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# The out-of-pocket health burden in the Czech Republic – Should we care?

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ABSTRACT

The system of cost sharing has changed several times in the Czech Republic, and it is not out of the question that further changes will take place. High out-of-pocket payments have a considerable impact on patients and the burden on their household budgets. Therefore, we aim to evaluate the impact of out-of-pocket payments on the burden of Czech households from a long term perspective and to determine the most vulnerable groups, taking into account policy changes across the observed period of 2007–2014. We use micro data from the Household Budget Survey conducted by the Czech Statistical Office. The burden and its changes are observed and a burden breakdown for out-of-pocket payment types is made. Special attention is paid to households with members aged 65 or more, and also to households with children. To estimate the burden, regression models are run using the Ordinary Least Square method with robust standard errors. We found that the burden is not equitably distributed among households, but that it tends to decrease with time. Modifications in user fees contributed to this decreasing trend. Even though protective mechanisms from high out-of-pocket payments are applied in the health care system, households with members aged over 65 years faced the highest burden. Another significant predictor of the high burden is household income and the presence of a health problem. Improvement of protection would be justifiable, especially in relation to the income situation of the household.



## Introduction

Private health payments, i.e. out-of-pocket payments (OOPP), have given rise to debate for decades in the Czech Republic. This is not surprising as OOPP have implications for all the players in the health care system (health insurance companies, health care providers and patients) and are a very rewarding political topic. In the last decade, the system of OOPP (cost sharing) has changed several times in the Czech Republic [1, 2] and it is not impossible that further changes will take place.

Out-of-pocket payments have a relatively small impact on the financing of health care services [3], but new (or increased) expenditure might have a considerable impact on patients and the burden on their household budgets [4, 5]. It has been shown that out-of-pocket payments are the most regressive way of paying for health care [6–9].

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Various vulnerable groups have been identified to which attention should be paid when the role of OOPP as a financing mechanism is highlighted [7, 10]. In an extreme case, OOPP can lead to catastrophic health expenditure [5, 11–13], poverty [14, 15] and forgoing health care [16–18]. These negative findings support the fact that various forms of cost sharing should be implemented with caution and the impacts should be evaluated on a regular basis [19]. On top of that, a system of protective mechanisms ought to be applied and re-evaluated in order to eliminate negative aspects of such payments for households and their members, especially for those who are ill and objectively consume more health care services.

With regard to what has been mentioned above, we aim to evaluate the impact of out-of-pocket payments on the burden of Czech households in the long term and to determine the most vulnerable groups. We observe the period of 2007–2014. The impact of changes in the system of out-of-pocket payments within the observed period is taken into consideration.

### *The system of out-of-pocket payments and changes to it*

The Czech Republic is one of the countries with statutory public health insurance and extensive health care coverage. Based on the official statistics for the observed period of 2007–2014, the level of public expenditure oscillated between 83–85% of total health expenditure [20]. Private expenditure (practically represented by OOPP) sharply increased in 2008, but the level of private expenditure has had a decreasing trend since 2009. The development of health expenditure is displayed in Table 1.

**Table 1 – Development of health expenditure in 2007–2014 [20]**

| Health expenditure/year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|
| Public expenditure as % of total expenditure | 85.2 | 82.5 | 83.7 | 83.8 | 84.2 | 84.0 | 84.3 | 84.5 |
| Private expenditure as % of total expenditure | 14.8 | 17.5 | 16.3 | 16.2 | 15.8 | 16.0 | 15.7 | 15.5 |
| Total expenditure as % of GDP | 6.5 | 6.8 | 7.8 | 7.4 | 7.5 | 7.5 | 7.5 | 7.4 |

The main source of public expenditure is statutory health insurance contributions paid by employees, employers, the self-employed, and by the state for those economically inactive within the population (children, students, pensioners, unemployed, etc.). No changes in legally set contributions of employees or employers took place in the observed period. Some adjustments of state payments for economically inactive population were done, however, it is often mentioned that these payments are insufficient and not sustainable in the long term [2].

Private expenditure – OOPP – consists of direct payments and co-payments. Direct payments include over-the-counter (OTC) pharmaceuticals, some health products and medical devices and supplies, health care services at the patient's request (surgery, screening and examinations outside covered schemes, etc.), a number of dental care services, and a very limited number of above standard services (luxury hotel services in hospital or surgery by a senior physician) [2].

