# University of Innsbruck

# What drives out-of pocket health expenditures of private households? Empirical evidence from the Austrian household budget survey

Alice Sanwald, Engelbert Theurl

**Working Papers in Economics and Statistics**

2014-04

# What drives out-of pocket health expenditures of private households? - Empirical evidence from the Austrian household budget survey

ALICE SANWALD[†]    ENGELBERT THEURL[‡]

### Abstract

Out-of-pocket health expenditures (OOPHE) are a substantial source of health care financing even in health care systems with an established role of prepaid financing. The empirical analysis of OOPHE is challenging, because they are fixed in an interaction with other sources of health care financing. We analyze to what extent a set of socio-economic and socio-demographic covariates of private households influences the OOPHE-patterns in Austria. Our empirical research strategy is guided by the approach Propper (2000) used to study the demand for private health care in the NHS. We use cross-sectional information provided by the Austrian household budget survey 2009/10. We apply a Two-Part Model (Logit/OLS with log-transformed dependent variable or Logit/GLM). We present results for total OOPHE and for selected OOPHE-subcategories. Overall, we find mixed results for the different expenditure categories and for the two decision stages. Probability & level of OOPHE increase with the household size and the level of education, while household income shows mixed results on both stages. Private health insurance and OOPHE seem to be complements, at least for total OOPHE and for OOPHE for physician services, while this relationship is insignificant for pharmaceuticals. Different forms of public insurance have an effect on the total OOPHE-level, for physician services and pharmaceuticals on both stages. To some extent the participation decision is influenced in a different way compared to the intensity decision. This is especially true for age, sex, household structure and the status of retirement. It turns out, that the explanatory power of the used variables is low for OOPHE for pharmaceuticals. A splitting up of pharmaceuticals into prescription fees and direct payments gives better insights into the determinants. We conclude: It is necessary to investigate subcategories of OOPHE. It also turns out, that systematic covariates explain only a very small part of the variation in the OOPHE-patterns. Finally, we also conclude that information on OOPHE from general household budget surveys are of limited value when studying the determinants.

---

[†]University of Innsbruck, Department of Economics and Statistics, Universitätsstrasse 15, A-6020 Innsbruck, Austria: E-Mail: Alice.Sanwald@uibk.ac.at

[‡]University of Innsbruck, Department of Economics and Statistics, Universitätsstrasse 15, A-6020 Innsbruck, Austria, E-Mail: Engelbert.Theurl@uibk.ac.at

# 1   Introduction

There exists a quite voluminous empirical literature on the determinants of health expenditures, primarily based on between country comparisons (Chernew and Newhouse, 2012). These studies mainly focus on total health expenditures and/or on their public part in order to answer questions about total or public resources devoted to health care and to evaluate the macroeconomic efficiency of health spending. Much less research has been done on private health expenditures, especially on out-of-pocket health care expenditures (OOPHE). This contradicts with the economic significance of this form of health care financing in reality. OOPHE are substantial. This is especially true in a worldwide perspective. Roughly 40 percent of the total health care bill is financed out of this source, in several world regions the OOPHE-share is up to 60 - 70 percent of the total health care bill (Köhlmeier, 2012). In a sample of OECD-countries the share of OOPHE on total health care spending is close to 20 percent (OECD-Health-Data (2013), see also figure 1).

But OOPHE are not only important from a fiscal perspective, they also have important consequences for the economic welfare. Illness poses a multiple threat to the economic wellbeing of individuals. It directly reduces utility and in many cases lowers the benefits from consuming other goods. It negatively affects the earning capabilities resulting in lower possibilities of consumption. Finally, treatment of bad health causes health expenditures which on their part further reduce the funds to consume other necessities & amenities of life. If individuals are risk averse they will demand risk pooling mechanisms to smooth their consumption path - either on the private insurance market and/or in the political arena. Avoiding OOPHE by prepaid plans seems to have a high potential for Pareto-improvements. It is also well known from empirical studies that a major reliance on OOPHE is likely to have a regressive impact on the income distribution (Wagstaff and Van Doorslaer, 2000). In addition, OOPHE act as a barrier for health care use and may have negative effects on the long term health status, especially for low income individuals (Newhouse and the Insurance Experiment Group, 1993). On the other hand, OOPHE might reduce the welfare loss caused by moral hazard behavior. In addition, if health insurance premiums include substantial loading fees above the fair premiums full insurance is no longer optimal at all even if no other market imperfections exist (e. g. moral hazard, adverse selection).

Any discussion of OOPHE needs an agreement on a working definition. OOPHE in reality cover a broad range of financing instruments. They are expenditures on health care services by individuals (households) in the form of direct payments to health care providers netted from reimbursements by prepaid plans. Using this broad definition we are able to define three types of OOPHE:

> Type 1: An individual is not covered by prepaid plans at all and has to pay the total health care bill directly (breadth of the prepaid plans)

Type 2: Although prepaid plans exist, parts of the health care services offered are excluded and have to be paid totally out-of-pocket (depth of the prepaid plans)

Type 3: The costs of the health care services covered are not financed completely by the prepaid plan (height of the prepaid plans). This type of OOPHE covers different forms of cost sharing (e. g. proportional cost sharing, coverage limits per health care service, absolute cost sharing)

There exist several reasons why surprisingly little scientific research work addresses the determinants of OOPHE, especially at the individual level. The definition of OOPHE given above reveals a few of them. We expect that the three types of OOPHE influence the individual decision to utilize the health care system differently.[1] This is even true within the different OOPHE-types. OOPHE of type 2 and especially type 3 are to some extent residual categories which accumulate in health care utilization within a public and/or private prepaid plan. Thus, the examination of the determinants of OOPHE requires a comprehensive model of health care utilization including all forms of financing and health care provision. Finally, the empirical basis offered by official statistical institutions to study the determinants of OOPHE at the individual level is rather poor. In many countries information on OOPHE (disaggregated by expenditure categories, e.g. inpatient care, outpatient care, pharmaceuticals) combined with reliable and relevant information on the socio-economic characteristics of individuals (households) is extremely scarce. Data on OOPHE derived from general consumer surveys often lack valid information of the latter type. Information from surveys on the health behavior and the health status of individuals do comparable well on the socio-economic characteristics of individuals (households), but as far as health care utilization is concerned they mainly focus on indicators of health care utilization in real terms (physician visits, hospital days) and not on health care expenditures. Even if they focus on health care expenditures, they do not differentiate between different OOPHE-types.

The following paper contributes to the literature in addressing the determinants of OOPHE on the household level. We study the determinants of OOPHE in Austria using cross-sectional information from the latest household budget survey 2009/10. No empirical work on this relationship is available at the moment. We are not only interested in the coefficients of the covariates which determine the OOPHE-level, we also want to gain insights whether the information from the household budget survey is an appropriate basis to study the proposed research question at all, an issue widely neglected in previous empirical research of OOPHE.

---

[1]Studies on the determinants of OOPHE in between country comparisons based on aggregated official data (OECD, WHO) are not able to differentiate between the different types of OOPHE mentioned in the text. The decision to use OOPHE as homogenous aggregate masks important differences between the countries.

