How Do Changes in the Minimum Wage Affect Household Consumption?

Jan Bittner[1] | *Prague University of Economics and Business, Prague, Czech Republic*

Received 23.5.2022, **Accepted** (reviewed) 22.8.2022, **Published** 17.3.2023

Abstract

Minimum wage hikes increase the consumption of affected households. This paper studies the structure of the additional consumption across various low-income household types. Using a unique set of cross-sectional data at the household level in the Czech Republic, I simulate the impact on consumption categories of additions to disposable income due to minimum wage increases between 2011 and 2019. My findings suggest that the additional income is predominantly allocated to essentials, despite a drop in their budget share. Consumption of addictive goods represents a luxury for low-income households, among whom the demand is even more elastic for those with children. Similarly, health and education expenditures are substantially income sensitive for households with children.

Keywords	***DOI***	***JEL code***
Minimum wage, income elasticity, household consumption, low-income households, household data	*https://doi.org/10.54694/stat.2022.23*	*D12, D30, J38*

INTRODUCTION

The minimum wage has attracted the attention of labour market researchers for decades. An extensive literature focuses on the impact of minimum wage increases on labour market outcomes, while the literature on the impact of minimum wage changes on consumption is limited. But the main goal of wage floors is not to support employment but to increase the welfare of low-income employees (ILO, 2015), genuinely realised through increasing their consumption.

This paper relates to the only four studies examining the direct relationship between the minimum wage and consumption. Aaronson et al. (2012) find a positive effect of minimum wage increases on US household aggregate consumption, where the effect is concentrated on durable consumption, especially vehicles purchased by a few households. The effect on durables is not accompanied by any impact on nondurables or services. However, Alonso (2016), using a double-log model and US retail sales data, finds that the minimum wage does increase consumption of nondurable goods. This relationship is stronger in cases in which minimum wage changes affect more employees. Alonso focuses only

[1] Faculty of Business Administration, Prague University of Economics and Business, W. Churchill Sq. 4, 130 67 Prague 3, Czech Republic. E-mail: jan.bittner@vse.cz. ORCID: <https://orcid.org/ 0000-0003-2297-6429>.

on nondurable consumption, leaving unexamined the consumption structure as a whole. Arpaia et al. (2017) examine the direct relationship between the minimum wage and total consumption across the income distribution. The result of their regression analysis using Eurostat experimental data is the theoretically expected positive effect on the consumption of low-income groups. Finally, according to Dautović (2017), Chinese households with at least one child consume all the additional income due to minimum wage increases. The consumption categories most affected by the income change are health and education expenditures.

From the theoretical perspective, a minimum wage increase can be considered a permanent positive income shock. The distinction between one-off and permanent income changes stems from the life-cycle hypothesis and the related permanent-income hypothesis, both of which predict the smoothing of consumption over a lifetime (Modigliani and Brumberg, 1955; Friedman, 1957). According to several surveys, people are more likely to reduce consumption after a negative income shock than to increase consumption after a positive shock (Fuster et al., 2018; Christelis et al., 2019). The degree to which a change in a person's disposable income is reflected in consumption depends on their marginal propensity to consume (Keynes, 1936). The marginal-propensity-to-consume hypothesis predicts that people with lower income consume more of the additional income (Carroll et al., 2017). Similarly, the model of hand-to-mouth consumers predicts such people spend most of their additional income because they face restricted liquidity and have unsatisfied basic needs (Ben-David and Bos, 2017; Baugh et al., 2018; Agarwal et al., 2020). This paper examines only low-income households whose marginal propensity to consume is presumably high (Carroll et al., 2017), because high share of their total expenditures covers subsistance level of consumption. Subsistance in consumption is a concept descibing the consumption required for satisfaction of basic needs (Steger, 2000). The subsistance requierement relates to poverty and directly affects consumption behaviour (Baumgärtner et al., 2013).

The aggregate positive income shock due to a minimum wage increase is higher when the undesirable labour market outcomes – disemployment, the price effect, and a drop in profit margins – are smaller. Eriksson and Pytliková (2004) examine an increase in the minimum wage in the Czech Republic and conclude that it led to a rise in the wages of low-income employees and had little or no effect on their employment. Grossmann et al. (2019) come to the same results when examining the period between 2013 and 2017, which overlaps with the period studied in this paper. The price effect, if any, occurs primarily in sectors whose workforce is disproportionately affected by the minimum wage (Lemos, 2006; Aaronson et al., 2008; MaCurdy, 2015; Cooper et al., 2017). But multiple studies find no direct price effect (Katz and Krueger, 1992; Machin et al., 2003; Draca et al., 2011). Notably, only 3.1% of employees in the Czech Republic earned less than 105% of the minimum wage in 2018, making the Czech minimum wage among the least restrictive in the European Union (Eurostat, 2022). As for the possibility of reduced profits, one of the few empirical studies – Draco et al. (2011) – finds only a short-term effect.

This paper builds on the rich empirical literature on income elasticity for twelve consumption categories, as defined by the COICOP (Classification of Individual Consumption According to Purpose), and the broader categories of nondurables, semidurables, durables, and services (*CZ-COICOP, n.d.*). A consumed good or service's income elasticity, which is the primary basis for empirically examining the income – consumption link, is *normal* (with positive income elasticity), *necessary* (with elasticity between zero and one), *luxury* (with elasticity above one), or *inferior* (with negative elasticity) (Hal R. Varian, 1992). Many empirical studies find food and nonalcoholic beverages to be necessary goods (Murty, 1981; Ogundari and Abdulai, 2013; Santeramo and Shabnam, 2015; Ogundari et al., 2016); the category's elasticity is 0.47 on average for Czech households (Malá and Červená, 2012). Additionally, low-income households' food consumption structure seems to be remarkably sensitive to changes in total consumption (Huang and Gale, 2009). Though household size (Houthakker, 1957; Massell, 1969), number of children (Pellerano

et al., 2020), number of adults (Horton and Hafstrom, 1985), and number of parents (Abdel-Ghany and Schwenk, 1993) affect consumption behaviour, there might not be any significant difference between households with and without children nor between households whose workers are employees and those whose workers are self-employed (Benda-Prokeinová et al., 2017).

The income elasticity of alcohol consumption for total population is inelastic (Fogarty, 2010; Laković et al., 2019) and varies around 0.6 (Nelson, 2013). Syrovátka et al. (2015) find similar estimates among Czech households, although the authors examined only beer and wine which tend to be less elastic than spirits (Nelson, 2013).The inelastic demand applies also to the tobacco consumption (Matsuda et al., 1999; Martinez et al., 2015), while low-income households tend to be more sensitive to income increases (Franks et al., 2007). To the contrary, Heboyan and Hovhannisyan (2019) find that income explains tobacco consumption only among light smokers with high income. The authors' interpretation relates to the addictive nature of tobacco being more potent driver of smoking than income.

The housing category, which is necessary, takes up a significant share of households' budget (Åkerman, 1957; Goodman, 1988; Hansen et al., 1996; Fernández-Kranz and Hon, 2006; Tandoh and Tewari, 2016). Associated parts of the housing category such as water (Dalhuisen et al., 2003; Ščasný and Smutná, 2019; Bruno and Jessoe, 2021) and energy (Tse and Raftery, 1999; Salotti et al., 2015; Vesterberg, 2016) make the whole category inelastic. Schulte and Heindl (2017) estimate that among German households, housing is relatively inelastic only for low-income households.

Transport is necessary for getting to work, school, and other places. It counts as a necessity in the cases of public transport services (Fouquet, 2012) and fuel (Graham and Glaister, 2002; Dahl, 2012). However, the transport category as a whole can be dominated by vehicle purchases, which have elastic demand (McCarthy, 1996; Linn and Shen, 2021). The remaining items in the category – such as air transport, which is very elastic (Gallet and Doucouliagos, 2014) – have much less weight.

Regarding countries with broad public provision of certain services, health care (Salotti et al., 2015; Mien and Said, 2018) and education (Abdel-Ghany and Schwenk, 1993; Matsuda et al., 1999) generally appear to be luxuries. But while demand for education among low-income households is elastic, education is even an inferior service for high-income households (Hashimoto and Heath, 1995).

The clothing-and-footwear category falls under the heading of luxuries (Jones, 1994; Kim, 2012), as do the categories of furnishings and household equipment (Salotti et al., 2015) and recreation services (Ghalwash, 2008), the latter of which includes highly elastic subcategories such as tourism (Bernini and Cracolici, 2016) and travelling (Zheng and Zhang, 2013) and less elastic ones such as cultural activities (Zieba, 2009). Households with low total expenditures display high income elasticity for international leisure travel (Stråle, 2021) and hotels (in the category of restaurants and accommodation services) (Davies and Mangan, 1992). In contrast, both access to the internet and mobile phones are becoming more and more essential in digitalised developed countries, which is reflected in the less than unitary elasticity for the category of information and communication goods and services (Salotti et al., 2015).

Regarding the broader COICOP categories, increasing the durability of a given item decreases income elasticity because consumer spending patterns are more flexible in the long run. Services range from inelastic passenger-transport and housing services to relatively elastic financial services (Wong and John McDermott, 1990; Salotti et al., 2015).

While building on the empirical literature on elasticity, this paper also enhances the literature on the impact of the minimum wage. My main objective is to explore how yearly changes in the minimum wage affect the structure of minimum wage earners' household consumption. For this purpose, I employ household-level microdata from the Household Budget Survey in the Czech Republic between 2011 and 2019 and carry out ex post simulations of the country's minimum wage hikes.

Section 1 describes my datasets. Section 2 presents my methodology. Section 3 presents the results, followed by Discussion in Section 4 and a final Conclusion.

1 DATA

This section presents the data in three segments: disposable-income changes due to an increase in the minimum wage, consumption expenditures, and a combination of net household income and related consumption structure.

1.1 Minimum wage

The period under review partly overlaps with six years of the frozen minimum wage, which was not increased until August 2013.[2] During these six years, the minimum wage fell from 36% to 31% of the average wage and from 42% to 37% of the median wage. This was followed by a period in which the minimum wage rose, including in relation to the average and median wages. In 2019 the minimum wage reached 37% of the average wage and 43% of the median wage. Czechia is one of the OECD countries with the lowest minimum wage. Comparing the minimum wage's relation to the average wage in the reviewed period, Czechia ranked twenty-eighth or twenty-seventh out of the thirty-one countries that set a statutory minimum wage (Eurostat, 2022). To study the minimum wage's impact on consumption, the year-on-year change of the gross minimum wage needs to be expressed as the change of household disposable income. For such purpose, I compute the yearly net minimum wage change showed in Table 1.