Co-payments are paid above a reference price (the price covered by public health insurance). In particular, co-payments are made for prescribed medications, some medical aids and dental care [2]. Additional OOP payments known as 'user fees' were introduced in 2008 (fee per general practitioner, specialist, dentist and home visit, prescription fee, inpatient fee per stay in hospital/spa, and emergency unit visit fee) [21].

Preventive services are free of charge, as well as laboratory and diagnostic examinations, continuing health care (chronically ill children and pregnant women), haemodialysis, services connected to blood donation and transport [2].

Some exemptions from payments are applied but relate only to the user fees. The following vulnerable groups are fully exempt from payment of fees: patients in material need; patients put into foster homes, orphanages, sanatoriums, patients under the system of protective treatment and in retirement homes or other inpatient care centres if they are left with 800 CZK (31 EUR) or less after the payment of appropriate costs for accommodation and food (or those who do not have any income) [21, 22]. Material need is specified according to Act no. 111/2006, Coll., on material need [23], as the situation in which an individual (or other individuals in a common household) does not have sufficient income to secure his/her basic life needs and is not able to change this situation on his/her own. An individual (or other individuals in a common household) is entitled to the benefits of material need providing that her/his income is lower than the set level of the living minimum or he/she faces a special situation (natural disaster or threat of social exclusion).

An annual OOPP maximum is applied in the amount of 5000 CZK (192 EUR) per person, and 2500 CZK (96 EUR) for children under the age of 18 and for the elderly aged 65 and more. Only physician visit fees, prescription fees and some co-payments for medications (co-payment for the cheapest medication available on the market with the same active component and means of application) are included in the OOP maximum [21, 22].

In the observed period of 2007–2014, the system of OOPP had several changes [21]. In 2007, direct payments and co-payments for drugs and dental services were commonly paid. In 2008, user fees were implemented as a new form of OOPP. Between 2008–2013, outpatient, inpatient and prescription fees were applied. In 2014, the inpatient fee was abolished [24]. The overview of OOPP and changes to them is shown in Table 2.

**Table 2 – Overview of out-of-pocket payments and protective mechanisms [2, 21, 22, 24]**

| Type of care | Co-payment | Uninsured services | Maximum payment | Protection measures | |
|---|---|---|---|---|---|
| Outpatient | Physician visit fee 1.2 EUR[a]; emergency visit fee 3.5 EUR; co-payments for dental care and medical aids | Some dental procedures, orthopaedic products, services on patient's request | An annual maximum for physician and prescription fees and medication co-payments (until the amount of the cheapest medication co-payment): basic (192 EUR); lowered for younger than 18 and older than 65 (96 EUR)[d] | Children younger than 18 excluded from physician visit fee[e] | Exempted only from fees: individuals below subsistence income level; in orphanages, sanatoriums; retirement homes with monthly income below 31 EUR |
| Drugs | Prescription fee 1.2 EUR[b]; various flat rates for a package | Non-essential drugs (e.g. diarrhoea, stomach pain); contraception | | NA | |
| Inpatient | Inpatient stay fee 2.3 (3.8) EUR[c] | Luxury hotel services | NA | Newborns excluded from inpatient stay fee | |

*Descriptions:* [a] applied between 2008–2014; [b] applied between 2008–2014 (since 2012 the fee of 30 CZK is paid no more for an item on prescription however for a prescription); [c] applied between 2008–2013 (inpatient fee increased to 3.8 EUR since 2012); [d] a lower OOPP maximum implemented in 2009; [e] the exemption for children implemented in 2009; NA = not available.

## Materials and methods

### *Data*

The analysis is based on the data from the Household Budget Survey, which is regularly conducted by the Czech Statistical Office on a representative sample of Czech households. The observed period is the years 2007–2014 with the following sample sizes: $N_{2007}$ = 2963, $N_{2008}$ = 2934, $N_{2009}$ = 2901, $N_{2010}$ = 2932, $N_{2011}$ = 2904, $N_{2012}$ = 2896, $N_{2013}$ = 2909 and $N_{2014}$ = 2888. The basis of the observation is a household included in the main sample (the supplementary samples included in the years 2007–2010 were excluded from the analysis).