The paper builds on the already existing empirical literature on the determinants of OOPHE using micro data mainly coming from consumer surveys. Briefly this literature is based on two traditions: (i) the health economics tradition and (ii) the consumer economics tradition. As far as the second approach is concerned, several papers study Engel Curves for private health expenditures (Leive and Xu, 2007). An important agenda of this type of papers is to analyze whether OOPHE have catastrophic effects on the economic welfare of the household (Xu et al., 2003). The papers of type (i) study OOPHE in different contexts of health economics and health politics. So Norton et al. (2006) study OOPHE in the US for elderly people. Chaze (2005) studies OOPHE in Switzerland using a Box-Cox indirect censoring model. Bilger and Chaze (2008) extent this model in order to analyze simultaneously health care consumption and insurance deductible choice in Switzerland. Matsaganis et al. (2009) present evidence on the performance of six alternative econometric estimators in studying OOPHE in Greece on the household level. Besides Bilger/Chaze also other authors study the effect of voluntary/obligatory public insurance on the level of OOPHE. Jowett et al. (2003) analyze the role of public voluntary health insurance on private health expenditures in Vietnam. Cuong et al. (2010) give evidence on the impact of compulsory health insurance on OOPHE in Vietnam. Jones et al. (2008) specifically focus on the role of the concession card on the OOPHE of private households in Australia.

The paper is organized as follows. Section 2 presents a brief overview of the institutional structure and the main characteristics of the Austrian health care system as far as this is necessary to follow our empirical strategy. Section 3 derives and describes the empirical approach used in the paper. Section 4 informs about the data basis. Section 5 presents the empirical results starting with an extended descriptive part on OOPHE in Austria. In section 6 we discuss several limitations and give conclusions.

# 2 The institutional setting of the Austrian health care system

In the next two sections we provide a stylized framework of the individual decision to make OOPHE in the Austrian health care sector. Such a framework has to include two building blocks: (i) the description of those characteristics of the Austrian health care system which predetermine the consumption decision and the utilization paths and (ii) the elaboration of an economic perspective, which allows the identification of possible OOPHE-determinants and their empirical estimation.

We start with building block (i). Basically the Austrian health care system is a two tiered health care system. The public health insurance system represents the first tier. Membership in this system is obligatory not only for wage earners in the public and

private sector, but also for self-employed persons (including farmers) and individuals receiving a pension from a public pension fund.[2] Individuals with family ties to obligatory insured persons and without own public insurance coverage obtain free insurance coverage. Overall, the public health insurance system covers around 99.3 percent[3] of the whole population, excluding only marginal groups from public health insurance. It is mainly financed by income related contributions paid by employers and employees. These contributions are the sole source of financing public outpatient care, while public inpatient care is additionally co-financed by the states and the communities out of taxes (Theurl, 2007). Private health insurance and OOPHE constitute the second tier of the Austrian health care system. Roughly 35 percent[4] of the population has signed contracts with private sickness funds, which predominantly offer additional coverage to the first tier services and/or improve the possibility to choose from a broader portfolio of providers within the system. The range/level of services financed by the public health insurance system and the states is fixed in benefit catalogues agreed between providers and financing institutions. These benefit catalogues are quite comprehensive and include almost all services which are state of the art.

Basically outpatient health care services are supplied by physicians having a contract with the public health insurance system and by private physicians. The spatial distribution of contracted physicians, which form the nucleus of public outpatient health care provision, is based on a location plan agreed between the public health insurance system and the Chamber of Physicians. Contracted physicians generate income from fee-for-services and lump-sum-payments. In contrast to contracted physicians, their private counterparts are free to choose their practice location. Their remuneration is agreed between the doctor and the patient, mainly based on a fee-for-service system.

Public inpatient health care services (including outpatient services of hospitals) are supplied by public hospitals financed on a DRG-basis (Theurl, 2007). Private inpatient health care services are offered by private - non-profit or profit - hospitals and by private departments of public hospitals.

Patients with public health insurance coverage are basically free to consult public or private health care providers. While the utilization of public health care services is based

---

[2]Thereby the public health insurance consists of different sickness funds with limited autonomy. They are separated by territorial and occupational characteristics. Workers in the private sector (76 % of the population) are covered by nine sickness funds operating at the level of the nine provinces (named GKK in the tables). Farmers (4 %; sickness fund named SVB), employers (8 %; sickness fund named SVA), public workers (8 %; sickness fund named BVA) are covered by nationwide operating insurance institutions. The picture is completed by insurance funds on the firm basis ('Betriebskrankenkassen').

[3]The information is taken from OECD-Health-Data (2012). Previous more detailed studies on this topic come up with slightly lower figures. Reliable information on the quality of health insurance coverage and the access to health care services for the missing 0.7 % is not available.

[4]Information from 2012, for details see Versicherungsverband-Österreich (2013). This share is quite stable over time.

on a benefit-in-kind-scheme with only limited cost-sharing elements,[5] treatment costs in the private sector (i) have to be paid out-of-pocket, (ii) are born by the private sickness funds and/or (iii) by the public health insurance. The latter only finances parts of the services offered by private providers, essentially based on the benefit catalogue and the remuneration scheme for public health care institutions. So financing mode (iii) includes substantial cost sharing for the patients. Patients with private health insurance normally pay their providers directly and get their money back on agreed principles of the insurance treaty. Pharmaceuticals in inpatient care are part of the hospital remuneration within the DRG-system. In the outpatient care sector a positive list of pharmaceuticals exists which are paid by the public insurance system.

In the next section we will use the information on the institutional structure in Austria to derive a stylized model of health care utilization and to describe its consequences on the level of OOPHE. What seems already clear from this section: For 'normal' individuals (households) in Austria OOPHE are mainly a matter of depth and height of public and private prepaid plans and not a matter of their breadth.[6]

# 3 The empirical approach: A model of health care utilization decisions

Basically, the significance of OOPHE in health care systems can be studied in two different, but interrelated settings: (i) on the macro level and (ii) on the micro level. In studies of the first type important institutional characteristics of the health care system (e. g. the level and structure of taxes to finance public health care provision, social health insurance contribution rates, cost sharing schemes) are endogenous. In the health economics literature models of this decision situation are quite prominent. They are mainly used to explain expenditure shares (e. g. private vs. public, OOPHE vs. prepaid financing plans) in between country comparisons. In these models the share of OOPHE is not primarily a private decision. Consequently, one has to use a perspective which is able to explain the joint allocation of resources between OOPHE and prepaid plans. The expenditure shares are determined in a political economy model by the distribution of individual characteristics (e. g. morbidity distribution in the population, income distribution) and institutional features (e. g. progressivity of public health care financing). Several authors offer such approaches (Gouveia, 1997); more recently Li et al. (2012) offer an extended version of the Gouveia-model; For an overview of different aspects of these models see Barros and

---

[5]This is especially true for workers in the private sector and farmers. Public workers and employers face a proportional cost sharing of 20 percent. All individuals with public insurance are confronted with prescription fees for pharmaceuticals as well as substantial cost sharing for therapeutic aids (e.g. glasses, crowns, bridges).

[6]This statement is especially valid for the data basis we use in the empirical analysis. We expect, that the 0.7 % of Austrians which are without social health insurance are not part of our sample.

Siciliani (2011). Decision models on the micro level predominantly focus on the individual process of health care utilization, thereby assuming that important institutional characteristics of health care utilization are fixed exogenous (e. g. the service level and financing scheme of the public system).