1.2 Consumption expenditures

I employ for my sample the Czech Republic's Household Budget Survey (HBS or "Statistika rodinných účtů"), commonly used for demand analysis in the country (Syrovátka, 2007; Janda et al., 2010; Dybczak et al., 2014; Jánský, 2014). The HBS contains detailed data on the amount and structure of consumption according to COICOP (*CZCOICOP, n.d.*) The studied consumption categories and their abbreviations are listed in Table A1 in the Appendix 1.

The goal is to create a dataset covering only households potentially affected by minimum wage changes. Therefore, I include only households with at least one employed person. I apply a condition of nonzero income from the employment activity while not excluding the income from self-employment, as it can provide ancillary income for employees' households. I exclude households with nonworking pensioner members.

I narrow the dataset to low-income households on the assumption that such households include minimum wage earners or share similar consumption patterns. I am unable to directly target households with minimum wage earners because there are too few of them. A household is considered low income when its income falls in the first quartile of households in the examined period (defined below). Thus, I obtain a unique sample of households whose dominant source of income is dependent activity (91% of total income). The mean income from self-employment is only supplementary and 83% of households have no such income.

Some households take part in the survey repeatedly. To ensure the observations are random, I keep each household only once, when it first appeared in the survey.

1.3 Household types: net disposable income and consumption structure

The impact of minimum wage changes varies according to the composition, total income, and consumption structure of a household. Therefore, I distinguish three types of households by the presence of children (with mediating effect on elasticity) and the number of adults (which affects net household income through variations in taxes and benefits):

[2] In 2013 the minimum wage increase took effect not in January, as in other years, but in August. Since I analyse the monthly minimum wage, I work with this year the same way as the others, taking into account that the year-round effect on consumption was only half.

(i) Single minimum wage earner without children (denoted 1 + 0).
(ii) Single minimum wage earner with two children (denoted 1 + 2).
(iii) Minimum wage earner with a nonworking partner and two children (denoted 2 + 2).

I take data on net household income from the OECD. The data are based on the TaxBEN model and combine the gross statutory minimum wage (income from employment) with family and in-work benefits. When applicable, the net income also includes social assistance and housing benefits. Table 1 presents the percentage change of disposable income calculated by dividing the change of the net minimum wage by the total disposable income of each household type.

Table 1 Minimum wage (in CZK per month) and the relative change of the disposable income

	2010	2011	2012	2013*	2014	2015	2016	2017	2018	2019
Minimum wage (MW)										
Gross MW	8 000	8 000	8 000	8 500	8 500	9 200	9 900	11 000	12 200	13 350
Change in gross MW	–	0	0	500	0	700	700	1 100	1 200	1 150
Change in net MW	–	0	0	445	0	623	623	829	828	799
% change of income										
1 + 0	–	0%	0%	4.4%	0%	5.6%	5.3%	6.6%	6.2%	5.7%
1 + 2	–	0%	0%	2.7%	0%	3.5%	3.5%	4.4%	3.9%	3.6%
2 + 2	–	0%	0%	2.7%	0%	3.5%	3.4%	4.2%	3.8%	3.5%

Note: % change of income represents the year-on-year relative change of net disposable income due to the minimum wage change.
* The minimum wage (MW) has changed since August.
Source: MoLSA, own calculations

The consumption structures of the household types are derived for each year from the HBS dataset as the mean shares of each consumption category of single childless households, single parents, and households with two parents with children. Table A2 in the Appendix 1 summarises the disposable income of each household type in each year and the structure of their consumption.

2 METHODS

I estimate the income elasticities of consumption categories to carry out ex post simulations of how minimum wage changes affect various household types. It further allows me to explore where such households allocate the additional disposable income, what they spend more and less on, and how the minimum wage changes transform the consumption pattern.

I use the HBS dataset to estimate the income elasticities of consumption categories. However, the HBS surveys a relatively small sample: 14 123 unique households between 2011 and 2019, only 2 967 of which remain after the above-described restrictions. Therefore, for the estimate of income elasticity of consumption, I divide the period into three-year periods, in which prices and wages remain reasonably stable. In other words, I group three consecutive years when creating the cross-sectional datasets. I obtain 1 443 observations in the first period (2011–2013), 1 223 observations in the second period (2014–2016), and 301 observations in the last period (2017–2019). The change in the data-collection method causes the number of observations in the third period to be relatively low.

I study a small subpopulation whose income range is narrow enough that we can assume its income elasticities remain unchanged with additional income. Thus, I employ the following model created by Houthakker (1957) and widely used for consumption analysis (Abdel-Ghany and Foster, 1982; Salotti et al., 2015; Ščasný and Smutná, 2019; Stråle, 2021):

$$ln(c_i) = \alpha_i + \beta ln(M_i) + \sum_{j=1}^{n} \gamma_j X_j + \epsilon\,. \tag{1}$$

Here, *i* stands for a time period, *c* corresponds to the consumption expenditure of an examined category, *M* is total consumption expenditure, X_j stands for the demographic control variables, α indicates the level constant, and ϵ represents the random error. I use the OLS estimation method with robust errors. Putting both the dependent variable $ln(c_i)$ and the main independent variable $ln(M_i)$ in the form of natural logarithms leads to a straightforward interpretation of the β coefficient as income elasticity (Houthakker, 1957). Because of the potential loss of observations from deriving the logarithm of zero values, I replace zero values with consumption of 1 CZK, following Stråle (2021). Given the data-related issues causing a mismatch between net income and total consumption, I use total consumption expenditure as a proxy for household income (Massell, 1969). Assuming low-income households' savings rate is close to zero, total expenditures serve as an accurate proxy for net disposable income.

I include multiple demographic characteristics as control variables, following the literature (Currie and Thomas, 1972; Harmon, 1988; Vesterberg, 2016): *dwelling* is the dummy variable for the type of dwelling; it equals 0 if a household lives in its own, in a cooperative, or in a privately owned flat or house, and it equals 1 if the household rents or resides for free (with relatives or friends). The variable *size* stands for the size of the municipality (ranging from 1 for villages below five hundred inhabitants to 8 for cities with more than one hundred thousand inhabitants).[3] Finally, since household composition influences consumption behaviour, I include a dummy variable indicating the presence of at least one child (*child*). Measuring the impact of a child on household consumption requires extending the model to determine whether the number of dependent children moderates the consumption–income relationship:

$$ln(c_i) = \alpha_i + \beta ln(M_i) + \sum_{j=1}^{n} \gamma_j X_j + \delta ln(M_i) \times child + \epsilon\,. \tag{2}$$

Here, the coefficient δ in front of the cross variable indicates whether the interaction of M_i and *child* strengthens or weakens consumers' sensitivity to the income change. When the moderation effect is significant, I use the corresponding β estimates for childless households and the sum $\beta + \delta$ for households with children.

Additionally, I add a price variable in the form of the consumer price index for individual consumer categories from the Czech Statistical Office (CZSO, 2022) to adjust income elasticity for the potential impacts of price changes during the three-year periods. However, adding the price index to the models leads to neither significant estimates nor better results, which I evaluate according to the coefficient of determination and using the Akaike's Information Criteria (AIC) and Bayesian Information Criteria (BIC). Hence, I do not continue to use those extended models.

For the subsequent simulation, I use the year-on-year change in disposable income due to the minimum wage change, the estimated income elasticity of consumption, and the amount and structure of consumption of typical households. The income elasticity of a specific consumption category *c* is defined as follows:

$$e_c = \frac{\Delta c}{\Delta M} \times \frac{M}{c}\,. \tag{3}$$

By a simple transformation, I calculate the relative change in expenditures by consumption category. By doing so, I simulate the new consumption structure after the change in the minimum wage.

[3] 1 = 499 inhabitants or fewer; 2 = 500–999; 3 = 1 000–1 999; 4 = 2 000–4 999; 5 = 5 000–9 999; 6 = 10 000–49 999; 7 = 50 000–99 999; 8 = 100 000 or more.

3 RESULTS

This section presents the income-elasticity estimates and then the results of simulations. Table A3 in the Appendix 1 displays the descriptive statistics by period. The coefficient estimates representing the elasticities are positive and statistically significant, except for educational expenditures in the third period.

The most elastic category is clothing and footwear in the third period, with elasticity of 3.6. Based on the estimates, transport (*c07*), alcoholic beverages and tobacco (*c02*), and restaurants and accommodation services (*c11*) fall under the luxury category. In contrast, food and nonalcoholic beverages (*c01*), housing, water, electricity, gas and other fuels (*c04*; except for the second period), and education services (c10) can be considered as necessities. Regarding the broader categories, nondurable goods (*c_nd*) fall under the heading of necessities. At the same time, the results indicate high elasticity of durable goods (*c_d*), lower elasticity for semidurables (*c_sd*), and approximately unitary elasticity for services. Table A4 in the Appendix 1 shows those results for the twelve consumption categories, and Table A5 presents the regression estimates for broader categories according to durability.

Following the outlined methodology, I run the second set of regressions, which tests whether the relationship between income and consumption is moderated by having children. The cross variable's positive and statistically significant coefficient indicates a strengthening mediation effect of having children. In other words, having at least one child raises a household's income elasticity. The regression results are presented in the Appendix 1 in Tables A6 and A7. In the first period, I found a sign of mediation effect in the case of health (*c06*) and education (*c10*); the *ln(M)* estimate for childless households was insignificant, and education was highly elastic for households with children. The income elasticity of other goods and services (*c12*) was mediated by children's presence. The potential mediation effect

Table 2 Income elasticities of consumption by period and household type

Consumption categories	2011–2013			2014–2016			2017–2019		
	1 + 0	1 + 2	2 + 2	1 + 0	1 + 2	2 + 2	1 + 0	1 + 2	2 + 2
c01	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8
c02	2	2	2	2	2	2	1.6	1.6	1.6
c03	1.4	1.4	1.4	1.7	1.7	1.7	3.6	3.6	3.6
c04	0.6	0.6	0.6	1.1	1.1	1.1	0.7	0.7	0.7
c05	1.8	1.8	1.8	1.4	1.4	1.4	2.1[a]	0.4[a]	0.4[a]
c06	1.1[a]	2.1[a]	2.1[a]	1.3	1.3	1.3	2.4	2.4	2.4
c07	2.2	2.2	2.2	1.1[a]	2[a]	2[a]	2.3	2.3	2.3
c08	1.1	1.1	1.1	1.1	1.1	1.1	0.9	0.9	0.9
c09	1.5	1.5	1.5	1.4	1.4	1.4	1.3	1.3	1.3
c10	0.2[a]	2.6[a]	2.6[a]	0.3[a]	2.5[a]	2.5[a]	0.4	0.4	0.4
c11	2.2	2.2	2.2	2.8[a]	1.6[a]	1.6[a]	1.5	1.5	1.5
c12	1.1[a]	1.5[a]	1.5[a]	1.3	1.3	1.3	1.6	1.6	1.6
c_nd	0.9	0.9	0.9	0.8	0.8	0.8	0.9	0.9	0.9
c_sd	1.3	1.3	1.3	1.3	1.3	1.3	2.3[a]	1.1[a]	1.1[a]
c_d	4.3	4.3	4.3	3.5	3.5	3.5	2.7	2.7	2.7
c_s	1	1	1	1.1	1.1	1.1	0.8[a]	1.4[a]	1.4[a]

Note: [a] the altered elasticities with mediation effect. For abbreviations, see Table A1 in the Appendix 1.
Source: Own calculations

on transport (*c07*) weakened the impact of income change on restaurants and accommodation services (*c11*) in the second period and on furnishings, household equipment, and routine household maintenance (*c05*) in the third period. Regarding the broader categories, I found a mediation effect only in the third period: a weakening effect on consumption of semidurables (driven by household equipment) and a strengthening effect on services (with rents, communication, and financial and recreation-related services as the main items). The diagnostics for the regressions are presented in the Appendix 2.