We observe the OOPP burden expressed as the amount of OOPP per person per month in CZK (an absolute definition) and as the share of net income spent on OOPP per month in % (a relative definition). The following categories of OOPP are taken into account: prescribed medication, prescription fees, over-the-counter (OTC) medication, outpatient care, outpatient fees, outpatient services, dental care, dental fees, inpatient care, inpatient fees, orthopaedic/therapeutic products and other health products. The total sum of OOPP is adjusted by refunds from health insurance companies as a result of reaching the OOPP maximum limit within the observed period.

### *Methods*

First of all, an analysis of the total OOPP burden in the years 2007–2014 in both absolute and relative definitions is provided. Attention is paid to the whole sample, households with a member aged 65+ and households with children. The changes in the burden are compared across time. In order to see which type of health care service influenced the burden, a breakdown of the burden for particular health care services is further conducted for the whole sample, households with a member aged 65+ and households with children. All the monetary variables used are adjusted for inflation using the Consumer Price Index (CPI) for the base year 2015 (2015 = 100) released by the Czech Statistical Office [25]. A calibrated weighting variable (PKOEF) is used for inference from the sample to the target population of households.

A regression analysis is applied to estimate factors influencing the burden. We used an Ordinary Least Square Method (OLS) using robust standard errors. Using robust standard errors enables us to handle violation of the assumption of normality and homoscedastic residuals, which is a common problem with health expenditure data and enables us to derive robust estimates of standard errors and confidence intervals for estimates of regression coefficients [26].

The relative definition of the burden is used as a dependent variable in our models. In model 1 the share of net income spent on OOPP is used. Model 2 employs the share of net income spent only on user fees as the dependent variable. Model 2 is run in order to evaluate the magnitude of the user fees burden across time.

In identifying the most suitable independent variables for the models, we start from the theoretical concepts of demand for health care [27], previous empirical studies [9, 10, 28–31] and the survey design [32]. Several models combining various explanatory variables were run and the eligibility was compared. Considering the correlations between dependent and explanatory variables and testing for multicollinearity between explanatory variables, the final models include the following set of variables: basic socio-demographic characteristics include gender and education (both related to the head of household) and are further extended by variables: presence of children in the household (households with dependent children), household size (distinguishing one-person households), and region of residence (14 regions in the Czech Republic). Previous research identified households with members aged 65+ as one of the most vulnerable groups [13, 14, 29, 30] and many policies also target protecting the elderly

(65+). In order to estimate the situation of the elderly we included a variable of elderly presence in the household in the model. This variable also serves as a proxy for age and the status of being a pensioner (direct inclusion of the age and pensioner variable is not suitable as multicollinearity is present). Unemployment is one of the important factors directly related to budget constraints economically active households might have. Therefore, the variable of unemployment is included (households receiving unemployment benefits are labelled as unemployed). As OOPP are the most regressive way to pay for health care (influence the poorest), equalised income quartiles are constructed.

Household budget survey data do not include information on health status or health consumption, but this is a highly relevant factor for the OOPP burden. We expect that these households will have a higher OOPP burden. In order to cope with this issue we implemented a proxy variable for health status/consumption in the model. We constructed a variable of morbidity reflecting whether a household receives sickness benefits or sickness pay in the observed periods. However, the power of the information has to be taken cautiously as this variable is related only to the working population. Another proxy for morbidity might be the presence of the elderly (65+) in the household, because with increasing age more people live with a health problem [33].

Region of residence might have an effect on the burden, especially due to the health care provider network, availability of services, regional government health policies and the social and economic development of the region. Furthermore households in 14 Czech regions were distinguished. When evaluating the effects of the burden across time, a dummy variable for each observed year is included. A set of variables is presented in Table 3.

