but being paid by many people who are just above the poverty line. Benefits decrease the at-risk-of-poverty rate to almost the initial pre-tax and pre-transfer level (8.9%). Finally, indirect taxes increase the poverty rate to 15.2%, while in-kind incomes only slightly decrease it again to 13.4%.

Overall, it is clear that the tax and benefit system contributes to lower income inequality, as captured by the Gini coefficient, but increases the at-risk-of-poverty rate. The robustness of the results was checked using alternative at-risk-of-poverty indicators and the main results remained unchanged. In particular, alternative definitions of the poverty line were used, based on 50% and 70% of the national median equivalized disposable income. In line with expectations, these alternative definitions shifted the poverty rates down and up, respectively, for all income concepts, so that the main results were unchanged (Table 3). Moreover, the robustness of the results was checked by defining the poverty line based on 60% of the national median equivalized market

TABLE 2
Poverty and Inequality Measures by Income Definitions

	Gini coefficient	At-risk-of- poverty rate (%)	Average poverty gap (as % of poverty line)	Total poverty gap (CZK billions per year)
Market income	0.460	27.9	78.5	164.28
Market income with pensions	0.331	8.6	39.5	16.49
Net market income (*after direct taxes*)	0.270	13.4	33.9	21.44
Disposable income (*after benefits*)	0.247	8.9	23.9	10.99
Post-fiscal income (*after indirect taxes*)	0.258	15.2	24.2	22.85
Final income (*after in-kind benefits*)	0.261	13.4	24.8	20.80

TABLE 3
At-Risk-of-Poverty Rates for Different Definitions of Poverty Line

	Baseline:	Robustness checks:		
	60% of median equivalized disposable income (%)	50% of median equivalized disposable income (%)	70% of median equivalized disposable income (%)	60% of median equivalized market income (%)
Market income	27.90	25.36	30.91	31.76
Market income with pensions	8.60	5.86	12.87	14.24
Net market income (*after direct taxes*)	13.40	8.38	20.93	22.74
Disposable income (*after benefits*)	8.90	5.12	16.00	17.99
Post-fiscal income (*after indirect taxes*)	15.20	8.07	26.21	29.86
Final income (*after in-kind benefits*)	13.40	7.44	23.40	26.51

income rather than disposable income, to see whether the usage of market income as a baseline changed the perceived impact of taxes and benefits on poverty rates. The results once again remained largely unchanged (Table 3), which further supports the previous conclusions.

Poverty Gaps

The average poverty gap for market incomes with pensions is 39.5% of poverty-line income. An average poor individual would thus need to be provided with an additional CZK 47,655 each year in order to get out of poverty. Direct taxes decrease the average poverty gap by 5.6 percentage points (from 39.5% to 33.9%), but increase the total poverty gap by CZK 4.9 billion (from CZK 16.5 to CZK 21.4 billion). The latter is due to households with market incomes only slightly above the poverty line paying non-zero payroll tax, which drives their disposable incomes below the line. Benefits decrease the average poverty gap by 10 percentage points (from 33.9% to 23.9%), and the total poverty gap by CZK 10.4 billion (from CZK 21.4 to CZK 11.0 billion). Closing half of the total after-tax poverty gap would seem to be a good policy achievement for a country with a relatively small budget. Nevertheless, should the Czech government want to eliminate pre-transfer poverty in the country, a well-targeted additional CZK 11 billion per year would suffice to do so. By way of comparison, the country's total expenditure on benefits in 2013 was CZK 63 billion (see Table 2).

It should be noted that the total poverty gap for market income (without pensions) is CZK 164 billion per year (Table 2); it is worth comparing this to total spending on pensions, which amounted to CZK 343.4 billion in 2013.[16] The total poverty gap for

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[16] Ministry of Labor and Social Affairs: Development of social spending, available online at http://www.mpsv.cz/files/clanky/17519/TZ_180314a.pdf

market income with pensions, at CZK 16.5 billion, is substantially smaller. This confirms once again that pensions not only decrease poverty rates substantially, but also significantly improve financial conditions for pensioners who are below the poverty line.

Targeting Benefits

This section assesses the targeting of individual benefits to two groups of individuals—those at risk of poverty (hereinafter referred to as poor) and others (nonpoor)—based on their market income with pensions (before taxes and transfers).