I present the final income elasticities in Table 2. I use the same estimated elasticities for each year in the given period and for both household types with children. But I differentiate the elasticities between the types of households for cases in which I found a potential moderation effect. I distinguish the latter cases with an index.

I do not report the years with no minimum wage change in the rest of the paper. By combining a relative change of income with the estimated elasticities, I obtain the relative change of expenditures on each consumption category (Table 3). By definition, the higher the income elasticity, the higher the relative consumption change. The major relative changes concern luxuries, such as clothing and footwear (*c03*) and durable goods in general. In contrast, the insensitive reaction relates to the consumption of food (*c01*), housing (*c04*), and nondurables.

However, to present the whole picture, the relative importance of each expenditure needs to be considered. For example, the extreme response of consumption of durables plays a minor role because its mean share in the household budget lies between 1% and 3%, depending on the type of household. I thus present the decomposed change of total expenditures in Table 4. The table shows

Table 3 The relative change of expenditures on each consumption category due to change in the minimum wage by year and type of household

Consumption categories	1 + 0						1 + 2						2 + 2					
	2013	2015	2016	2017	2018	2019	2013	2015	2016	2017	2018	2019	2013	2015	2016	2017	2018	2019
c01	3%	4%	4%	6%	5%	5%	2%	3%	3%	4%	3%	3%	2%	3%	2%	4%	3%	3%
c02	9%	11%	11%	11%	10%	9%	5%	7%	7%	7%	6%	6%	5%	7%	7%	7%	6%	6%
c03	6%	9%	9%	24%	23%	20%	4%	6%	6%	16%	14%	13%	4%	6%	6%	15%	14%	13%
c04	3%	6%	6%	4%	4%	4%	2%	4%	4%	3%	3%	2%	2%	4%	4%	3%	3%	2%
c05	8%	8%	8%	14%	13%	12%	5%	5%	5%	2%	1%	1%	5%	5%	5%	2%	1%	1%
c06	5%	8%	7%	16%	15%	14%	6%	5%	5%	11%	9%	9%	6%	5%	5%	10%	9%	9%
c07	10%	6%	6%	15%	14%	13%	6%	7%	7%	10%	9%	8%	6%	7%	7%	10%	9%	8%
c08	5%	6%	6%	6%	5%	5%	3%	4%	4%	4%	3%	3%	3%	4%	4%	4%	3%	3%
c09	7%	8%	7%	8%	8%	7%	4%	5%	5%	6%	5%	5%	4%	5%	5%	5%	5%	5%
c10	1%	2%	2%	3%	2%	2%	7%	9%	9%	2%	2%	1%	7%	9%	8%	2%	1%	1%
c11	10%	16%	15%	10%	10%	9%	6%	6%	6%	7%	6%	6%	6%	6%	6%	7%	6%	6%
c12	5%	7%	7%	10%	10%	9%	4%	5%	5%	7%	6%	6%	4%	5%	4%	7%	6%	6%
c_nd	4%	5%	4%	6%	6%	5%	2%	3%	3%	4%	4%	3%	2%	3%	3%	4%	4%	3%
c_sd	6%	8%	7%	15%	14%	13%	4%	5%	5%	5%	4%	4%	4%	5%	5%	4%	4%	4%
c_d	19%	20%	19%	18%	17%	15%	11%	12%	12%	12%	10%	10%	11%	12%	12%	11%	10%	9%
c_s	5%	6%	6%	5%	5%	4%	3%	4%	4%	6%	5%	5%	3%	4%	4%	6%	5%	5%

Note: %ΔM represents a percentage change of disposable income. Unitary elasticity would change the consumption expenditure by the same rate.
Source: Own calculations

that households spend the vast majority of the additional income on nondurables and services. In more detail, the minimum wage earner with two children allocates more additional income to food (*c01*) and housing (*c04*). Two-adult households spend relatively less on housing.

The final point of view presented in Table 5 compares the original and the new consumption structure and highlights the shift in the importance of the categories in the consumption mix. Across household types, food (*c01*), housing (*c04*), and nondurables become less important – falling by more than 100 basis points (1 percentage point) – after the minimum wage increases. All household types consistently, though fractionally, increase their share of the following consumption categories: alcohol, beverages, tobacco and narcotics (*c02*), clothing and footwear (*c03*), restaurants and accommodation services (*c11*), other goods and services (*c12*), and durables.

Table 4 Decomposition of total expenditure change (separately for the twelve consumption categories and the four broader categories)

Consumption categories	1 + 0						1 + 2						2 + 2					
	2013	2015	2016	2017	2018	2019	2013	2015	2016	2017	2018	2019	2013	2015	2016	2017	2018	2019
c01	13%	11%	11%	15%	14%	14%	15%	14%	15%	18%	20%	15%	16%	15%	18%	20%	18%	20%
c02	5%	6%	5%	7%	5%	5%	3%	3%	3%	2%	5%	3%	5%	3%	2%	6%	5%	2%
c03	6%	7%	6%	12%	13%	13%	6%	7%	7%	21%	13%	11%	4%	7%	9%	9%	17%	12%
c04	16%	24%	25%	17%	14%	17%	18%	27%	26%	17%	15%	22%	13%	22%	15%	16%	10%	14%
c05	7%	5%	5%	6%	7%	7%	5%	4%	4%	1%	2%	1%	4%	4%	3%	2%	1%	1%
c06	2%	2%	2%	2%	4%	5%	3%	2%	2%	3%	2%	4%	2%	1%	1%	1%	2%	6%
c07	14%	7%	7%	11%	12%	9%	11%	11%	10%	12%	12%	10%	21%	15%	16%	15%	19%	14%
c08	5%	5%	4%	4%	3%	4%	6%	5%	5%	4%	6%	5%	6%	6%	5%	4%	4%	4%
c09	11%	10%	9%	8%	8%	9%	9%	8%	7%	7%	8%	8%	7%	6%	5%	8%	10%	8%
c10	0%	0%	0%	0%	0%	0%	2%	2%	2%	1%	0%	0%	1%	2%	1%	0%	1%	0%
c11	9%	11%	12%	10%	9%	7%	9%	8%	8%	7%	8%	9%	6%	6%	8%	4%	8%	11%
c12	12%	13%	13%	10%	10%	9%	12%	10%	10%	7%	9%	11%	15%	13%	16%	14%	6%	9%
c_nd	37%	35%	36%	52%	46%	42%	42%	40%	40%	40%	48%	29%	49%	42%	46%	47%	51%	50%
c_sd	12%	13%	12%	20%	24%	21%	12%	13%	13%	13%	10%	7%	13%	15%	17%	10%	12%	11%
c_d	13%	10%	10%	2%	6%	8%	9%	7%	9%	3%	6%	5%	5%	6%	3%	2%	1%	1%
c_s	37%	42%	42%	25%	25%	29%	37%	41%	38%	45%	36%	59%	33%	37%	34%	41%	37%	39%

Source: Own calculations

Table 5 Change of the share in total consumption expenditure (basis points)

Consumption categories	1 + 0						1 + 2						2 + 2					
	2013	2015	2016	2017	2018	2019	2013	2015	2016	2017	2018	2019	2013	2015	2016	2017	2018	2019
c01	–32	–53	–49	–49	–53	–42	–23	–38	–40	–36	–27	–17	–31	–42	–49	–30	–43	–32
c02	11	15	13	14	8	8	4	5	5	2	7	4	7	5	3	8	5	3
c03	5	11	10	58	62	55	3	8	9	70	37	28	2	8	9	29	51	32
c04	–61	–22	–22	–107	–100	–97	-42	–12	–11	–68	–43	–56	–36	–12	–7	–51	–46	–43
c05	13	5	5	17	21	20	6	2	3	–12	–17	–9	4	3	2	–15	–6	–10

Table 5 (continuation)

Consumption categories	1 + 0						1 + 2						2 + 2					
	2013	2015	2016	2017	2018	2019	2013	2015	2016	2017	2018	2019	2013	2015	2016	2017	2018	2019
c06	0	1	1	6	14	15	4	1	1	8	4	9	3	0	0	3	3	12
c07	32	–3	–3	39	39	26	16	19	16	28	25	20	29	26	26	35	40	27
c08	0	–5	–4	–11	–12	–10	0	–3	–3	–7	–7	–5	–1	–3	–3	–5	–9	–6
c09	12	6	5	3	0	2	6	4	4	3	4	4	4	3	2	4	0	2
c10	–1	–1	–1	–1	–4	0	3	3	3	–6	–3	–1	2	3	2	–2	–6	–3
c11	20	40	41	15	11	10	14	9	9	9	10	10	9	6	8	5	6	10
c12	0	5	4	16	14	13	9	3	4	9	10	13	10	3	4	18	5	9
c_nd	–46	–66	–62	–31	–43	–32	–24	–39	–42	–43	–42	–39	–21	–38	–34	–41	–35	–33
c_sd	11	15	14	71	78	63	8	10	10	–4	–2	–4	9	13	14	–2	–1	–1
c_d	45	41	37	9	22	25	18	17	22	7	14	11	9	14	7	5	3	2
c_s	–10	11	11	–49	–58	–57	–1	11	9	40	30	32	2	12	13	38	33	32

Source: Own calculations

4 DISCUSSION

Increases in the minimum wage increase the consumption expenditures of affected households. This effect is driven by the inelastic subcategories within the broad categories of nondurables and services, such as food and housing. Low-income households spend a substantial share of income on those essentials, yet their sensitivity to income shocks remains relatively high. Therefore, more than three-quarters of the additional income is allocated to nondurables and services. This is consistent with Alonso's (2016) finding of a positive effect on nondurables. The affected households decrease the share of nondurables, and single childless households also reduce the share of services. Yet the importance of services remains profound.