**Table 3 – Set of independent variables**

| Variable | Description |
|---|---|
| Gender | A dummy variable for household head: female = 1, male = 0 |
| Education | A categorical variable for education:<br>basic; if household head has basic/no education = 1, otherwise = 0<br>secondary; if household head has completed secondary education = 1, otherwise = 0<br>tertiary; if household head completed tertiary education (bachelor's degree and higher) = 1; otherwise = 0 |
| Children | A dummy variable: if household with children younger than 18 = 1, otherwise = 0 |
| One-person household | A dummy variable: if one-person household = 1, otherwise = 0 |
| Unemployment | A dummy variable: if receiving unemployment benefits = 1, otherwise = 0 |
| Elderly presence | A categorical variable:<br>elderly_65; if both partners are aged 65 or over = 1, otherwise = 0<br>elderly_p65; if one partner aged 65 or over and other partner younger = 1, otherwise = 0<br>youngish; if both partners younger than 65 = 1, otherwise = 0 |
| Income | A categorical variable for income quartiles:<br>Quartile 1 (poorest)<br>Quartile 2<br>Quartile 3<br>Quartile 4 (richest) |
| Morbidity | A dummy variable: if receiving sickness benefits/sick pay = 1, otherwise = 0 |
| Region | A categorical variable for regions: if Central Bohemia = 1, otherwise = 0; if Hradec Králové = 1, otherwise = 0; if Karlovy Vary = 1, otherwise = 0; if Liberec = 1, otherwise = 0; if Moravian-Silesian = 1, otherwise = 0; if Olomouc = 1, otherwise = 0; if Pardubice = 1, otherwise = 0; if Plzeň = 1, otherwise = 0; if Prague = 1, otherwise = 0; if South Bohemia = 1; otherwise = 0; if South Moravia = 1; otherwise = 0; if Ústí nad Labem = 1; otherwise = 0; if Vysočina = 1; otherwise = 0; if Zlín = 1; otherwise = 0 |
| Year | Dummy variables: if 2007, year = 1, otherwise = 0; if 2008 = 1, otherwise = 0; if 2009 = 1, otherwise = 0; if 2010 = 1, otherwise = 0; if 2011 = 1, otherwise = 0; if 2012 = 1, otherwise = 0; if 2013 = 1, otherwise = 0; if 2014 = 1, otherwise = 0 |

The software IBM SPSS Statistics 24 was used for data processing and the analyses.

## Results

In 2007, the burden was lowest due to non-existing user fees. It sharply increased in 2008 and oscillated around the same figure with the turn in 2012 when the burden dropped. Some mild differences in the trend can be observed between different types of household. Households with members aged 65+ spent most money in absolute and relative terms. After user fees implementation, they faced the highest increase in the burden. It is worth mentioning that after a very mild decrease between 2009 and 2011, in 2012 their relative burden jumped to the level of 2008 and the absolute burden was among the highest in the observed period. Households with children had a more than twice lower burden compared to the elderly (65+), and from 2010 the burden reached around the same value (Table 4).

**Table 4 – Overview of the OOPP burden in the years 2007–2014 (absolute and relative burden – monthly averages)**

| Year | All households | | Households with a member aged 65+ | | Households with children | |
|---|---|---|---|---|---|---|
| | Per person [CZK] | Share of income [%] | Per person [CZK] | Share of income [%] | Per person [CZK] | Share of income [%] |
| 2007 | 273 | 2.17 | 367 | 3.25 | 156 | 1.54 |
| 2008 | 330 | 2.61 | 461 | 4.06 | 190 | 1.86 |
| 2009 | 330 | 2.53 | 462 | 3.89 | 188 | 1.78 |
| 2010 | 335 | 2.53 | 486 | 3.97 | 178 | 1.69 |
| 2011 | 334 | 2.49 | 490 | 3.82 | 173 | 1.70 |
| 2012 | 336 | 2.57 | 508 | 4.06 | 177 | 1.74 |
| 2013 | 317 | 2.45 | 480 | 3.86 | 164 | 1.62 |
| 2014 | 320 | 2.41 | 460 | 3.59 | 180 | 1.69 |

In order to analyse the development in more detail, a breakdown of OOPP burden was done for all types of household mentioned. The results are given in Table 5. The overall burden is highest for households with members aged 65+ for the majority of observed health care types, especially for drugs. The elderly also spend high amounts on dental care and inpatient care (including inpatient care fees) compared to other households. Households with children faced a relatively higher burden for outpatient care, but not for outpatient care fees relative to other households.

Focusing on changes in the OOPP system exemptions from payments of outpatient care fees which were implemented for children in April 2009, in our results we can observe a drop in outpatient care fees for households with children in 2009, followed by a decline in 2010 and further development of the same trend until 2014.

In the same period, the OOPP maximum was lowered for children and the elderly (65+). Regarding households with children, relevant expenditure for prescribed drugs and prescription fees had a decreasing trend, but the expenditure steadily decreased from 2008 to 2014 anyway. Conversely, OTC drugs had an increasing trend and in 2014 reached the highest amount across the observed period. We might speculate that households with children substituted prescribed drugs for OTC drugs, or in other words, compensated for savings in prescribed drugs with OTC drugs.