In our context we study the level of OOPHE from a micro perspective. Thereby the essential institutional characteristics of the health care system are fixed by political decisions in the past and are therefore treated as exogenous. We use an approach of demand for medical care where different institutional options of care exist. This model goes back to Goddard and Smith (1998) and was used by Propper (2000) to study the demand for private health care in the UK. We adjust this approach to the institutional setting of the Austrian health care system as outlined in section 2.

Each individual[7] has four alternative pathways *(j=0,1,2,3)* through the Austrian health care sector with different consequences for OOPHE. Additionally, there exists an outside option not to use the health care sector in the case of illness at all. This clearly leads to zero OOPHE. There exist two possibilities to use the health care sector without OOPHE *(j=0)*. First, the individual consumes services offered by the public health care sector which are totally covered by public and/or private health insurance institutions. The second possibility is to use services of the private sector without any deductibles or direct OOPHE. The second pathway is cost sharing of type 3 *(j=1)*, when using the public and/or the private sector of the health care system. This means that the height of the prepaid systems is not complete. The third option *(j=2)* is the consumption of services, which are not included in the benefit catalog of the public and private prepaid plans. This leads to direct OOPHE and means that the depth of the prepaid plans is not complete (type 2). The last pathway *(j=3)* is a consumption which leads to a combination of type 2 and 3.

According to Propper the individual $i$ assigns each alternative pathway a latent net valuation depending on the characteristics of the individual e.g. the health status, willingness to pay, willingness to wait (Propper, 2000). The latent net valuation is given by $m_{ij} = f(X_i, R, Q, W_{ij}, p_{ij})$; $i = 1, ..., n$; $j= 0,1,2,3$ while the associated weight of each pathway is determined by the mentioned characteristics. $X$ is defined as a set of demographic and socio-economic variables including information on the associated public and private insurance coverage. The range of services in the total health care system $R$ is determined by the existing medical knowledge and the basic entry rules (e.g. market approval for pharmaceuticals). This range can be separated into i) services of the benefit catalogue of public health insurance system *R(P)* determined by political decisions and therefore exogenous in the case of health care consumption. Some individuals have signed a private health insurance contract. This contract already exists and therefore will be

---

[7]Although our data set is based on information on the household level, the actors in our model of health care utilization are individuals.

treated as exogenous in our decision making context. The benefit catalogue of private health insurance offers ii) services $R(PR)$ and we assume that $R(PR)$ includes the total range of $R(P)$ and additional services. In addition, we expect that the benefits $Q$ individuals derive from the services follow approved medical standards and do not depend on the mode of provision (e. g. private or public).[8] The consumption of health care services is combined with additional characteristics (e. g. waiting time, transport costs, anxiety, psychological costs, search costs) which are captured by $W$ and are seen as costs. In addition, we say that individuals may have to pay a direct price $p$ for consuming health care goods. This price $p$ takes the form of cost sharing and/or of direct out-of-pocket payments.[9] We expect that the latent net valuation increases with $R$ and $Q$ and decreases with $W$ and $p$. The household chooses the alternative with the highest level of net valuation, that is $m_{ij} = max(m_{i0}, m_{i1}, m_{i2}, m_{i3})$. Assuming that $X$, $R$ and $Q$ remain constant and $W$, $p > 0$ we can define the following scenarios of health care utilization and its consequences for type 2 and 3:

1. The individual will consume exclusively in the public sector, if (i) the services needed are within the range of publicly provided health care services $R(P)$, if (ii) $(W+p)$ of consuming in the publicly financed sector is lower than $(W+p)$ in the sector financed by private insurance and if (iii) $(W+p)$ of consuming in the public financed sector is lower than $(W+p)$ in the direct out-of-pocket provision mode. If there does not exist a private insurance contract, condition (ii) vanishes. If the conditions (i) - (iii) hold, OOPHE will be zero if no cost sharing arrangement exists *(j=0)*. Otherwise we will have OOPHE of type 3 from cost sharing *(j=1)*.

2. If (i) holds, but (ii) changes the signs and (iv) $(W+p)$ in the out-of-pocket-mode is higher than in the private insurance mode, than the individual will consume under the private health insurance regime. OOPHE may result out of consumption in the private health insurance regime, if cost sharing arrangements are valid *(j=1)*, otherwise OOPHE are zero *(j=0)*.

3. If (i) holds, but (ii) and (iii) change the sign, the individual will consume in the out-of-pocket-mode and this will lead to direct OOPHE *(j=2)*.

4. If the services needed are not within the range of publicly financed health care services $R(P)$, but they are covered by $R(PR)$ and if they fulfill preposition (iv), the individual will consume under the private health insurance regime. OOPHE will result if the utilization of the health care sector is combined with cost sharing *(j=1)*, otherwise *(j=0)*.

---

[8]The assumption is made to keep the comparison clearly presented.
[9]$p$ is relative to income. So the resource restriction is included in the optimization problem.

5. If the services needed are not within the range of publicly financed health care services $R(P)$, but they are covered by $R(PR)$, but preposition (iv) changes the sign, the individual will consume in the out-of-pocket-mode and this will lead to direct OOPHE *(j=2)*.

6. If the health care services are neither covered by $R(P)$ nor by $R(PR)$, then the individual will consume in the out-of-pocket-mode and this will lead to direct OOPHE *(j=2)*.

7. The pathway *(j=3)* results, if the individual simultaneously consumes multiple services of the previous listing.

Our stylized model makes clear that the institutional design of the health care system (range of services provided, prices, quality) fixes important cornerstones of the utilization pathways. Additionally, the probability of choosing one of the four pathways *(j=0,1,2,3)* depends on socio-economic characteristics of the individual (e. g. age, family status, opportunity costs of time, income, health status, distance to health care facilities, insurance status). In our empirical approach we use selected socio-economic characteristics to explain differences in OOPHE between households in Austria. Our data set shows the characteristics of data sets about health expenditures widely known in the empirical literature: skewness, excess zeros and heavy right tails. In our econometric approach we therefore use a Two-Part Model widely proposed in the health economics literature for similar empirical problems (Jones, 2000; Madden, 2008). The first stage of the model predicts the likelihood of any OOPHE and was specified as Logit. The second part predicts the level of spending, conditional on having non-zero OOPHE. For the latter part we use either an OLS model with log-transformed dependent variable or a GLM depending on the performance of the expenditure subgroups.

The probability of having positive OOPHE - either of type 2 or 3 or the combination of both - reduces to three different binary Logit models and can be defined in the following way:

$$Pr_{ij} = Prob[m_i = j | X_i] = \frac{exp(X_i' \beta_j)}{1 + exp(X_i' \beta_j)} \qquad \forall i = 1, ..., n; \quad j=1,2,3$$

$m_i$ ist the observed pathway individual $i$ has chosen; $X$ is a matrix of the socio-economic characteristics of the household, e. g. household structure, regional conditions, public insurance arrangements and additional private health insurance contracts, age, gender, household income and education level. Furthermore, the height of spending is also affected by the matrix $X$ with the included household variables. The conditional expenditure level can be summarized to:

$$E_{ij}[m_i | X_i, m_i = j] \qquad \forall i = 1, ..., n; \quad j=1,2,3$$

# 4 Data

To analyze OOPHE at the household level in Austria we use data from the household
budget survey 2009/10 conducted by the National Statistical Service Office, Statistics
Austria.[10] In Austria this periodically repeated survey (in the moment with a five year
interval) is primarily used to study the level and structure of private consumption of
households within the System of National Accounts and to calculate the inflation rate for
consumption goods. The observation unit is the private household without institution-
alized households (hospitals, long term care and jail). A household consists of a single
person or two or more persons living and consuming together in a flat or parts of a flat.
Temporary absent persons (for holidays, schooling) are part of the household, blood rela-
tionship has no significance to define a household. The total sample offered by Statistics
Austria consists of 6,534 households with 15,540 members, which means a return rate of
38.1 %. The exclusion of 747 households with undefined household or insurance structures
results in a final sample size of 5,787 households. For several reasons the sample is not
representative for the Austrian household structure. Therefore each household is assigned
a weight in order to establish representativeness of the sample to the Austrian population
(for details see Statistik-Austria (2011b)).