Almost 80% of poor individuals receive at least one benefit (see Table 4), compared with 29% of nonpoor individuals. The child allowance is the most widespread benefit in terms of its coverage of poor individuals; 59% of poor individuals receive this benefit. On the other hand, it constitutes a relatively small budget (CZK 4 billion). Other *state social support benefits* are either focused only on the lowest-income individuals (housing benefit) or are not targeted at poor individuals (parental allowance), and thus only around 30% of poor individuals receive these. Birth grants and the maternity benefit are designed for individuals with newborn children, and thus cover only about 1% of poor individuals, and represent *ad hoc* payments with small budgets. Various *aid-in-material need benefits* are targeted at individuals with the lowest incomes, and thus about 15% of poor individuals receive these. About 20% of poor individuals do not receive any benefits; these are mostly childless individuals with incomes close to the poverty threshold. The parental allowance, which is the largest non-means-tested benefit, is the most widespread benefit in terms of its coverage of nonpoor individuals.

Table 4 also presents the share of total benefit expenditures going to individuals who are poor (based on their market income with pensions), which provides a further perspective on benefit

TABLE 4
Coverage and Targeting of Benefits

	Total expenditure on benefit (CZK millions per year)	Coverage of poor individuals (% of poor covered by a benefit)	Targeting of nonpoor individuals (% of nonpoor individuals covered by at least one benefit)	Share of expenditures going to poor individuals (%)
Any benefit	63,364	79.1	29.0	37.8
Child allowance	3,993	58.6	6.3	68.9
Parental allowance	24,927	31.1	12.5	28.8
Housing benefit	6,102	28.0	2.7	78.0
Birth grant	70	1.0	0.1	72.3
Maternity benefit	4,794	1.4	1.8	9.2
Unemployment benefit	6,989	15.4	6.7	32.2
Living allowance	2,608	14.9	0.2	84.4
Housing supplement	1,359	14.7	0.4	75.6

targeting. Overall, only 37.8% of total expenditure on benefits goes to poor individuals. This very low share is largely driven by non-means-tested *contributory benefits* (maternity and unemployment benefits) and the parental allowance, which is a large-scale non-means-tested *state social support benefit* for families with small children. These three benefits swallow up almost three quarters of the country's total benefit expenditures (see Table 4). This means that a great deal of the benefits budget is spent on nonpoor individuals who have small children or who have recently lost their jobs. The other *state social-support benefits* and *aid-in-material-need benefits* are much more focused on assisting poor individuals, with between 69% and 84% of expenditures on child allowance, birth grant, housing supplement, housing benefit, and living allowance going to poor individuals.

Effectiveness of Benefits in Diminishing Income Inequality and Poverty

This section explores how effective individual benefits are in reducing income inequality and poverty. Effectiveness is measured in terms of the benefit's impact on a change in a particular indicator, such as the Gini coefficient, the poverty rate, or the average poverty gap. In particular, we look at how much the indicator changes, and divide the change by the percentage share of the relevant benefit on the total disposable income of the country. The greater the effect on the poverty/inequality indicator per unit of spending on a particular benefit, the more effective this benefit is in eliminating poverty or inequality. The indicators are depicted in Table 5.

The least effective benefits in reducing income inequalities (measured by the Gini coefficient) and the average poverty gap are the *contributory benefits* (maternity and unemployment benefits) and parental allowance. The maternity benefit, in fact, increases inequality (measured by the Gini coefficient); meanwhile, it does reduce the average poverty gap and poverty rate, but only slightly. This observation is in line with the benefit's primary purpose, which is to support mothers during the periods before and after childbirth.