It does not seem that the OOPP maximum implementation would help the elderly immediately after implementation regarding sustaining expenditure on prescribed medication. An increase in co-payments for prescribed medication is observed from 2010, even if after prescription fee implementation expenditure dropped in 2008 and 2009 compared to 2007. On the other hand, outpatient fees (only physician fees are included in the maximum) and prescription fees had a steadily decreasing trend from 2008. Regarding prescription fees, a faster decrease has been observed since 2012 when a fee of 30 CZK was no longer paid per item on prescription but per prescription. A decrease in the prescription fee in 2013 and 2014 was surely supported by the policies of pharmacies, which, as part of competition, started to compensate for the prescription fees from their profit margins.

In terms of magnitude of burden, inpatient care fees had the highest impact on the elderly. After the increase in the inpatient fee in 2012 (no maximum limit was applied), a sharp increase in the burden was clear. The fee was cancelled in 2014, and we can see that the overall relative burden on the elderly was much lower than in 2008 and approached the level of 2007.

Estimation of factors affecting the OOPP and fee burden is provided in Table 6. Female gender is a significant predictor of a higher OOPP burden, as well as education. The higher the education the more households spent on OOPP. The results showed that people living alone (one-person households) also face a higher burden. On the other hand, households with children spent a lower share of their income on OOPP. The most powerful contributor to the OOPP burden is the presence of the elderly in the household. Households where at least one partner is aged 65 or over spent 1.25 p.p. ($p > 0.001$) more compared to households with younger members. Even households where both partners were aged 65 faced a one third higher burden (1.86, $p > 0.001$). The results confirm the regressive character of OOPP – comparing the richest fourth quartile to poorer quartiles the share of income spent on OOPP increases. Thus, poor households spent significantly more than richer households. Receiving unemployment benefits was not found to be a significant predictor of the OOPP burden.

Receiving sickness benefits/pay, in other words, having any health problem is related to a higher OOPP burden (0.37; $p > 0.001$).

The results confirmed that there are differences between regions. Compared to the capital Prague, households from 9 out of 13 regions had a significantly lower burden. The least was spent by households from the Moravian-Silesian and Ústí nad Labem regions.

Evaluating changes across time in all the observed years, the burden was higher compared to the reference year 2007. The highest burden was in 2008, with a decreasing trend to 2011. After an increase in 2012, the burden sharply dropped in 2013 and was only slightly higher in 2014 compared to initial year of 2007.

Focusing only on the user fees burden, the patterns are very similar. An exception is education. There are no significant differences between higher and lower education,

**Table 5 – Breakdown of OOPP for all households, households with a member aged 65+ and households with children (in CZK per person and month)**