Take the housing category as an example. Its income elasticity exceeds one in the second period, even though the existing literature uniformly considers housing necessary (Harmon, 1988; Hansen et al., 1996). Such a finding suggests that low-income households have not sufficiently satisfied their housing needs, be they electricity, heating, water, or dwellings. Also, consistently with Engel's law (Houthakker, 1957) and a rich empirical literature (Murty, 1981; Ogundari and Abdulai, 2013; Santeramo and Shabnam, 2015; Ogundari et al., 2016), expenditures on food and nonalcoholic beverages are income inelastic. The minimum wage change decreased the proportion of food expenditures up to 50 basis points. This impact is similar for all household types and in all periods. Nonetheless, a more detailed analysis might detect significant changes within the food category as suggested by Huang and Gale (2009).

Aaronson et al. (2012) argue that the minimum wage's impact on consumption is driven by spending on durables. Durables indeed do record the most significant increase in consumption: up to one-fifth of the total increase. Still, durables occupy a negligible part of low-income households' budgets. Nevertheless, many households who purchased a vehicle were filtered out of the dataset because such outliers significantly distorted the consumption structure in the year the purchase was made, so interpreting the result requires caution.

The sensitivity of childless households' consumption sometimes differs from that of households with children. This difference is manifested mainly in semidurables, whose budget share increased by up to 78 basis points for childless households whereas its share fell among households with children. This category includes consumer goods, which may still be an unaffordable luxury for poorer parents.

The opposite effect can be observed in services, the importance of which decreases significantly in childless households and increases in households with children.

The high sensitivity of health expenditures is expected given the comprehensive coverage by the public sector. Childless households may be older and have higher mean share of health expenses which is directly connected to the potential strengthening mediation effect. The same applies to education: though it is a marginal category of consumption, I found a strong positive mediation effect. Offspring may require extra educational costs not covered by the public system, such as tuition, tutoring, and kindergarten. The higher elasticity may indicate a willingness of parents to incur these expenses, yet their willingness is constrained by disposable income. Both effects are supported by Dautović (2017), who considers health and education the drivers of consumption increases among households with children.

Low-income households spend limited resources on addictive goods, such as alcohol, tobacco, and narcotics. I found that households consistently spend a higher share of their budget on those items following a positive income shock. The effect is driven by the goods' high elasticity, indicating these goods are non-essentials for low-income households. Similarly, Franks et al. (2007) find higher income elasticity of tobacco among low-income households relative to higher-income groups. The corresponding increase in the budget share of households with children is much lower. Clearly, only a marginal amount of additional income due to minimum wage hikes is allocated to alcohol and tobacco.

Consumption of furnishings, household equipment, and routine household maintenance seems inelastic among households with children in the third studied period. Their insensitive reaction to an income shock may relate to their prioritising of other categories over inessential equipment. Increased purchasing power between the second and the third period given by the fastest growth of the minimum wage increased spending on the categories of clothing and footwear and of recreation, sport, and culture. Overall, these categories do not affect the consumption structure much.

According to both the existing literature and my findings, restaurants and accommodation services are considered nonessentials. Because of its higher share in the budget, the category gains considerably higher share after the minimum wage increases in 1 + 0 households, especially in 2012 and 2013. The proportion of transport expenditures grows with minimum wage hikes and constitutes up to a fifth of additional spending. The category of information and communication goods and services mostly loses share in the consumption structure but has close to unitary elasticity regardless of time period and household type. Other goods and services increase their share by up to 18 basis points in response to minimum wage hikes. The mediation effect is significant, but it does not change the nature of those expenditures.

CONCLUSION

In this paper, I examined the relationship between minimum wage changes and consumption structure in the Czech Republic. My findings suggest that the growth of households' working income is associated with a general shift in consumption structure from necessary nondurable goods to luxury durable goods, especially in one-member households. Yet the share of essentials in the family budget remains substantial. Moreover, health and education spending are very sensitive to income shocks in households with children, and parents in those households consider alcohol and tobacco luxuries.

The HBS dataset is commonly used for demand analysis. Narrow focus of this paper on the low-income households required to merge multiple years into one period. Using a different dataset with more observations or defining the low-income threshold less restrictively might offer more robust estimates. It could also allow for more detailed analysis beyond the general COICOP categories.

Further investigation may offer more profound insight into what happens within the general categories, especially in the case of so-called sin consumption. My results for the category of alcohol, tobacco, and narcotics contradict the standard finding that addictive goods are inelastic, and they may contribute

to the academic and policy discussion about regressivity of excise taxes. A policy application, however, requires more detailed analysis of consumption items. Empirical studies focused on low-income households could take advantage of my dataset construction to study other specified subgroups of households in more detail. Comparative research of various regions with more restrictive wage policies or with different minimum wage policy-making regimes may shed more light on the role of the type of income shock. My results represent a substantial input for shaping public policies targeting the working poor.

ACKNOWLEDGMENT

This work was supported by the Faculty of Business Administration, Prague University of Economics and Business under Grant No. 39/2021.

References

AARONSON, D., AGARWAL, S., FRENCH, E. (2012). The spending and debt response to minimum wage hikes [online]. *American Economic Review*, 102(7): 3111–3139. <https://doi.org/10.1257/aer.102.7.3111>.

ABDEL-GHANY, M., FOSTER, A. C. (1982). Impact of income and wife's education on family consumption expenditures [online]. *Journal of Consumer Studies & Home Economics*, 6(1): 21–28. <https://doi.org/10.1111/j.1470-6431.1982.tb00582.x>.

ABDEL-GHANY, M., SCHWENK, F. N. (1993). Differences in consumption patterns of single-parent and two-parent families in the United States [online]. *Journal of Family and Economic Issues*, 14(4): 299–315. <https://doi.org/10.1007/BF01013982>.

AGARWAL, S., CHOMSISENGPHET, S., MEIER, S., ZOU, X. (2020). In the mood to consume: Effect of sunshine on credit card spending [online]. *Journal of Banking & Finance*, 121, 105960. <https://doi.org/10.1016/j.jbankfin.2020.105960>.

ÅKERMAN, G. (1957). The income elasticity of demand for housing [online]. *Scandinavian Economic History Review*, 5(1): 49–73. <https://doi.org/10.1080/03585522.1957.10411391>.

ALONSO, C. (2016). *Beyond Labor Market Outcomes: the Impact of the Minimum Wage on Nondurable Consumption* [online]. Princeton University. <https://doi.org/10.2139/ssrn.2818623>.

ARPAIA, A., CARDOSO, P., KISS, A., HERCK, K. V., VANDEPLAS, A. (2017). *Statutory Minimum Wages in the EU: Institutional Settings and Macroeconomic Implications* [online]. IZA Paper No. 124. <http://ftp.iza.org.pp124.pdf>.

BAUGH, B., BEN-DAVID, I., PARK, H., PARKER, J. (2018). *Asymmetric Consumption Smoothing* [online]. National Bureau of Economic Research, No. w25086, p. w25086. <https://doi.org/10.3386/w25086>.

BAUMGÄRTNER, S., DRUPP, M. A., QUAAS, M. (2013). Subsistence and Substitutability in Consumer Preferences [online]. *University of Lüneburg Working Paper Series in Economics*, 281. <https://doi.org/10.2139/ssrn.2370383>.

BENDA-PROKEINOVÁ, R., DOBEŠ, K., MURA, L., BULECA, J. (2017). Engel's approach as a tool for estimating consumer behaviour [online]. *E a M: Ekonomie a Management*, 20(2): 15–29. <https://doi.org/10.15240/tul/001/2017-2-002>.

BEN-DAVID, I., BOS, M. (2017). *Impulsive Consumption and Financial Wellbeing: Evidence from an Increase in the Availability of Alcohol* [online]. National Bureau of Economic Research, No. w23211. <https://doi.org/10.3386/w23211>.

BERNINI, C., CRACOLICI, M. F. (2016). Is participation in the tourism market an opportunity for everyone? Some evidence from Italy [online]. *Tourism Economics*, 22(1): 57–79. <https://doi.org/10.5367/te.2014.0409>.

BRUNO, E. M., JESSOE, K. (2021). Using price elasticities of water demand to inform policy [online]. *Annual Review of Resource Economics*, 13: 427–441. <https://doi.org/10.1146/annurev-resource-110220-104549>.

CARROLL, C., SLACALEK, J., TOKUOKA, K., WHITE, M. N. (2017). The distribution of wealth and the marginal propensity to consume [online]. *Quantitative Economics*, 8(3): 977–1020. <https://doi.org/10.3982/QE694>.

CHRISTELIS, D., GEORGARAKOS, D., JAPPELLI, T., PISTAFERRI, L., VAN ROOIJ, M. (2019). Asymmetric Consumption Effects of Transitory Income Shocks [online]. *The Economic Journal*, 129(622): 2322–2341. <https://doi.org/10.1093/ej/uez013>.

CURRIE, J. M., THOMAS, W. J. (1972). *The Demand for food: an exercise in household budget analysis*. Manchester University Press.

CZ-COICOP. (n.d.). *Klasifikace individuální spotřeby* (CZ-COICOP) [online]. Czech Statistical Office. [cit. 11.12.2021]. <https://www.czso.cz/csu/czso/klasifikace_individualni_spotreby_-cz_coicop->.

CZSO. (2022). *Inflation, Consumer Prices* [online]. Czech Statistical Office. <https://www.czso.cz/csu/czso/inflation_consumer_prices_ekon>.

DAHL, C. A. (2012). Measuring global gasoline and diesel price and income elasticities [online]. *Energy Policy*, 41: 2–13. <https://doi.org/10.1016/j.enpol.2010.11.055>.

DALHUISEN, J. M., FLORAX, R. J. G. M., DE GROOT, H. L. F., NIJKAMP, P. (2003). Price and income elasticities of residential water demand: a meta-analysis [online]. *Land Economics*, 79(2): 292–308. <https://doi.org/10.2307/3146872>.