Nevertheless, for this article the subject of greatest interest is the effectiveness of the benefits that are intended to fight poverty—in particular, *aid-in-material-need benefits* (housing supplement and living allowance) and other *state social-support benefits* (housing benefit, child allowance, and birth grant). The most effective tools for fighting income inequality and

TABLE 5
Effectiveness of Social Benefits in Reducing Income Inequality and Poverty

Benefit type	Effectiveness indicator based on		
	At-risk-of-poverty rate	*Average poverty gap*	*Gini coefficient*
All benefits	0.67	1.50	0.35
Child allowance	1.97	1.72	0.76
Parental allowance	0.77	0.12	0.33
Housing benefit	0.48	5.03	0.65
Birth grant	0.00	7.12	0.75
Maternity benefit	0.18	0.16	−0.01
Unemployment benefit	0.41	1.28	0.31
Living allowance	0.01	7.98	0.62
Housing supplement	0.06	5.96	0.81

decreasing the poverty gap are the two aid-in-material-need benefits—the living allowance and the housing supplement. Per unit of expenditure, these reduce income inequality and lower the average poverty gap the most (Table 5). However, although they help the lowest-income individuals and decrease the poverty rate the most, they are not generous enough to raise people out of poverty. Spending on the child allowance is the most effective tool to reduce the at-risk-of-poverty rate, while the housing benefit is the most versatile benefit in fighting relative poverty and inequality, as it combines high effectiveness in decreasing the average poverty gap and income inequality with reasonable effectiveness in decreasing the poverty rate.

CONCLUSION

In terms of its disposable-income distribution, the Czech population is one of the more equal societies in Europe, if not the whole developed world. When income inequality and relative poverty are measured using common indicators, the country exhibits an extraordinarily low incidence of both phenomena. Is this due to low inequality in its earnings and pension system, or to effective redistribution by the tax and benefit system? To answer this question, individual data on household incomes and expenditures were put together, and how each factor contributes to the whole was identified.

The market-income poverty rate (when pensions are included) was found to be only 8.6%, which is an extraordinarily low value for a European country. In the Czech Republic, pensions constitute a substantial part of market income for individuals in the first four income deciles. The results show that pensions substantially contribute to the low level of relative income poverty and inequality in Czech society. Direct taxes increase the poverty rate to 13.4%, while transfers (benefits) decrease it back to the initial pre-tax and pre-transfer levels. Finally, indirect taxes further increase the poverty rate to 15.2%. Overall, the narrowly defined tax-benefit system (direct taxes and social benefits) does not change the poverty rate at all, while the addition of indirect taxes increases inequality. So, somewhat surprisingly, when tax-benefit policies are taken into account, the government's current policies are, in fact, found to increase relative poverty. The tax and benefit system is thus evidently not the driving force behind the Czech Republic's having the world's lowest levels of inequality and relative poverty. Key factors that do influence this outcome are low earnings inequality and the pension system, which provides the majority of the senior population with very egalitarian pensions, keeping many of them above the relative poverty threshold. The origins of the country's low earnings inequality require further investigation.

In addition to answering the main research question, this article provides first estimates of the redistributive effectiveness of a number of social and tax policies. The findings reveal, among other things, that *aid-in-material-need benefits* are among the most effective in decreasing the relative poverty gap and income inequality, but they are quite small in scale and cover only about 15% of poor individuals. While 80% of poor individuals receive at least one social benefit, 62% of total expenditure on social benefits goes to nonpoor individuals; this is mainly a consequence of child-related (maternity benefit and parental allowance) and other contributory benefits (unemployment benefit).

The findings open three important areas for further research. First, the conclusion as to the government's role in inequality and poverty might change if other policies had been included, such as public services aimed at education or health; they were not included in this article due to

limited data availability. These policies have been studied for other countries by Lustig and Higgins (2013) and O'Dea and Preston (2012). Similarly, this article takes a one-year snapshot of the Czech population rather than a life-cycle view, as Caspersen and Metcalf (1995) did, which might explain the interplay between the huge impact of pensions (provided on a pay-as-you-go basis) on income inequality and the relatively high payroll taxes, including social security payments for old-age pensions. Furthermore, wealth is not taken into account, as in Šonje, Časni, and Vizek (2012), and differences in inflation rates are not reflected, as studied in Hait and Janský (2016) and Sorić (2013), or variation in regional price levels, discussed for the Czech Republic by Bajgar and Janský (2015) and Cadil et al. (2014), both of which also affect living standards.

Last but not least, the authors propose that their research questions (and other related questions) should be answered using not only single-country Czech data, but also international data, especially datasets comparable across European countries. The originality of the results stems partly from the merged household-level income and expenditure data; these types of data are becoming standard in rich as well as poor countries, but are seldom comparable across countries. The income data are standardized across most of the European Union and some countries beyond in the form of the EU-SILC, but this is not the case for data on expenditures.

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