Information on the consumer behavior is gathered in two ways: (i) the diary approach
and (ii) the recall approach. Households participating in the survey are asked to fill in
a diary over 14 days in which they record every single expense. The system results in
52 overlapping weeks of bookkeeping (end of April 2009 - beginning of May 2010). This
method allows the representation of seasonal patterns and of specific consumption periods.
The recall approach is used for consumer durables and irregular/seasonal expenditures
within the last 12 months. 53 % of the overall consumption expenditures are based on the
information from the diary approach and 47 % on the recall method. As far as health ex-
penditures are concerned the following expenditure categories are collected following the
recall approach: therapeutic aids (in ophthalmology and dentistry, expenditures for spas,
rehabilitation centers and long term care institutions. In addition, households are asked
for expenses > EUR 300 in the last year by using the recall method (see Statistik-Austria
(2011a,c)). Important socio-economic characteristics of the household are gathered by
face-to-face interviews. All expenditures are controlled for plausibility und recalculated
into monthly expenditures. The health care expenditure catalog consists of pharmaceu-
ticals, medical products, physician services, dental services, hospital services, diagnostic
tests, long term care and health spas. Figure A1 in the appendix informs about the differ-
ent expenditure categories and the rules of aggregation. Several household expenditures
are not counted as consumption expenditures. So health expenditures, which are refunded

---

[10]We checked alternative data sources (e. g. EU-SILC, Mikrocensus, ATHIS, SHARE). The household
budget survey is the only data source which provides information about OOPHE for health care services
for private households in Austria at a micro level at all.

by public or private health insurance institutions, are not included as consumption expenditures, they are netted out. The monetary value of all expenditures is represented in Euros.

# 5  Results

## 5.1  Selected empirical insights into the role of OOPHE in Austria

We provide more extensive descriptive statistics beyond the simple summary statistics presented in empirical analyses normally to give better insights into the character and structure of OOPHE. Fig. 1 shows the significance of OOPHE in Austria in a comparison of selected OECD-countries in 2011 (or recent year).[11]
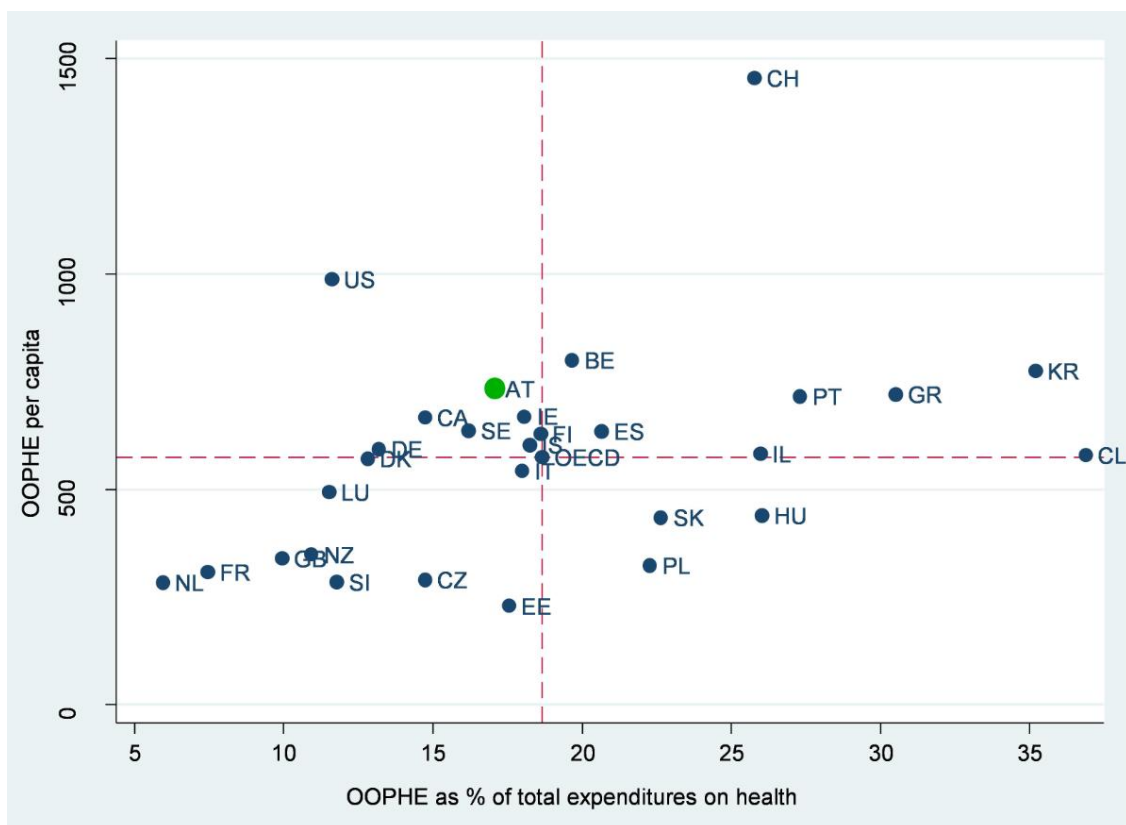


Figure 1: OOPHE - a comparison of OECD-states

The information is based on OECD-classifications and therefore not directly comparable with the data from the Austrian household budget survey. We demonstrate the significance of OOPHE by using two indicators: (i) OOPHE per capita (in PPP/US$) and (ii) OOPHE as share of total health care expenditures. Both indicators show a high degree of heterogeneity between OECD-countries. The unweighted OECD-average is 560

[11]Source: OECD-Health-Data (2013)

US$ on indicator (i) and 18.5 percent on indicator (ii). The values for Austria are slightly above the average for indicator (i) and slightly below the average on indicator (ii). In a time series perspective covering the period since 1995 the share of OOPHE on total health care expenditures in Austria is remarkable stable. OOPHE account for approximately 75 % of all private health expenditures. We observe also a high stability in a medium term perspective for the shares of total private consumption spend for health purposes. Based on the ESVG-1995 classification Austrian households currently spend 3.5 % of total private consumption out-of-pocket on health care goods ( Statistik-Austria (2013)).