| Item | Type of household | Year | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
| Drugs on prescription | Total | 80 | 79 | 73 | 79 | 81 | 78 | 69 | 67 |
| | 65+ | 150 | 130 | 123 | 136 | 144 | 138 | 123 | 113 |
| | Children | 35 | 42 | 37 | 37 | 36 | 34 | 29 | 28 |
| Prescription fee | Total | – [a] | 26 | 21 | 20 | 19 | 13 | 9 | 6 |
| | 65+ | – [a] | 53 | 44 | 40 | 39 | 26 | 18 | 12 |
| | Children | – [a] | 9 | 7 | 6 | 6 | 5 | 3 | 2 |
| OTC drugs | Total | 88 | 78 | 89 | 87 | 94 | 97 | 100 | 101 |
| | 65+ | 116 | 99 | 110 | 114 | 122 | 132 | 137 | 139 |
| | Children | 57 | 51 | 59 | 56 | 59 | 59 | 63 | 68 |
| Therapeutic appliances and equipment | Total | 41 | 39 | 43 | 44 | 40 | 38 | 36 | 39 |
| | 65+ | 40 | 42 | 42 | 61 | 52 | 50 | 53 | 55 |
| | Children | 24 | 24 | 26 | 25 | 21 | 19 | 18 | 22 |
| Other medical products | Total | 4 | 4 | 4 | 7 | 4 | 3 | 3 | 4 |
| | 65+ | 4 | 4 | 4 | 9 | 5 | 4 | 5 | 7 |
| | Children | 4 | 4 | 4 | 4 | 3 | 2 | 3 | 3 |
| Outpatient care | Total | 13 | 12 | 13 | 17 | 14 | 17 | 18 | 18 |
| | 65+ | 6 | 6 | 7 | 12 | 10 | 15 | 17 | 13 |
| | Children | 15 | 12 | 16 | 12 | 14 | 19 | 14 | 15 |
| Outpatient care fee | Total | – [a] | 20 | 17 | 16 | 16 | 15 | 15 | 15 |
| | 65+ | – [a] | 30 | 28 | 26 | 27 | 26 | 25 | 25 |
| | Children | – [a] | 13 | 8 | 6 | 6 | 6 | 5 | 6 |
| Dental care | Total | 31 | 39 | 38 | 40 | 43 | 37 | 41 | 51 |
| | 65+ | 27 | 36 | 44 | 44 | 48 | 42 | 55 | 65 |
| | Children | 16 | 18 | 19 | 19 | 18 | 19 | 19 | 28 |
| Dental care fee | Total | – [a] | 5 | 5 | 3 | 2 | 2 | 2 | 2 |
| | 65+ | – [a] | 4 | 9 | 3 | 3 | 3 | 3 | 3 |
| | Children | – [a] | 5 | 2 | 2 | 1 | 1 | 1 | 1 |
| Outpatient services | Total | 4 | 4 | 5 | 3 | 4 | 5 | 4 | 6 |
| | 65+ | 5 | 4 | 4 | 3 | 3 | 4 | 4 | 7 |
| | Children | 2 | 4 | 3 | 3 | 3 | 3 | 3 | 5 |
| Inpatient care | Total | 11 | 10 | 9 | 11 | 8 | 12 | 6 | 10 |
| | 65+ | 19 | 22 | 20 | 22 | 17 | 31 | 11 | 23 |
| | Children | 4 | 3 | 2 | 4 | 2 | 2 | 1 | 2 |
| Inpatient care fee | Total | – [a] | 15 | 13 | 10 | 11 | 20 | 15 | 1 [b] |
| | 65+ | – [a] | 31 | 28 | 20 | 24 | 41 | 32 | 1 [b] |
| | Children | – [a] | 6 | 5 | 5 | 5 | 8 | 6 | 0 |

*Note:* [a] no user fees in 2007; [b] no inpatient care fee from 2014, but there were additional payments for inpatient stays at the end of the previous year, therefore the average amount is 1 CZK in 2014.

however, there is a difference between lower and secondary education. Based on the estimation, households with lower education faced a slightly higher user fees burden. Fewer regions showed a statistically significant difference compared to Prague, nevertheless if significant, these regions faced a mildly lower fee burden than Prague. The lowest fee burden was found in the South Bohemian region. It is obvious from the results that the user fee burden dropped over time and this trend was in accordance with the total OOPP burden development.

## Discussion

The results showed that OOPP have a diverse impact on the burden of household budgets. The impact differed between households but the trend was consistent – the burden had a decreasing tendency over the observed period. It was shown that some changes in user fee payments had an important impact on the burden. It is worth mentioning the inpatient fee. After its increase, the burden was raised especially for the households of the elderly. As there was no limit for the inpatient fee, the subsequent cancellation of the fee was an important step for those households. The effect of the protective mechanism in the form of the OOPP maximum is not clear. It seems that for households of the elderly there were no obvious benefits regarding co-payments for prescribed medication. This suggestion might be confirmed by the official data about the number of patients who reached the OOPP maximum and received returned payments above the threshold (around 2.5 % in 2014) [34].