DAUTOVIĆ, E., HAU, H., HUANG, C. (2017). The Consumption Response to Minimum Wages: Evidence from Chinese Households [online]. *HKIMR Research Paper WP No. 24/2017*. <https://doi.org/10.2139/ssrn.3075020>.
DAVIES, B., MANGAN, J. (1992). Family expenditure on hotels and holidays [online]. *Annals of Tourism Research*, 19(4): 691–699. <https://doi.org/10.1016/0160-7383(92)90061-S>.
DYBCZAK, K., TÓTH, P., VOŇKA, D. (2014). Effects of Price Shocks on Consumer Demand: Estimating the QUAIDS Demand System on Czech Household Budget Survey Data [online]. *R-Czech Journal of Economics and Finance*, 64. <https://journal.fsv.cuni.cz/storage/1312_476-500---toth.pdf>.
EUROSTAT. (2022). *Minimum wage statistics* [online]. Luxembourgh. <https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Minimum_wage_statistics>.
FERNÁNDEZ-KRANZ, D., HON, M. T. (2006). A cross-section analysis of the income elasticity of housing demand in Spain: Is there a real estate bubble? [online]. *Journal of Real Estate Finance and Economics*, 32(4): 449–470. <https://doi.org/10.1007/s11146-006-6962-9>.
FOGARTY, J. (2010). The demand for beer, wine and spirits: a survey of the literature [online]. *Journal of Economic Surveys*, 24(3): 428–478. <https://doi.org/10.1111/j.1467-6419.2009.00591.x>.
FOUQUET, R. (2012). Trends in income and price elasticities of transport demand (1850–2010) [online]. *Energy Policy*, 50: 62–71. <https://doi.org/10.1016/j.enpol.2012.03.001>.
FRANKS, P., JERANT, A. F., LEIGH, J. P., LEE, D., CHIEM, A., LEWIS, I., LEE, S. (2007). Cigarette prices, smoking, and the poor: Implications of recent trends [online]. *American Journal of Public Health*, 97(10): 1873–1877. <https://doi.org/10.2105/AJPH.2006.090134>.
FRIEDMAN, M. (1957). *Theory of the Consumption Function* [online]. Princeton: Princeton University Press. <https://press.princeton.edu/books/paperback/9780691138862/theory-of-the-consumption-function>.
FUSTER, A., KAPLAN, G., ZAFAR, B. (2018). *What Would You Do With $500? Spending Responses to Gains, Losses, News and Loans* [online]. National Bureau of Economic Research, No. w24386. <https://doi.org/10.3386/w24386>.
GALLET, C. A., DOUCOULIAGOS, H. (2014). The income elasticity of air travel: a meta-analysis [online]. *Annals of Tourism Research*, 49: 141–155. <https://doi.org/10.1016/j.annals.2014.09.006>.
GHALWASH, T. M. (2008). Demand for environmental quality: an empirical analysis of consumer behavior in Sweden [online]. *Environmental and Resource Economics*, 41(1): 71–87. <https://doi.org/10.1007/s10640-007-9181-9>.
GOODMAN, A. C. (1988). An econometric model of housing price, permanent income, tenure choice, and housing demand [online]. *Journal of Urban Economics*, 23(3): 327–353. <https://doi.org/10.1016/0094-1190(88)90022-8>.
GRAHAM, D. J., GLAISTER, S. (2002). The Demand for Automobile Fuel: a Survey of Elasticities. *Journal of Transport Economics and Policy*, 36(1): 1–25.
HAL R. VARIAN. (1992). *Microeconomic analysis* [online]. Norton. <http://archive.org/details/microeconomicana00vari_0>.
HANSEN, J. L., FORMBY, J. P., SMITH, W. J. (1996). The income elasticity of demand for housing: Evidence from concentration curves [online]. *Journal of Urban Economics*, 39(2): 173–192. <https://doi.org/10.1006/juec.1996.0009>.
HARMON, O. R. (1988). The income elasticity of demand for single-family owner-occupied housing: an empirical reconciliation [online]. *Journal of Urban Economics*, 24(2): 173–185. <https://doi.org/10.1016/0094-1190(88)90037-X>.
HASHIMOTO, K., HEATH, J. A. (1995). Income elasticities of educational expenditure by income class: the case of Japanese households [online]. *Economics of Education Review*, 14(1): 63–71. <https://doi.org/10.1016/0272-7757(94)00030-A>.
HEBOYAN, V., HOVHANNISYAN, V. (2019). *Tobacco-Control Policies and US Demand for Cigarettes: an Application of a Quantile Regression Model with State Fixed Effects.* Agricultural and Applied Economics Association.
HORTON, S. E., HAFSTROM, J. L. (1985). Income Elasticities for Selected Consumption Categories: Comparison of Single Female-Headed and Two-Parent Families [online]. *Home Economics Research Journal*, 13(3): 292–303. <https://doi.org/10.1177/1077727X8501300308>.
HOUTHAKKER, H. S. (1957). An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law [online]. *Econometrica*, 25(4): 532–551. <https://doi.org/10.2307/1905382>.
HUANG, K. S., GALE, F. (2009). Food demand in China: Income, quality, and nutrient effects [online]. *China Agricultural Economic Review*, 1(4): 395–409. <https://doi.org/10.1108/17561370910992307>.
ILO. (2015). *Minimum Wage Policy Guide* [online]. ILO, December 3, 2015. <http://www.ilo.org/global/topics/wages/minimum-wages/definition/WCMS_439072/lang--en/index.htm>.
JANDA, K., MIKOLÁŠEK, J., NETUKA, M. (2010). Complete almost ideal demand system approach to the Czech alcohol demand [online]. *Agricultural Economics*, 56(9): 421–434. <https://doi.org/10.17221/117/2009-AGRICECON>.
JÁNSKÝ, P. (2014). Consumer Demand System Estimation and Value Added Tax Reforms in the Czech Republic. *Czech Journal of Economics and Finance (Finance a Uver)*, 64(3): 246–273.
JONES, R. M. (1994). The demand for clothing in the UK 1974–1991. *Journal of Clothing Technology & Managemen*t, 11(3): 85–110.
KEYNES, J. M. (1936). *The General Theory of Employment, Interest, and Money.* Palgrave Macmillan.
KIM, K. (2012). Demand Analysis of Clothing and Footwear: the Effects of Price, Total Consumption Expenditures and Economic Crisis [online]. *Journal of the Korean Society of Clothing and Textiles*, 36(12): 1285–1296. <https://doi.org/10.5850/JKSCT.2012.36.12.1285>.

LAKOVIĆ, T., MUGOŠA, A., ČIZMOVIĆ, M., RADOJEVIĆ, G. (2019). Impact of taxation policy on household spirit consumption and public-finance sustainability [online]. *Sustainability* (Switzerland), 11(20). <https://doi.org/10.3390/su11205858>.

LINN, J., SHEN, C. (2021). *The Effect of Income on Vehicle Demand: Evidence from China's New Vehicle Market* [online]. Working Paper 21–17. <https://trid.trb.org/view/1869227>.

MALÁ, Z., ČERVENÁ, G. (2012). Analysis of inequality in the consumption of foodstuffs and beverages – the example of the Czech Republic [online]. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 60(4): 255–266. <https://doi.org/10.11118/actaun201260040255>.

MARTINEZ, E., MEJIA, R., PÉREZ-STABLE, E. J. (2015). An empirical analysis of cigarette demand in Argentina [online]. *Tobacco Control*, 24(1): 89–93. <https://doi.org/10.1136/tobaccocontrol-2012-050711>.

MASSELL, B. F. (1969). Consistent Estimation of Expenditure Elasticities from Cross-Section Data on Households Producing Partly for Subsistence [online]. *The Review of Economics and Statistics*, 51(2): 136–142. <https://doi.org/10.2307/1926722>.

MATSUDA, S., SONE, T., MURATA, H. (1999). Income elasticity of education and smoking [online]. *Environmental Health and Preventive Medicine*, 3(4): 180–183. <https://doi.org/10.1007/BF02932255>.

MCCARTHY, P. S. (1996). Market Price and Income Elasticities of New Vehicle Demands [online]. *The Review of Economics and Statistics*, 78(3): 543–547. <https://doi.org/10.2307/2109802>.

MIEN, T. S., SAID, R. (2018). A cross-sectional household analysis of household consumption patterns: an indirect approach to identify the possible factors of personal bankruptcy [online]. *Jurnal Ekonomi Malaysia*, 52(3): 245–261. <https://doi.org/10.17576/JEM-2018-5203-18>.

MODIGLIANI, F., BRUMBERG, R. (1955). *Utility analysis and the consumption function: an interpretation of cross-section data*. London: Post-Keynesian Economics.

MURTY, K. N. (1981). Analysis of food consumption in the Federal Republic of Germany [online]. *Empirical Economics*, 6(1): 75–86. <https://doi.org/10.1007/BF02509782>.

NELSON, J. P. (2013). Meta-analysis of alcohol price and income elasticities – with corrections for publication bias [online]. *Health Economics Review*, 3(1): 1–10. <https://doi.org/10.1186/2191-1991-3-1>.

OECD. (2022). *Incomes of minimum wage earners* [online]. <https://stats.oecd.org/Index.aspx?DataSetCode=IMW#>.

OGUNDARI, K., ABDULAI, A. (2013). Examining the heterogeneity in calorie-income elasticities: a meta-analysis [online]. *Food Policy*, 40: 119–128. <https://doi.org/10.1016/j.foodpol.2013.03.001>.

OGUNDARI, K., ITO, S., OKORUWA, V. O. (2016). Estimating nutrition-income elasticities in sub-Saharan Africa: implications on health [online]. *Journal of Economic Studies*, 43(1): 59–69. <https://doi.org/10.1108/JES-07-2014-0125>.

PELLERANO, L., PORRECA, E., ROSATI, F. C. (2020). Income Elasticity of Child Labor: Do Cash Transfers have an Impact on the Poorest Children? [online]. *IZA Journal of Development and Migration*, 11(1). <https://doi.org/10.2478/izajodm-2020-0011>.

SALOTTI, S., MONTINARI, L., AMORES, A., RUEDA-CANTUCHE, J. (2015). *Total expenditure elasticity of non-durable consumption of European households* [online]. JRC Working Paper No. JRC94405, Joint Research Centre (Seville site). <https://econpapers.repec.org/paper/iptiptwpa/jrc94405.htm>.

SANTERAMO, F. G., SHABNAM, N. (2015). The income-elasticity of calories, macro- and micro-nutrients: What is the literature telling us? [online]. *Food Research International*, 76(P4): 932–937. <https://doi.org/10.1016/j.foodres.2015.04.014>.

ŠČASNÝ, M., SMUTNÁ, Š. (2019). Estimation of Price and Income Elasticity of Residential Water Demand in the Czech Republic over Three Decades. *IES Working Papers*, 13.

STEGER, T. M. (2000). Economic growth with subsistence consumption [online]. *Journal of Development Economics*, 62(2): 343–361. <https://doi.org/10.1016/S0304-3878(00)00088-2>.

STRÅLE, J. (2021). Household level heterogeneity in the income elasticities of demand for international leisure travel [online]. *Tourism Economics*. <https://doi.org/10.1177/13548166211033406>.

SYROVÁTKA, P. (2007). Exponential model of the Engel curve: Application within the income elasticity analysis of the Czech household's demand for meat and meat products [online]. *Agricultural Economics*, 53(9): 411–420. <https://doi.org/10.17221/636-agricecon>.

SYROVÁTKA, P., CHLÁDKOVÁ, H., ŽUFAN, P. (2015). Consumer demand for wine and beer in the Czech Republic, and their mutual influences [online]. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, 63(6): 2119–2125. <https://doi.org/10.11118/actaun201563062119>.

TANDOH, F., TEWARI, D. D. (2016). The income and price elasticity of demand for housing in Ghana: Empirical evidence from household level data [online]. *South African Journal of Economic and Management Sciences*, 19(2): 160–174. <https://doi.org/10.17159/2222-3436/2016/v19n2a1>.