Table 1 shows the structure of OOPHE for different categories based on the information from the Austrian household budget survey. The table reveals a very specific consumption structure of OOPHE widely differing from the structure of total health expenditures. The most important expenditure category belongs to therapeutic aids with 44 % of total OOPHE. 17 % of OOPHE are spent on pharmaceuticals, either directly or indirectly by paying the prescription fee in the public health insurance system. Inpatient care accounts for 4 % of OOPHE, which is extremely low. Table 1 also informs about the number of households with OOPHE > 0 in the observed period and the average expenditures per household.[12] We observe the expected picture that the share of households without OOPHE for physician and especially inpatient services is comparable high. The very low average OOPHE for inpatient services again points to the very specific role of OOPHE in the Austrian hospital sector. The specific role of OOPHE in the financing the Austrian health care system also becomes obvious when we compare the structure of OOPHE with the structure of the total current health expenditures in Austria (last column of table 1).[13] Roughly 70 % of total current health expenditures are spent for outpatient care (physician services 26 %) and inpatient care (inpatient services 45 %) while only 23 % of OOPHE are spent for these two main services of the health care sector. Only 5 % of total health expenditures are dedicated to therapeutic aids.[14]

Table 2 presents selected information on the relationship between OOPHE and household income. We will focus on the significance of income to explain the OOPHE-level of households more extensively later on in the paper. In this descriptive part we concentrate

---

[12]The number & share of households with OOPHE > 0 in the different expenditure categories also depend on the application of different forms of data collection. This is especially true for medical devices compared to expenditures for physician or hospital services. As mentioned the latter are collected using the diary approach while the information on medical devices are based on a recall system covering the expenditures of one year.

[13]We have to be cautious when comparing these two aggregates of expenditure categories. The data come from different sources and follow different classifications of expenditure categories. But even having in mind these problems they allow important conclusions on the specific role of OOPHE in the Austrian health care system.

[14]One could speculate whether the observed huge differences in the expenditure structure of OOPHE and total health expenditures are in line with normative criteria of equity and efficiency. But such a discussion is beyond the focus of the paper.

Table 1: The structure of OOPHE in Austria

| Expenditure categories | Total households | | Households with expenditures > 0 | | Total health expenditures |
|---|---|---|---|---|---|
| | Average exp. | Percentage | Average exp. | Number of HH | Percent |
| OTC pharmaceuticals | 11.05 | 10.51 | 41.01 | 1,559 | 13 |
| Therapeutic aids | 46.26 | 44.02 | 85.39 | 3,135 | 5 |
| Physician services | 19.74 | 18.79 | 192.97 | 592 | 26 |
| Inpatient services[1] | 3.99 | 3.80 | 51.18 | 451 | 45 |
| Other expenditures | 17.20 | 16.37 | 85.52 | 1,158 | 11 |
| Prescription fee | 6.85 | 6.52 | 34.47 | 1,150 | -[2] |
| Total OOPHE | 105.08 | 100.00 | 138.34 | 4,396 | 100 |

Notes: 1) Includes dental services. 2) Precription fees are not a health expenditure category in this expenditure classification. Source for the last column: Statistics Austria, Current expenditure on health by function of care and source of funding in Austria 2011.

only on the effect of OOPHE on the income distribution between households. This question is widely discussed in the health economics literature (Wagstaff and Van Doorslaer, 2000). While the empirical literature on this topic normally uses aggregated coefficients/indices (e. g. Gini coefficient, Kakwani index) to assess the progressivity/regressivity of health care financing overall and/or from different sources,[15] we draw on the share of household income which is dedicated to OOPHE in different income groups as an indicator for distributional effects. The information we get is comparable to the information from the Kakwani-Index. If the proportion of OOPHE increases with income (as an indicator for the ability to pay), it indicates some degree of progressivity.

In table 2 households (HH) are ordered by their household income (from the poorest to the richest) and separated into income quintiles (Q1 to Q5). On the left side of the table we use raw household income as an ordering criteria while on the right side of the table we draw on equivalized income (equalization weights: head of the household 1, every person aged >= 14, 0,5, ever person aged < 14, 0,3 ) to order the households. Table 2 includes information on the average OOPHE per quintile and the shares of OOPHE on total household income and on total household consumption expenditures. We present these indicators for total OOPHE and for different expenditure categories. In our interpretation we focus on the income share of OOPHE on the left side of the table. The results on the right side of the table are slightly different, but the conclusions from an equity perspective are quite similar. For total OOPHE we observe that the OOPHE-share on income decreases continuously with income from roughly 4.95 % in quintile 1 to 2.90 % in quintile 5. That means a reduction of roughly two percentage points.

So our results confirm the conclusions of previous studies, which find that OOPHE are a regressive tool of raising health care revenues (Wagstaff and Van Doorslaer, 2000);

---

[15]The benchmark for progressivity/regressivity of health care financing in this literature is the ability-to-pay principle. For details see Wagstaff and Van Doorslaer (2000).

recent information for Hungary is given by Baji et al. (2012). The regressive effect on the distribution of household income does not only depend on the decline of the share when income rises but also on the level of the share, which is - as already mentioned - quite low. As far as the single components of OOPHE are concerned, their effect from an equity perspective is not so clear. Prescription fees seem to have a strong regressive effect since their share on income declines from 0.46 % in quintile 1 to 0.12 % in quintile 5. The picture for inpatient services is ambiguous, the other components show regressive effects, but the share does not fall monotonic with rising household income.

In table 3 we present additional information on the relative burden OOPHE cause for private households. We ask which percentage of the households faces a share of OOPHE to total consumption expenditures above a threshold of 2 %, 5 % and 10 %.[16] As in table 2 we rank the households based on income quintiles. In our description we concentrate on total OOPHE of private households and the ranking based on raw income (left part of table 3). Overall the data reveal a low percentage of private households (less than 2 %) with a substantial relative burden (>10 %) caused by OOPHE. The pattern is very stable for the different income quintiles.

Table A2 in the appendix gives previous insights into additional covariates which might cause differences in OOPHE. We present disaggregated information on OOPHE for different types of households, for different private and public insurance characteristics and for the broader socio-economic environment of the household, measured by the degree of urbanization. However, we are cautious in drawing any conclusions from the raw data.

# 6  Econometric Results

In the present data set we defined four different subgroups of OOPHE: total OOPHE, physician services, OTC pharmaceuticals and prescription fees. Our data do not allow differentiating between the pathways 1, 2 for total OOPHE and physician services which results in *(j=3)*. They include deductibles on services offered by contracted or private physicians and direct OOPHE which are not born by public or private health insurance institutions. Only in the case of pharmaceutical expenditures we are able to disaggregate: Pathway *(j=1)* is covered by prescription fees and *(j=2)* by OTC pharmaceuticals.

We use different socio-economic characteristics to explain differences in OOPHE-levels between households. Household types were defined depending on the number of children and adults. This remained in standard household constellations of singles, couples, couples with children and single parents. Households with 'exceptional' household members, e.g. further relatives or non-related cohabitants are excluded. In order to derive socio-economic

---

[16]This approach is widely used in the health economics literature to identify households with 'catastrophic and impoverishing' shares of OOPHE. Not surprisingly this research work primarily focuses on the situation in countries with low economic development. See Xu et al. (2003).