**Table 6 – Estimation of factors affecting the OOPP and the fee burden**

| Dependent variable | Model 1 OOPP burden | Model 2 Fees burden |
|---|---|---|
| Adjusted R square | 0.134 | 0.170 |
| | 1.295[c] | 0.320[c] |
| Const (intercept) | 1.295[c] | 0.320[c] |
| | (0.068) | (0.020) |
| Female | 0.317[c] | 0.054[c] |
| | (0.043) | (0.011) |
| Secondary education | 0.208[c] | –0.030[b] |
| | (0.033) | (0.009) |
| Tertiary education | 0.546[c] | 0.015 |
| | (0.059) | (0.015) |
| Household with children | –0.513[c] | –0.138[c] |
| | (0.032) | (0.008) |
| One-person household | 0.262[c] | 0.050[c] |
| | (0.051) | (0.012) |
| Both elderly 65+ | 1.864[c] | 0.520[c] |
| | (0.070) | (0.022) |
| One elderly 65+ | 1.250[c] | 0.327[c] |
| | (0.053) | (0.014) |
| 1st income quartile | 0.863[c] | 0.296[c] |
| | (0.049) | (0.012) |
| 2nd income quartile | 0.713[c] | 0.212[c] |
| | (0.045) | (0.012) |
| 3rd income quartile | 0.332[c] | 0.089[c] |
| | (0.041) | (0.007) |
| Unemployed | –0.079 | –0.006 |
| | (0.054) | (0.012) |
| Morbidity | 0.367[c] | 0.142[c] |
| | (0.034) | (0.010) |
| Central Bohemia | 0.046 | 0.026 |
| | (0.070) | (0.019) |
| Zlín | –0.049 | 0.036 |
| | (0.090) | (0.029) |
| Pardubice | –0.078 | –0.031 |
| | (0.091) | (0.021) |
| Vysočina | –0.109 | –0.042[a] |
| | (0.080) | (0.019) |
| Olomouc | –0.165[a] | –0.044[a] |
| | (0.075) | (0.019) |
| Liberec | –0.169[a] | –0.018 |
| | (0.085) | (0.023) |
| South Moravia | –0.226[b] | –0.040[a] |
| | (0.069) | (0.018) |
| Hradec Králové | –0.227[b] | –0.014 |
| | (0.080) | (0.026) |
| Plzeň | –0.256[b] | 0.015 |
| | (0.083) | (0.027) |
| South Bohemia | –0.358[c] | –0.084[c] |
| | (0.074) | (0.019) |
| Karlovy Vary | –0.371[c] | –0.032 |
| | (0.086) | (0.022) |
| Ústí nad Labem | –0.407[c] | –0.050[a] |
| | (0.072) | (0.020) |
| Moravia-Silesia | –0.443[c] | –0.037[a] |
| | (0.065) | (0.017) |
| y.2008 | 0.414[c] | Reference category |
| | (0.058) | |
| y.2009 | 0.345[c] | –0.098[c] |
| | (0.056) | (0.019) |
| y.2010 | 0.332[c] | –0.165[c] |
| | (0.056) | (0.016) |
| y.2011 | 0.283[c] | –0.174[c] |
| | (0.053) | (0.016) |
| y.2012 | 0.342[c] | –0.154[c] |
| | (0.061) | (0.019) |
| y.2013 | 0.197[c] | –0.240[c] |
| | (0.053) | (0.017) |
| y.2014 | 0.123[a] | –0.388[c] |
| | (0.054) | (0.014) |

*Note:* In brackets – robust standard error; reference categories: male, basic education, no elderly 65+, 4th income quartile (richest households), Prague, y.2007.
[a] Significance level at 5%.
[b] Significance level at 1%.
[c] Significance level at 0.1%.

In our analysis we identified several significant predictors for a high OOPP burden. Our finding about a higher burden for women in the Czech Republic corresponds to conclusions of studies from other countries [9, 13, 29]. The higher burden is mostly explained by the higher health care consumption of women (birth control, pregnancy and childbirth) but also by lower income (women earn less on average, have the role of caregivers in households and thus might be longer economically inactive) [35]. In our data, gender does not represent only the gender dimension because only the gender of household head is observed. However, it is mostly a sign of an incomplete family (one-parent household) according to the survey's methodology.

The impact of education on the OOPP burden partly contradicts previous studies where households with lower education were identified as vulnerable households [9, 10, 13, 28, 29]. We found that the overall OOPP burden is higher for the more educated, increasing with the level of education. However, regarding the user fees burden, households with lower education spent relatively more compared to households with secondary education. How can we explain this fact? First of all, the majority of cited studies concentrated on catastrophic health payments, thus, on groups with relatively high payments (mostly defined as at least 5% of household income). These households mostly belonged to the poorest households and the concentration of lower education was common [5, 11–13]. It is expected that people with lower education earn less than those with higher education. On the other hand, according to the Grossman concept of demand for health, education increases efficiency, thus, also efficiency in health production [36]. Moreover, education may suggest what the lifestyle and thus health care consumption

behaviour of a household may be [37]. It is claimed that more educated people spend more on preventive services and noncritical conditions [27]. Whilst the less educated may tend to spend more at the point of use (therefore, in our case they have a higher user fee burden in the user fee burden model). Controlling for other OOPP types, our assumption is confirmed. Only the user fee burden is higher for the less educated, while prescribed medication did not show a significant difference, and all other OOPP components showed a positive relationship with increasing education.