TSE, R. Y. C., RAFTERY, J. (1999). Income elasticity of housing consumption in Hong Kong: a cointegration approach [online]. *Journal of Property Research*, 16(2): 123–138. <https://doi.org/10.1080/095999199368184>.

VESTERBERG, M. (2016). The hourly income elasticity of electricity [online]. *Energy Economics*, 59: 188–197. <https://doi.org/10.1016/j.eneco.2016.08.014>.

WONG, A. Y.-T., JOHN MCDERMOTT, C. (1990). Consumption of durables, non-durables and services in new zealand: a system-wide analysis [online]. *New Zealand Economic Papers*, 24(1): 115–127. <https://doi.org/10.1080/00779959009544157>.

ZHENG, B., ZHANG, Y. (2013). Household Expenditures for Leisure Tourism in the USA, 1996 and 2006 [online]. *International Journal of Tourism Research*, 15(2): 197–208. <https://doi.org/10.1002/jtr.880>.

ZIEBA, M. (2009). Full-income and price elasticities of demand for German public theatre [online]. *Journal of Cultural Economics*, 33(2): 85–108. <https://doi.org/10.1007/s10824-009-9094-2>.

APPENDIX 1

Table A1 COICOP classification

Abbrev.	Name of the category
c01	Food and nonalcoholic beverages
c02	Alcoholic beverages, tobacco and narcotics
c03	Clothing and footwear
c04	Housing, water, electricity, gas and other fuels
c05	Furnishings, household equipment and routine household maintenance
c06	Health
c07	Transport
c08	Information and communication
c09	Recreation, sport and culture
c10	Education services
c11	Restaurants and accommodation services
c12	Other goods and services
c_nd	Nondurable consumption
c_sd	Semidurable consumption
c_d	Durable consumption
c_s	Services

Source: CZ-COICOP (n.d.)

Table A2 Net disposable income and shares of consumption categories by household type

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Household type 1 + 0									
Income	9 847	10 026	10 015	10 473	11 075	11 746	12 576	13 261	14 121
c01	19%	20%	20%	20%	20%	19%	21%	21%	21%
c02	3%	3%	3%	3%	4%	3%	6%	4%	4%
c03	5%	5%	5%	5%	5%	5%	4%	5%	4%
c04	29%	29%	29%	28%	27%	29%	31%	28%	32%
c05	4%	4%	4%	4%	4%	5%	3%	5%	4%
c06	3%	2%	2%	2%	2%	2%	1%	2%	2%

Table A2 (continuation)

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Household type 1 + 0									
c07	7%	7%	7%	7%	7%	7%	6%	7%	5%
c08	5%	5%	5%	5%	5%	5%	5%	5%	5%
c09	9%	9%	8%	8%	9%	8%	8%	8%	9%
c10	0%	0%	0%	0%	0%	0%	0%	1%	0%
c11	5%	4%	4%	5%	5%	5%	8%	7%	6%
c12	11%	12%	12%	12%	13%	12%	8%	8%	7%
c_nd	47%	48%	47%	47%	47%	47%	57%	53%	48%
c_sd	10%	10%	10%	10%	10%	10%	9%	11%	10%
c_d	3%	3%	3%	3%	3%	3%	1%	2%	3%
c_s	40%	39%	39%	40%	40%	40%	33%	34%	40%
Household type 1 + 2									
Income	14 696	16 644	16 634	17 091	17 843	17 798	18 902	21 209	22 127
c01	24%	24%	23%	23%	24%	25%	26%	27%	20%
c02	2%	2%	2%	1%	2%	2%	1%	4%	2%
c03	5%	5%	5%	5%	5%	5%	7%	4%	3%
c04	30%	31%	32%	30%	30%	28%	31%	25%	37%
c05	3%	3%	3%	3%	3%	4%	4%	6%	4%
c06	2%	2%	2%	2%	2%	2%	2%	1%	2%
c07	5%	5%	6%	7%	7%	6%	6%	6%	5%
c08	6%	6%	6%	6%	6%	6%	5%	7%	6%
c09	8%	7%	7%	8%	7%	7%	6%	7%	6%
c10	1%	1%	1%	1%	1%	1%	2%	1%	0%
c11	5%	5%	5%	5%	6%	6%	6%	6%	7%
c12	9%	9%	9%	10%	10%	10%	6%	6%	8%
c_nd	49%	50%	51%	49%	51%	52%	49%	58%	38%
c_sd	11%	10%	9%	10%	10%	10%	14%	10%	9%
c_d	2%	3%	2%	2%	2%	3%	1%	2%	2%
c_s	39%	37%	37%	39%	37%	35%	36%	29%	51%
Household type 2 + 2									
Income	14 696	16 644	16 634	17 091	17 843	18 575	19 778	21 563	22 587
c01	27%	26%	26%	25%	25%	31%	27%	28%	29%
c02	4%	4%	3%	2%	2%	1%	4%	4%	2%
c03	4%	4%	4%	4%	5%	6%	3%	6%	4%
c04	26%	28%	24%	28%	24%	17%	27%	20%	24%
c05	3%	3%	3%	4%	4%	3%	5%	2%	4%
c06	2%	1%	1%	2%	1%	1%	1%	1%	3%

Table A2 (continuation)

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Household type 2 + 2									
c07	7%	8%	12%	11%	9%	10%	8%	11%	7%
c08	5%	5%	7%	6%	6%	6%	5%	6%	5%
c09	6%	7%	6%	5%	6%	5%	7%	10%	7%
c10	1%	1%	0%	0%	1%	1%	1%	2%	1%
c11	4%	5%	3%	4%	5%	6%	3%	7%	8%
c12	10%	9%	12%	10%	12%	15%	10%	5%	7%
c_nd	58%	58%	57%	54%	53%	56%	57%	59%	59%
c_sd	10%	10%	10%	10%	11%	13%	10%	12%	11%
c_d	2%	1%	1%	2%	2%	1%	1%	1%	0%
c_s	30%	31%	32%	33%	34%	31%	33%	28%	30%

Note: Net disposable income is expressed in CZK per month and represents the net family income.
Source: Own calculations, OECD (2022)

Table A3 Descriptive statistics by period (mean in CZK per month)

	2011–2013			2014–2016			2017–2019		
	Mean	sd	Mean share	Mean	sd	Mean share	Mean	sd	Mean share
Total	13 812	2 600	–	14 204	2 696	–	17 063	3 824	–
c01	2 938	1 060	21%	2 987	1 057	21%	4100	1 724	24%
c02	401	553	3%	426	615	3%	719	837	4%
c03	636	442	5%	683	462	5%	763	859	4%
c04	3 941	1 606	29%	3 886	1 645	28%	4 902	2 139	29%
c05	559	506	4%	569	499	4%	733	810	4%
c06	285	307	2%	286	306	2%	302	397	2%
c07	983	900	7%	1 088	930	8%	1 086	1 194	6%
c08	764	431	6%	750	388	5%	932	565	6%
c09	1 122	801	8%	1 106	798	8%	1 223	948	7%
c10	62	229	0%	47	149	0%	75	289	0%
c11	602	552	4%	680	647	5%	1 015	1 041	6%
c12	1 520	828	11%	1 698	963	12%	1 216	1 075	7%
c_nd	6 848	2 038	50%	6 941	2 098	49%	9 463	3 236	56%
c_sd	1 351	774	10%	1 432	805	10%	1 767	1 326	10%
c_d	413	592	3%	419	572	3%	321	737	2%
c_s	5 200	1 951	38%	5 413	2 069	38%	5 512	2 748	33%

Note: Total represents total consumption expenditures, mean is in CZK per month, sd represents standard deviation, mean share indicates mean share of the consumption category of total spending.
Source: Own calculations

Table A4 Regression-parameter estimates of the twelve consumption categories

Independent variables	*ln(c01)*	*ln(c02)*	*ln(c03)*	*ln(c04)*	*ln(c05)*	*ln(c06)*	*ln(c07)*	*ln(c08)*	*ln(c09)*	*ln(c10)*	*ln(c11)*	*ln(c12)*
2011–2013												
ln(M)	0.738***	2.023***	1.386***	0.631***	1.827***	1.343***	2.170***	1.142***	1.469***	0.774***	2.196***	1.220***
	(17.85)	(8.02)	(9.85)	(6.47)	(17.13)	(8.27)	(10.14)	(8.41)	(16.44)	(3.34)	(8.52)	(15.54)
Child	0.218***	−0.857***	0.0820	0.0523	−0.257***	−0.201**	−0.114	0.168***	−0.156***	1.974***	0.323***	−0.210***
	(12.41)	(−7.46)	(1.34)	(1.40)	(−5.59)	(−2.65)	(−1.36)	(3.34)	(−4.25)	(14.50)	(3.50)	(−6.29)
Size	−0.0214***	−0.114***	−0.0166	0.0993***	−0.0291**	0.0398*	−0.173***	−0.0423***	0.00570	0.0459*	−0.0894***	−0.0530***
	(−5.62)	(−5.07)	(−1.27)	(10.78)	(−2.79)	(2.44)	(−11.92)	(−4.02)	(0.66)	(2.01)	(−4.01)	(−7.01)
Dwelling	−0.115***	0.425***	−0.169*	−0.0543	−0.229***	−0.333***	0.0854	0.0138	−0.153***	0.135	0.263*	−0.176***
	(−6.07)	(4.04)	(−2.57)	(−0.98)	(−4.55)	(−4.28)	(1.05)	(0.26)	(−3.61)	(1.17)	(2.57)	(−4.94)
Constant	0.992*	−13.58***	−6.930***	1.586	−11.12***	−7.779***	−13.36***	−4.265***	−7.134***	−7.208**	−14.93***	−4.047***
	(2.53)	(−5.67)	(−5.16)	(1.68)	(−11.05)	(−5.06)	(−6.57)	(−3.32)	(−8.42)	(−3.28)	(−6.07)	(−5.40)
N	1 443	1 443	1 443	1 443	1 443	1 443	1 443	1 443	1 443	1 443	1 443	1 443
adj. R-sq	0.297	0.088	0.081	0.124	0.176	0.059	0.127	0.083	0.172	0.196	0.083	0.186
AIC	705.0	5 756.8	4 033.7	2 821.3	3 506.7	4 716.6	5 110.4	3 713.4	2 845.7	5 877.7	5 712.3	2 492.2
BIC	731.4	5 783.2	4 060.1	2 847.7	3 533.1	4 743.0	5 136.7	3 739.7	2 872.1	5 904.1	5 738.6	2 518.5
2014–2016												
ln(M)	0.710***	2.017***	1.674***	1.072***	1.437***	1.328***	2.550***	1.056***	1.356***	0.746**	2.599***	1.294***
	(16.04)	(7.28)	(10.97)	(5.95)	(10.66)	(7.08)	(10.65)	(8.30)	(14.21)	(3.20)	(8.67)	(14.40)
Child	0.229***	−1.018***	0.0886	0.0931*	−0.205***	−0.135	−0.200*	0.187**	−0.199***	2.164***	0.323**	−0.231***
	(12.03)	(−7.70)	(1.41)	(2.19)	(−3.75)	(−1.45)	(−2.13)	(3.22)	(−4.46)	(13.92)	(2.94)	(−5.92)
Size	−0.0170***	−0.119***	0.00241	0.104***	−0.0366**	0.0122	−0.197***	−0.0361***	0.00423	0.0185	−0.0720**	−0.0498***
	(−4.31)	(−4.90)	(0.17)	(8.84)	(−2.88)	(0.62)	(−12.41)	(−3.36)	(0.46)	(0.81)	(−3.01)	(−5.95)
Dwelling	−0.0917***	0.262*	−0.0791	−0.148	−0.300***	−0.278**	0.0948	0.111*	−0.121*	0.344**	0.117	−0.248***
	(−4.97)	(2.18)	(−1.25)	(−1.90)	(−4.54)	(−2.77)	(1.10)	(2.32)	(−2.49)	(2.83)	(0.97)	(−6.09)