Table 2: The structure of OOPHE in Austria

| | HH income quintiles (poorest to richest) | | | | | Equivalised HH income quintiles (poorest to richest) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Q 1 | Q 2 | Q 3 | Q 4 | Q 5 | Q 1 | Q 2 | Q 3 | Q 4 | Q 5 |
| *Prescription fee* | | | | | | | | | | |
| Average exp. | 5.12 | 7.07 | 8.32 | 7.38 | 6.37 | 5.30 | 7.79 | 7.51 | 6.86 | 6.79 |
| % of HH income | 0.46 | 0.35 | 0.31 | 0.21 | 0.12 | 0.43 | 0.37 | 0.30 | 0.21 | 0.15 |
| % of HH spending | 0.35 | 0.33 | 0.33 | 0.23 | 0.16 | 0.29 | 0.35 | 0.33 | 0.23 | 0.19 |
| *OTC pharmaceuticals* | | | | | | | | | | |
| Average exp. | 7.56 | 9.34 | 10.50 | 13.17 | 14.67 | 9.04 | 10.43 | 10.69 | 11.64 | 13.45 |
| % of HH income | 0.58 | 0.46 | 0.39 | 0.37 | 0.28 | 0.58 | 0.48 | 0.38 | 0.34 | 0.30 |
| % of HH spending | 0.45 | 0.39 | 0.38 | 0.39 | 0.36 | 0.42 | 0.43 | 0.37 | 0.38 | 0.38 |
| *Physician services* | | | | | | | | | | |
| Average exp. | 9.47 | 18.35 | 17.90 | 23.43 | 29.55 | 16.71 | 17.55 | 14.72 | 20.58 | 29.14 |
| % of HH income | 0.86 | 0.94 | 0.65 | 0.65 | 0.54 | 1.19 | 0.77 | 0.48 | 0.55 | 0.65 |
| % of HH spending | 0.49 | 0.49 | 0.52 | 0.59 | 0.61 | 0.54 | 0.53 | 0.40 | 0.57 | 0.65 |
| *Inpatient services* | | | | | | | | | | |
| Average exp. | 1.84 | 4.95 | 3.18 | 4.13 | 5.84 | 3.33 | 3.39 | 4.27 | 3.47 | 5.48 |
| % of HH income | 0.14 | 0.25 | 0.12 | 0.12 | 0.10 | 0.20 | 0.15 | 0.16 | 0.11 | 0.10 |
| % of HH spending | 0.11 | 0.21 | 0.13 | 0.13 | 0.12 | 0.15 | 0.14 | 0.16 | 0.12 | 0.12 |
| *Therapeutic aids* | | | | | | | | | | |
| Average exp. | 22.53 | 38.02 | 42.55 | 53.25 | 74.95 | 29.15 | 40.71 | 45.93 | 50.67 | 64.84 |
| % of HH income | 1.86 | 1.88 | 1.59 | 1.49 | 1.41 | 1.91 | 1.85 | 1.66 | 1.45 | 1.36 |
| % of HH spending | 1.32 | 1.56 | 1.48 | 1.52 | 1.69 | 1.29 | 1.58 | 1.53 | 1.51 | 1.66 |
| *Other expenditures* | | | | | | | | | | |
| Average exp. | 12.72 | 10.38 | 15.29 | 23.14 | 24.04 | 13.16 | 12.37 | 14.18 | 22.26 | 23.61 |
| % of HH income | 1.04 | 0.52 | 0.57 | 0.64 | 0.44 | 0.93 | 0.59 | 0.55 | 0.62 | 0.52 |
| % of HH spending | 0.69 | 0.43 | 0.51 | 0.58 | 0.51 | 0.56 | 0.46 | 0.50 | 0.63 | 0.58 |
| *Total OOPHE* | | | | | | | | | | |
| Average exp. | 59.25 | 88.16 | 97.79 | 124.62 | 155.65 | 76.78 | 92.29 | 97.34 | 115.71 | 143.33 |
| % of HH income | 4.95 | 4.40 | 3.63 | 3.49 | 2.90 | 5.24 | 4.23 | 3.54 | 3.27 | 3.08 |
| % of HH spending | 3.40 | 3.40 | 3.35 | 3.42 | 3.47 | 3.24 | 3.49 | 3.29 | 3.45 | 3.58 |

Table 3: OOPHE and household income: The relative burden of OOPHE

| | HH income quintiles (poorest to richest) | | | | | Equivalised HH income quintiles (poorest to richest) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Q 1 | Q 2 | Q 3 | Q 4 | Q 5 | Q 1 | Q 2 | Q 3 | Q 4 | Q 5 |
| *Prescription fee* | | | | | | | | | | |
| Expenditures > 2% | 1.20 | 1.10 | 1.00 | 0.48 | 0.28 | 0.86 | 1.19 | 1.04 | 0.60 | 0.40 |
| Expenditures > 5% | 0.26 | 0.12 | 0.19 | 0.02 | 0.07 | 0.17 | 0.19 | 0.19 | 0.03 | 0.07 |
| *OTC pharmaceuticals* | | | | | | | | | | |
| Expenditures > 2% | 1.40 | 1.10 | 1.10 | 0.85 | 0.93 | 1.23 | 1.30 | 0.93 | 0.98 | 0.93 |
| Expenditures > 5% | 0.38 | 0.24 | 0.14 | 0.22 | 0.12 | 0.36 | 0.22 | 0.14 | 0.21 | 0.17 |
| *Physician services* | | | | | | | | | | |
| Expenditures > 2% | 1.10 | 1.10 | 1.30 | 1.60 | 1.90 | 1.22 | 1.23 | 1.10 | 1.59 | 1.76 |
| Expenditures > 5% | 0.60 | 0.60 | 0.70 | 0.86 | 0.86 | 0.57 | 0.64 | 0.48 | 0.81 | 0.98 |
| *Inpatient services* | | | | | | | | | | |
| Expenditures > 2% | 0.31 | 0.38 | 0.21 | 0.35 | 0.41 | 0.40 | 0.31 | 0.28 | 0.33 | 0.35 |
| Expenditures > 5% | 0.07 | 0.24 | 0.12 | 0.14 | 0.12 | 0.12 | 0.16 | 0.14 | 0.12 | 0.16 |
| *Therapeutic aids* | | | | | | | | | | |
| Expenditures > 2% | 3.63 | 4.10 | 4.40 | 4.30 | 5.10 | 3.60 | 4.20 | 4.44 | 4.42 | 4.84 |
| Expenditures > 5% | 1.45 | 1.64 | 1.54 | 1.50 | 1.70 | 1.49 | 1.69 | 1.66 | 1.38 | 1.61 |
| *Other expenditures* | | | | | | | | | | |
| Expenditures > 2% | 1.66 | 1.26 | 1.37 | 1.42 | 1.49 | 1.33 | 1.16 | 1.31 | 1.61 | 1.76 |
| Expenditures > 5% | 0.86 | 0.38 | 0.47 | 0.59 | 0.47 | 0.67 | 0.45 | 0.48 | 0.57 | 0.59 |
| *Total OOPHE* | | | | | | | | | | |
| Expenditures > 2% | 8.40 | 8.23 | 9.52 | 9.12 | 9.49 | 8.17 | 9.21 | 8.66 | 8.59 | 9.75 |
| Expenditures > 5% | 4.18 | 4.18 | 4.13 | 4.30 | 4.73 | 4.04 | 4.37 | 4.13 | 4.30 | 4.68 |
| Expenditures > 10% | 1.73 | 1.92 | 1.50 | 1.50 | 1.68 | 1.61 | 1.75 | 1.47 | 1.73 | 1.78 |

information about the household we use both adults of the household if available and calculate their average education level, age and early retirement status. Information about gender refers to the householder. Furthermore, we derive if both or at least one adult has a contract with a private health insurance. A subcategorization of different public health insurance institutions is done to account for different deductibles. As a reference point we use the public health insurance status of the householder and take the public insurance for private workers (GKK) as reference group.