The regressive character of OOPP is obvious for both total burden and user fees burden and it corresponds to conclusions of other studies [6–9]. This finding supports the thesis that protection from high OOPP should be related to income, and an income threshold for maximum payments should be set should we want to improve the protection of poorer households.

Even if the OOPP maximum for some payments is applied to individuals aged 65+ in the Czech Republic, the elderly still face the highest burden and this is more serious where more elderly people live in the household. Conversely, protection for households with children seems to be sufficient as households with children showed a lower OOPP and user fee burden than households without children.

In accordance with our expectations, having any health problem is related to a higher OOPP burden. The finding that morbidity increases the burden was confirmed elsewhere [38]. Thus, it seems to be desirable to target protection for particular diseases. Being aware of the fact that the elderly suffer from a greater number of diseases [39, 40] leads us back to increased protection for the elderly.

The findings about regions are not straightforward, but it is obvious that households in Prague spend a higher share of their income on OOPP. The share is lower in other regions, which may show that health care services are cheaper outside Prague and/or that because Prague is the richest region with the lowest unemployment rate and highest gross income households can afford to spend more. The lowest share is in the regions with the highest unemployment rate and lower gross income (Moravian-Silesian and Ústí nad Labem regions) [41] which can, conversely, suggest that households from these regions might be cautious about their spending and cannot afford to spend such amounts on OOPP. If this was true it would support the idea of protection related to household income. Nevertheless, further research focused on this issue is necessary.

A positive finding is that there has been a clear decrease in the burden since 2008 and on average the level of OOPP has almost dropped to the level of 2007. This we attribute to modifications in user fees – the cancellation of the prescription fee for each item on the prescription and the inpatient fee. Since 2015, only the less frequent emergency fee has been paid and no other changes in the cost sharing scheme have been implemented. Therefore we can expect that the burden has further dropped.

## Conclusion

The OOPP burden increased after the implementation of new user fees in the Czech Republic from 2008. As the various exemptions and changes took place between 2008 and 2014 the overall OOPP burden of households changed, but the differences between households remain. However, the burden is not equitably distributed, and nor was it even before the implementation of user fees. The burden is highest for households of the elderly (households with members aged 65 and over), while conversely households with children which are often mentioned as a vulnerable group and protected from high health payments showed a much lower burden and as such are not a predictor for a high OOPP burden.

A positive conclusion is that the OOPP burden has shown a decreasing trend in recent years, and the latest data would probably confirm a further decrease as the majority of user fees were cancelled in 2015.

A non-positive finding is that the protection of the poor and the elderly is not sufficient in the Czech Republic. Even if some protective features are implemented in the system they are not working as effectively as one would expect, especially if the objective of social and health policy is to support equity in health financing (and health care access) and protect the most vulnerable. The modifications in user fees have decreased the household burden, but it is obvious that poor households and households of the elderly still face a higher burden. It is not clear which changes occur in the health care system in the future, but it is not impossible that OOPP will increase. In this case, it would be highly desirable to reassess current protection mechanisms and target protection better at the elderly and especially households with lower incomes.

Evaluating the burden is a complex issue and various aspects could be analysed in more detail. Some aspects outlined in the discussion would be worth exploring more comprehensively (effects of education, differences in regions, efficiency of the OOPP maximum, etc.). Even if it is beyond the scope of the presented paper, there is potential for further research. The Household Budget Survey is a suitable source of data for exploring household expenditure (health expenditure). However, it would be desirable to have some information in more detail or in a more suitable design, and many relevant variables related to health status and health care consumption are not observed in the survey. Nevertheless, we find it extremely important, despite the limitations, to analyse and assess the burden from the perspective of socio-economic determinants and its development over time. The findings provided can make a contribution for policy makers and further the direction of health care (cost sharing) policy.

## Conflict of interests

The authors have no conflict of interest to disclose.

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