Table A4 (continuation)

Independent variables	*ln(c01)*	*ln(c02)*	*ln(c03)*	*ln(c04)*	*ln(c05)*	*ln(c06)*	*ln(c07)*	*ln(c08)*	*ln(c09)*	*ln(c10)*	*ln(c11)*	*ln(c12)*
2014–2016												
Constant	1.235**	−13.52***	−9.765***	−2.677	−7.377***	−7.581***	−16.79***	−3.532**	−6.112***	−6.933**	−18.84***	−4.697***
	(2.93)	(−5.11)	(−6.64)	(−1.56)	(−5.75)	(−4.27)	(−7.33)	(−2.95)	(−6.75)	(−3.14)	(−6.57)	(−5.46)
N	1 223	1 223	1 223	1 223	1 223	1 223	1 223	1 223	1 223	1 223	1 223	1223
adj. R-sq	0.317	0.086	0.118	0.124	0.118	0.040	0.177	0.099	0.143	0.245	0.094	0.206
AIC	457.5	4 963.4	3 333.7	2 969.5	3 161.9	4 262.8	4 242.7	2 854.5	2 504.9	4 808.1	4 943.3	2 184.1
BIC	483.0	4 989.0	3 359.3	2 995.0	3 187.4	4 288.4	4 268.3	2 880.0	2 530.4	4 833.7	4 968.8	2 209.6
2017–2019												
ln(M)	0.846***	1.639**	3.612***	0.657***	1.872***	2.414***	2.271***	0.858*	1.279***	0.375	1.547*	1.569***
	(9.88)	(3.26)	(5.84)	(6.91)	(7.58)	(4.37)	(3.79)	(2.24)	(7.34)	(0.98)	(2.28)	(5.95)
Child	0.249***	−0.160	−0.300	0.0434	−0.0647	−0.476	−0.639	0.151	−0.197	2.162***	0.0446	0.0788
	(5.66)	(−0.75)	(−0.86)	(0.78)	(−0.48)	(−1.43)	(−1.83)	(0.76)	(−1.94)	(6.45)	(0.14)	(0.65)
Size	−0.0297**	−0.0325	0.103	0.0413***	−0.0232	−0.0618	−0.101	0.0639	−0.00782	0.0286	0.101	−0.0181
	(−2.99)	(−0.68)	(1.48)	(3.65)	(−0.80)	(−0.93)	(−1.53)	(1.50)	(−0.39)	(0.61)	(1.63)	(−0.66)
Dwelling	−0.0662	0.361	−0.191	0.309***	−0.183	−0.517	−0.896*	−0.204	−0.193	−0.151	0.288	−0.415**
	(−1.42)	(1.62)	(−0.57)	(5.52)	(−1.32)	(−1.47)	(−2.46)	(−0.93)	(−1.71)	(−0.72)	(1.02)	(−3.05)
Constant	0.0959	−10.17*	−30.33***	1.725	−11.94***	−18.69***	−15.54**	−2.206	−5.475**	−3.481	−9.745	−8.432**
	(0.12)	(−2.07)	(−5.07)	(1.85)	(−4.95)	(−3.48)	(−2.67)	(−0.58)	(−3.23)	(−0.93)	(−1.50)	(−3.30)
N	301	301	301	301	301	301	301	301	301	301	301	301
adj. R-sq	0.370	0.039	0.099	0.227	0.169	0.055	0.066	0.026	0.142	0.222	0.025	0.146
AIC	240.1	1 219.3	1 424.5	329.9	870.0	1 390.8	1 412.7	1 082.5	691.1	1 219.5	1 364.6	888.3
BIC	258.6	1 237.8	1 443.1	348.4	888.6	1 409.3	1 431.3	1 101.0	709.6	1 238.0	1 383.2	906.8

Note: ***, ** and * indicate significance at 0.1%, 1%, and 5% respectively, robust standard deviation is in parentheses.
Source: Own calculations

Table A5 Regression-parameter estimates of broad consumption categories

	2011–2013				2014 –2016				2017–2019			
	ln(c_nd)	*ln(c_sd)*	*ln(c_d)*	*ln(c_s)*	*ln(c_nd)*	*ln(c_sd)*	*ln(c_d)*	*ln(c_s)*	*ln(c_nd)*	*ln(c_sd)*	*ln(c_d)*	*ln(c_s)*
ln(M)	0.856***	1.348***	4.261***	1.025***	0.810***	1.348***	3.496***	1.125***	0.908***	2.121***	2.671***	0.835***
	(26.77)	(17.44)	(14.96)	(21.26)	(23.45)	(15.68)	(11.07)	(22.06)	(12.98)	(7.65)	(4.09)	(7.14)
Child	0.0820***	0.0545	−0.613***	−0.0667***	0.0938***	0.0423	−0.763***	−0.0963***	0.0342	−0.0133	0.0368	0.0411
	(6.30)	(1.54)	(-4.75)	(−3.48)	(6.10)	(1.11)	(−5.21)	(−4.12)	(1.02)	(−0.12)	(0.09)	(0.63)
Size	−0.0402***	−0.0117	0.0284	0.0536***	−0.0398***	−0.00764	0.0133	0.0506***	−0.0568***	0.00902	0.0469	0.0900***
	(−14.47)	(−1.47)	(1.06)	(13.03)	(−13.11)	(−0.89)	(0.45)	(12.10)	(−7.59)	(0.33)	(0.62)	(5.63)
Dwelling	−0.200***	−0.0782*	−0.231	0.219***	−0.202***	−0.0565	−0.129	0.227***	−0.128***	−0.129	−0.0311	0.209**
	(−12.34)	(−2.09)	(−1.83)	(11.93)	(−11.65)	(−1.41)	(−0.95)	(11.89)	(−3.36)	(−0.96)	(−0.08)	(2.74)
Constant	0.899**	−5.725***	−35.83***	−1.624***	1.318***	−5.721***	−28.45***	−2.541***	0.564	−13.55***	−23.20***	−0.126
	(2.98)	(−7.79)	(−13.20)	(−3.55)	(4.02)	(−6.97)	(−9.42)	(−5.25)	(0.83)	(−5.06)	(−3.67)	(−0.11)
N	1443	1443	1443	1443	1223	1223	1223	1223	301	301	301	301
adj. R-sq	0.459	0.178	0.143	0.405	0.463	0.183	0.107	0.430	0.517	0.203	0.042	0.262
AIC	−64.92	2 573.8	6 217.2	786.7	−62.76	2 160.1	5 248.7	655.0	56.50	875.3	1 486.5	434.8
BIC	−38.55	2 600.2	6 243.6	813.1	−37.22	2 185.6	5 274.3	680.5	75.03	893.9	1 505.0	453.3

Note: ***, ** and * indicate significance at 0.1%, 1%, and 5% respectively, robust standard deviation is in parentheses.
Source: Own calculations

Table A6 Regression-parameter estimates of the twelve consumption categories with a mediation effect

Independent variables	*ln(c01)*	*ln(c02)*	*ln(c03)*	*ln(c04)*	*ln(c05)*	*ln(c06)*	*ln(c07)*	*ln(c08)*	*ln(c09)*	*ln(c10)*	*ln(c11)*	*ln(c12)*
2011–2013												
log(M)	0.718***	1.843***	1.406***	0.695***	1.845***	1.117***	2.106***	1.193***	1.473***	0.225	2.302***	1.125***
	(14.72)	(6.81)	(8.90)	(6.06)	(14.60)	(6.22)	(8.96)	(7.83)	(14.13)	(1.01)	(7.47)	(13.05)
Child	−0.627	−8.317	0.907	2.691	0.455	−9.529*	−2.768	2.279	−0.00606	−20.72**	4.691	−4.136*
	(−0.72)	(−1.30)	(0.27)	(1.33)	(0.21)	(−2.51)	(−0.52)	(0.71)	(−0.00)	(−3.11)	(0.91)	(−2.20)
*ln(M)*child*	0.0885	0.781	−0.0864	−0.276	−0.0745	0.977*	0.278	−0.221	−0.0157	2.376***	−0.457	0.411*
	(0.96)	(1.17)	(−0.24)	(−1.30)	(−0.33)	(2.47)	(0.50)	(−0.67)	(−0.08)	(3.41)	(−0.85)	(2.09)
Size	−0.0212***	−0.113***	−0.0167	0.0989***	−0.0292**	0.0412*	−0.173***	−0.0426***	0.00568	0.0494*	−0.0901***	−0.0524***
	(−5.55)	(−5.00)	(−1.27)	(10.86)	(−2.79)	(2.54)	(−11.83)	(−4.03)	(0.65)	(2.17)	(−4.03)	(−6.93)
Dwelling	−0.115***	0.424***	−0.169*	−0.0542	−0.229***	−0.333***	0.0853	0.0140	−0.153***	0.133	0.264*	−0.177***
	(−6.07)	(4.04)	(−2.57)	(−0.98)	(−4.55)	(−4.28)	(1.05)	(0.26)	(−3.60)	(1.16)	(2.57)	(−4.95)
Constant	1.185*	−11.87***	−7.119***	0.982	−11.28***	−5.643***	−12.76***	−4.748**	−7.168***	−2.011	−15.93***	−3.148***
	(2.57)	(−4.63)	(−4.74)	(0.89)	(−9.46)	(−3.30)	(−5.72)	(−3.29)	(−7.28)	(−0.95)	(−5.43)	(−3.84)
N	1 443	1 443	1 443	1 443	1 443	1 443	1 443	1 443	1 443	1 443	1 443	1 443
adj. R-sq	0.297	0.088	0.080	0.124	0.175	0.062	0.126	0.083	0.171	0.205	0.083	0.188
AIC	706.2	5 756.9	4 035.6	2 821.5	3 508.6	4 712.4	5 112.0	3 714.7	2 847.7	5 863.2	5 713.6	2 489.0
BIC	737.8	5 788.5	4 067.3	2 853.1	3 540.3	4 744.1	5 143.6	3 746.4	2 879.4	5 894.8	5 745.2	2 520.7
2014–2016												
log(M)	0.701***	2.136***	1.778***	1.175***	1.414***	1.141***	2.252***	0.952***	1.413***	0.304	2.848***	1.206***
	(13.68)	(6.99)	(9.81)	(5.22)	(9.12)	(5.57)	(9.13)	(7.90)	(13.07)	(1.41)	(8.06)	(12.24)
Child	−0.170	4.541	4.963	4.886*	−1.274	−8.838	−14.12*	−4.670	2.433	−18.50*	11.96*	−4.342*
	(−0.18)	(0.67)	(1.72)	(1.99)	(−0.43)	(−1.87)	(−2.07)	(−1.16)	(1.12)	(−2.44)	(2.11)	(−1.96)
*ln(M)*child*	0.0416	−0.580	−0.508	−0.500	0.111	0.907	1.451*	0.506	−0.274	2.155**	−1.214*	0.429
	(0.42)	(−0.82)	(−1.70)	(−1.95)	(0.36)	(1.85)	(2.06)	(1.22)	(−1.22)	(2.73)	(−2.06)	(1.87)