Table 6 shows the descriptive statistics of selected household characteristics related to the four OOPHE-subgroups. The first column is the mean of the total sample size whereby the conditional mean of households with non-zero expenditures is separated by the OOPHE-subcategories. The range of the variables relates to the total sample size. The average OOPHE of all households are EUR 105 per month and the maximum monthly burden is EUR 3,964 which relates predominantly to dental services. Households consisting of singles, couples and couples with children are relatively even distributed throughout the total sample size. Single parents are the minority and account for 8% of the included households. The percentage of single-person households decreases slightly while the share of couples with children increases if we consider households with non-zero expenditures. The average household income of the total sample size is EUR 2,986 while the level of income increases in all OOPHE-subcategories. The adults age lies between 18 and 85 years and they are on average 50 years old. Tertiary education relates to 9% of households and is consistent for the total sample size and households with total OOPHE. 21% of the included households have an additional health insurance contract for both adults. This remains consistent if households face total OOPHE. Almost three-quarters of the householders are insured at GKK both in the total sample size and in the conditional parts. The subgroup of total OOPHE has the fewest non-zero expenditure observations and 76% of the included households report monthly expenditures.

The highest monthly burden relates to OOPHE on physician services. Furthermore, households in this OOPHE-subcategory have on average the highest level of income. This expenditure category also includes the highest share of couples with children, householders insured at BVA, adults with tertiary education and additional health insurance compared to all other OOPHE-subcategories. It is important to note that twice as many households are insured at BCA compared to the total sample size.

In contrast to prescription fees the subcategory of OTC pharmaceuticals has a higher share of couples with children and single parents. The adults of this category are on average 6 years younger and have a higher household income than adults in the prescription fee subgroup. The conditional means of the household income, private health insurance and householders age are in each subgroup on average larger or at least equal to the means of the total sample size. Tertiary education behaves differently and is smaller or larger depending on the concerned expenditure subgroup.

Table 4: Descriptive statistics: OOPHE and socio-economic characteristics

| Variables | Mean | Range Min | Range Max | Total OOPHE > 0 Mean | Std. dev. | Physician services > 0 Mean | Std. dev. | OTC pharmaceuticals>0 Mean | Std. dev. | Prescription fees > 0 Mean | Std. dev. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Expenditures | 105.08 | 0 | 3964.29 | 138.34 | 212.71 | 145.4 | 169.01 | 41.00 | 48.16 | 34.47 | 31.54 |
| *Household characteristics* | | | | | | | | | | | |
| Single | 0.30 | 0 | 1 | 0.26 | 0.44 | 0.17 | 0.38 | 0.21 | 0.41 | 0.24 | 0.43 |
| Couple | 0.30 | 0 | 1 | 0.32 | 0.47 | 0.35 | 0.48 | 0.32 | 0.47 | 0.40 | 0.49 |
| Couple & children | 0.32 | 0 | 1 | 0.35 | 0.48 | 0.42 | 0.49 | 0.39 | 0.49 | 0.32 | 0.47 |
| Single parent | 0.08 | 0 | 1 | 0.07 | 0.26 | 0.06 | 0.23 | 0.08 | 0.26 | 0.04 | 0.20 |
| Income | 2,986.40 | 203.55 | 15,657.54 | 3,124.32 | 1,566.98 | 3,497.61 | 1,774.71 | 3,225.39 | 1,505.35 | 3,079.38 | 1,510.71 |
| Age | 50.24 | 18 | 85 | 51.02 | 15.00 | 50.14 | 14.86 | 50.81 | 15.21 | 56.26 | 14.87 |
| Education, tertiary | 0.09 | 0 | 1 | 0.09 | 0.29 | 0.12 | 0.32 | 0.10 | 0.31 | 0.06 | 0.23 |
| *Insurance characteristics* | | | | | | | | | | | |
| GKK | 0.71 | 0 | 1 | 0.69 | 0.46 | 0.55 | 0.50 | 0.67 | 0.47 | 0.69 | 0.46 |
| BVA | 0.18 | 0 | 1 | 0.20 | 0.40 | 0.35 | 0.48 | 0.23 | 0.42 | 0.20 | 0.40 |
| SVA | 0.08 | 0 | 1 | 0.09 | 0.28 | 0.07 | 0.26 | 0.08 | 0.27 | 0.08 | 0.27 |
| SVB | 0.03 | 0 | 1 | 0.03 | 0.17 | 0.03 | 0.17 | 0.02 | 0.14 | 0.03 | 0.16 |
| Add. Health insurance (2)[a] | 0.21 | 0 | 1 | 0.21 | 0.41 | 0.27 | 0.45 | 0.23 | 0.42 | 0.22 | 0.42 |
| N (households) | 5,787 | | | 4,396 | | 461 | | 1,559 | | 1,150 | |

Note: a) All adults of the household have an additional health insurance. This also includes households consisting of one adult (e.g. single-person households, single parents).

18

The Two-Part Model of total OOPHE (see table 5) shows differing effects of the household structure: Couples with children are most likely to have expenditures. This reveals significantly a multiplier effect of an increasing household size. However, the level of expenditures is not affected by the number of household members. Both parts of the model are affected positively by increasing age and an increasing education level. The strongest effect relates to household members in the age category of 65 to 85 years with 2 times higher average expenditures. A lower degree of urbanization reduces the level of spending significantly. Female householders have a higher likelihood of demanding total OOPHE, but do not influence the level of spending. Household members being insured at BVA affect both stages of the model significantly. A differing effect of additional private health insurances is observable: While already one adult of the household with private health insurance contract is sufficient to affect the level of total OOPHE positively, the likelihood of having expenditures is influenced only by two private insurance contracts. Additionally, household income has a positive effect on both parts.

In contrast, the relevant variation of physician service expenditures is in the first part of this model. Couples and couples with children increase the likelihood of expenditures. This supports the multiplier effect of a larger household size. A higher education level influences both parts of the model positively while household members with tertiary education are the main explanatory variable of the second part. On average, they approximately spend twice as much as household members with primary education. The age structure of the adults remains insignificant in both decision stages. Being insured at BVA and having two additional private health insurance contracts raises the likelihood of OOPHE while BVA reduces its level.

The results of OTC pharmaceuticals show that all household types are more likely to have OOPHE than single-person households. Couples with children have the highest likelihood of OTC pharmaceuticals followed by couples and single parents. The likelihood increases significantly if adults are above 65 years old. Income, female householders, the level of education and individuals insured at BVA increase the likelihood of OTC spending significantly while a lower degree of urbanization decreases it. In the second part, household members beeing insured at SVA increase the level of expenditures approximately by 20 %. Furthermore, income influences the level of expenditures positively while lower urbanization still decreases it.

OOPHE of prescription fees behave differently: Increasing age and couples with children increase the likelihood of OOPHE. However, being early retired decreases it. The conditional part is influenced by couples and increasing age. Household members in the age category 45 to 65 years have 1.7 times higher OOPHE, the next age category increases OOPHE by factor 2. In addition, income affects the level of spending negatively.