Table A6 (continuation)

Independent variables	*ln(c01)*	*ln(c02)*	*ln(c03)*	*ln(c04)*	*ln(c05)*	*ln(c06)*	*ln(c07)*	*ln(c08)*	*ln(c09)*	*ln(c10)*	*ln(c11)*	*ln(c12)*
2014–2016												
Size	−0.0170***	−0.120***	0.00222	0.104***	−0.0366**	0.0126	−0.196***	−0.0359***	0.00412	0.0194	−0.0725**	−0.0497***
	(−4.30)	(−4.91)	(0.16)	(8.80)	(−2.87)	(0.64)	(−12.42)	(−3.38)	(0.44)	(0.85)	(−3.03)	(−5.93)
Dwelling	−0.0916***	0.260*	−0.0806	−0.149	−0.300***	−0.275**	0.0991	0.112*	−0.121*	0.350**	0.113	-0.247***
	(−4.96)	(2.16)	(−1.27)	(−1.91)	(−4.53)	(−2.74)	(1.15)	(2.35)	(−2.51)	(2.88)	(0.94)	(−6.07)
Constant	1.316**	−14.65***	−10.76***	−3.653	−7.159***	−5.809**	−13.96***	−2.543*	−6.648***	−2.726	−21.21***	−3.860***
	(2.70)	(−5.03)	(−6.17)	(−1.71)	(−4.85)	(−2.99)	(−5.92)	(−2.21)	(−6.47)	(−1.34)	(−6.28)	(−4.10)
N	1 223	1 223	1 223	1 223	1 223	1 223	1 223	1 223	1 223	1 223	1 223	1 223
adj. R-sq	0.317	0.085	0.119	0.126	0.118	0.042	0.183	0.101	0.143	0.252	0.096	0.208
AIC	459.3	4 964.6	3 333.4	2 968.5	3 163.8	4 261.4	4 235.8	2 853.1	2 505.6	4 797.7	4 941.8	2 181.9
BIC	490.0	4 995.3	3 364.1	2 999.1	3 194.4	4 292.1	4 266.4	2 883.7	2 536.2	4 828.4	4 972.4	2 212.6
2017–2019												
log(M)	0.836***	1.552**	3.750***	0.653***	2.082***	2.300***	1.861**	0.809	1.247***	0.168	1.361	1.456***
	(8.89)	(2.78)	(5.71)	(6.45)	(8.13)	(3.94)	(3.04)	(1.93)	(6.72)	(0.52)	(1.88)	(4.98)
Child	−0.552	−7.136	10.83	−0.282	16.89*	−9.650	−33.69	−3.826	−2.752	−14.51	−14.92	−9.040
	(−0.28)	(−0.67)	(0.54)	(−0.10)	(2.21)	(−0.54)	(−1.66)	(−0.44)	(−0.53)	(−0.70)	(−0.69)	(−1.69)
*ln(M)*child*	0.0816	0.711	−1.134	0.0331	−1.728*	0.935	3.367	0.405	0.260	1.699	1.524	0.929
	(0.41)	(0.66)	(−0.55)	(0.11)	(−2.22)	(0.52)	(1.64)	(0.46)	(0.49)	(0.80)	(0.70)	(1.70)
Size	−0.0294**	−0.0301	0.0997	0.0415***	−0.0289	−0.0588	−0.0899	0.0652	−0.00697	0.0342	0.106	−0.0150
	(−2.95)	(−0.63)	(1.40)	(3.61)	(−1.00)	(−0.88)	(−1.38)	(1.53)	(−0.35)	(0.74)	(1.71)	(−0.54)
Dwelling	−0.0663	0.361	−0.189	0.309***	−0.181	−0.518	−0.900*	−0.205	−0.193	−0.153	0.285	−0.416**
	(−1.42)	(1.62)	(−0.57)	(5.51)	(−1.30)	(−1.47)	(−2.50)	(−0.94)	(−1.71)	(−0.74)	(1.01)	(−3.06)
Constant	0.191	−9.342	−31.65***	1.763	−13.95***	−17.60**	−11.63	−1.735	−5.172**	−1.506	−7.973	−7.352**
	(0.21)	(−1.72)	(−5.00)	(1.78)	(−5.57)	(−3.11)	(−1.95)	(−0.42)	(−2.86)	(−0.47)	(−1.14)	(−2.60)

Table A6 (continuation)

Independent variables	*ln(c01)*	*ln(c02)*	*ln(c03)*	*ln(c04)*	*ln(c05)*	*ln(c06)*	*ln(c07)*	*ln(c08)*	*ln(c09)*	*ln(c10)*	*ln(c11)*	*ln(c12)*
2017–2019												
N	301	301	301	301	301	301	301	301	301	301	301	301
adj. R-sq	0.368	0.037	0.097	0.225	0.180	0.052	0.074	0.023	0.140	0.223	0.025	0.148
AIC	242.0	1 221.0	1 426.2	331.9	866.7	1 392.5	1 411.4	1 084.3	692.9	1 219.9	1 365.8	888.9
BIC	264.2	1 243.3	1 448.4	354.1	888.9	1 414.7	1 433.6	1 106.6	715.1	1 242.1	1 388.1	911.1

Note: ***, ** and * indicate significance at 0.1%, 1%, and 5% respectively, standard deviation is in parentheses.
Source: Own calculations

Table A7 Regression-parameter estimates of broad consumption categories with a mediation effect

	2011–2013				2014 –2016				2017–2019			
	ln(c_nd)	*ln(c_sd)*	*ln(c_d)*	*ln(c_s)*	*ln(c_nd)*	*ln(c_sd)*	*ln(c_d)*	*ln(c_s)*	*ln(c_nd)*	*ln(c_sd)*	*ln(c_d)*	*ln(c_s)*
ln(M)	0.855***	1.333***	4.257***	0.988***	0.799***	1.388***	3.284***	1.082***	0.924***	2.270***	3.160***	0.759***
	(22.13)	(14.71)	(13.19)	(18.00)	(20.45)	(14.22)	(9.41)	(20.56)	(12.06)	(7.37)	(4.62)	(5.96)
Child	0.0124	−0.567	−0.761	−1.602	−0.428	1.946	−10.63	−2.124	1.318	12.00*	39.41	−6.087*
	(0.02)	(−0.34)	(−0.12)	(−1.45)	(−0.53)	(0.98)	(−1.36)	(−1.45)	(0.76)	(2.05)	(1.94)	(−1.97)
*ln(M)*child*	0.00729	0.0651	0.0155	0.161	0.0544	−0.198	1.029	0.211	−0.131	−1.224*	−4.012	0.624*
	(0.11)	(0.38)	(0.02)	(1.39)	(0.65)	(−0.97)	(1.27)	(1.39)	(−0.74)	(−2.05)	(−1.93)	(1.99)
Size	−0.0402***	−0.0116	0.0284	0.0538***	−0.0397***	−0.00772	0.0137	0.0507***	−0.0572***	0.00503	0.0338	0.0921***
	(−14.42)	(−1.45)	(1.06)	(13.07)	(−13.08)	(−0.90)	(0.46)	(12.18)	(−7.57)	(0.18)	(0.45)	(5.74)
Dwelling	−0.200***	−0.0782*	−0.231	0.219***	−0.201***	−0.0571	−0.126	0.227***	−0.128***	−0.128	−0.0258	0.208**
	(−12.34)	(−2.09)	(−1.83)	(11.93)	(−11.62)	(−1.43)	(−0.93)	(11.85)	(−3.36)	(−0.95)	(−0.07)	(2.75)
Constant	0.915*	−5.583***	−35.79***	−1.272*	1.424***	−6.109***	−26.44***	−2.128***	0.412	−14.97***	−27.86***	0.600
	(2.52)	(−6.51)	(−11.65)	(−2.45)	(3.85)	(−6.56)	(−7.93)	(−4.26)	(0.55)	(−5.04)	(−4.21)	(0.49)
N	1 443	1 443	1 443	1 443	1 223	1 223	1 223	1 223	301	301	301	301
adj. R-sq	0.458	0.178	0.143	0.405	0.463	0.183	0.108	0.432	0.516	0.207	0.050	0.267
AIC	−62.93	2 575.7	6 219.2	786.2	−61.19	2 161.1	5 248.7	653.4	58.04	874.7	1 484.8	433.8
BIC	−31.29	2 607.4	6 250.8	817.8	−30.53	2 191.8	5 279.4	684.1	80.28	896.9	1 507.0	456.0

Note: ***, ** and * indicate significance at 0.1%, 1%, and 5% respectively, standard deviation is in parentheses.
Source: Own calculations

APPENDIX 2

DIAGNOSTICS

The variance of the residual terms depends largely on observations in nonlogarithmic form. In most cases, I removed heteroscedasticity by the model building because logarithmisation is an effective transformation in the heteroscedastic regressions. However, the problem persisted in a couple of regressions, so I chose OLS estimation with robust errors as the estimation method.

I tested multicollinearity by calculating variance inflation factors (VIF), whose value of 1 or close to zero indicates that the independent variables are not correlated.

I excluded observations that could affect the estimates before estimating the models. I also removed outliers identified as illogical or deviating for methodological reasons.

Despite the prevalence of statistically significant estimates, high variance of consumption among low-income households causes low values of the coefficient of determination – between 0.023 and 0.517. For this reason, I occasionally did not reject the null hypothesis about the informative value of the model only with intercept, using the F-test of overall significance. Nonetheless, I used a unified method for all the regressions rooted in theoretical assumptions and previous empirical studies.