Table 5: Econometric results of the Two- Part Model: Total OOPHE and subcategories

| | Total OOPHE | | | | Physician services | | | |
|---|---|---|---|---|---|---|---|---|
| | Probability (Logit) | | Conditional (GLM$^a$) | | Probability (Logit) | | Conditional (OLS$^b$) | |
| | Coeff. | S.E. | Coeff. | S.E. | Coeff. | S.E. | Coeff. | S.E. |
| Couple | -0.718*** | 0.119 | -0.134 | 0.109 | 0.395* | 0.202 | 0.054 | 0.191 |
| Couple & children | 0.478*** | 0.112 | -0.002 | 0.081 | 0.562*** | 0.214 | 0.110 | 0.206 |
| Single parents | -0.540*** | 0.175 | -0.102 | 0.144 | -0.014 | 0.264 | -0.063 | 0.284 |
| Average urbanization | -0.018 | 0.099 | -0.037 | 0.075 | 0.072 | 0.153 | 0.115 | 0.138 |
| Low urbanization | -0.086 | 0.092 | -0.148** | 0.065 | 0.007 | 0.137 | -0.031 | 0.131 |
| Age 25 - 45 | 0.370** | 0.184 | 0.306* | 0.183 | 0.262 | 0.434 | -0.242 | 0.395 |
| Age 45 - 65 | 0.913*** | 0.184 | 0.495*** | 0.175 | 0.035 | 0.436 | -0.138 | 0.395 |
| Age 65 - 85 | 1.237*** | 0.196 | 0.723*** | 0.174 | 0.537 | 0.444 | -0.133 | 0.412 |
| Early retired | 0.147 | 0.169 | -0.106 | 0.108 | 0.201 | 0.256 | -0.178 | 0.274 |
| Female householders | 0.440*** | 0.099 | 0.021 | 0.069 | -0.106 | 0.152 | 0.018 | 0.153 |
| Education, secondary | 0.526*** | 0.120 | 0.358*** | 0.085 | 0.598** | 0.258 | 0.468* | 0.242 |
| Education, tertiary | 0.597*** | 0.179 | 0.471*** | 0.112 | 0.617* | 0.321 | 0.696** | 0.298 |
| BVA | 0.202* | 0.110 | 0.167*** | 0.065 | 0.784*** | 0.132 | -0.287** | 0.114 |
| SVA | 0.034 | 0.137 | 0.025 | 0.076 | -0.073 | 0.22 | 0.024 | 0.200 |
| SVB | 0.026 | 0.218 | 0.298* | 0.158 | -0.079 | 0.331 | 0.002 | 0.463 |
| Add. Health insurance (1)$^c$ | 0.098 | 0.138 | 0.156* | 0.082 | 0.030 | 0.171 | -0.191 | 0.173 |
| Add. Health insurance (2)$^d$ | 0.259*** | 0.097 | 0.138** | 0.061 | 0.306** | 0.145 | 0.089 | 0.138 |
| Log. Income | 0.379*** | 0.100 | 0.325*** | 0.07 | 0.373** | 0.163 | 0.103 | 0.142 |
| Constant | -3.073*** | 0.791 | 1.536*** | 0.591 | -6.812*** | 1.260 | 3.419*** | 1.076 |
| N (households) | 5,787 | | 4,396 | | 5,787 | | 461 | |
| Pseudo-R$^2$ / R$^2$ | 0.075 | | | | 0.049 | | 0.046 | |

Notes: a) GLM with log-link and gamma distribution, b) OLS with log of (positive) expenditures, c) (1) refers to one adult of the household with additional health insurance, d) (2) all adults of the household have an additional health insurance. This also includes households consisting of one adult (e.g. single-person households, single parents). Robust standard errors are given in the corresponding columns and *, **, *** denote 10%, 5% and 1% significance levels.

Table 5: continued

| | OTC pharmaceuticals | | | | Prescription fees | | | |
|---|---|---|---|---|---|---|---|---|
| | Probability (Logit) | | Conditional (OLS)[b] | | Probability (Logit) | | Conditional (GLM)[a] | |
| | Coeff. | S.E. | Coeff. | S.E. | Coeff. | S.E. | Coeff. | S.E. |
| Couple | 0.515*** | 0.118 | 0.059 | 0.099 | 0.488*** | 0.127 | 0.468*** | 0.083 |
| Couple & children | 0.933*** | 0.127 | -0.002 | 0.107 | 0.540*** | 0.149 | 0.153 | 0.105 |
| Single parents | 0.398*** | 0.149 | -0.052 | 0.131 | -0.375* | 0.212 | 0.029 | 0.134 |
| Average urbanization | 0.074 | 0.092 | -0.163** | 0.069 | -0.010 | 0.103 | 0.012 | 0.069 |
| Low urbanization | -0.173** | 0.087 | -0.116* | 0.064 | -0.131 | 0.096 | -0.097 | 0.066 |
| Age 25 - 45 | 0.309 | 0.250 | -0.055 | 0.183 | 0.709* | 0.374 | 0.247* | 0.143 |
| Age 45 - 65 | 0.405 | 0.248 | -0.129 | 0.182 | 1.342*** | 0.369 | 0.538*** | 0.145 |
| Age 65 - 85 | 0.817*** | 0.254 | -0.063 | 0.188 | 2.029*** | 0.371 | 0.678*** | 0.147 |
| Early retired | -0.135 | 0.157 | -0.113 | 0.103 | -0.317* | 0.180 | 0.112 | 0.133 |
| Female householders | 0.260*** | 0.090 | 0.020 | 0.076 | 0.110 | 0.102 | -0.053 | 0.075 |
| Education, secondary | 0.483*** | 0.137 | 0.105 | 0.098 | 0.158 | 0.134 | -0.084 | 0.075 |
| Education, tertiary | 0.728*** | 0.184 | 0.177 | 0.137 | -0.230 | 0.217 | 0.053 | 0.148 |
| BVA | 0.206** | 0.090 | 0.062 | 0.069 | -0.041 | 0.106 | -0.024 | 0.067 |
| SVA | -0.081 | 0.131 | 0.175* | 0.100 | -0.243 | 0.153 | -0.004 | 0.115 |
| SVB | -0.280 | 0.235 | 0.143 | 0.138 | -0.251 | 0.250 | 0.092 | 0.135 |
| Add. Health insurance (1)[c] | -0.025 | 0.109 | -0.029 | 0.083 | 0.058 | 0.124 | -0.017 | 0.087 |
| Add. Health insurance (2)[d] | 0.080 | 0.088 | -0.005 | 0.068 | 0.089 | 0.101 | 0.072 | 0.064 |
| Log. Income | 0.182** | 0.089 | 0.128* | 0.075 | 0.092 | 0.106 | -0.123* | 0.065 |
| Constant | -3.906*** | 0.699 | 2.285*** | 0.571 | -3.793*** | 0.865 | 3.815*** | 0.489 |
| | | | | | | | | |
| N (households) | 5,787 | | 1,559 | | 5,787 | | 1,150 | |
| Pseudo-R² / R² | 0.036 | | 0.022 | | 0.054 | | | |

Notes: a) GLM with log-link and gamma distribution, b) OLS with log of (positive) expenditures, c) (1) refers to one adult of the hosuehold with additional health insurance, d) (2) all adults of the household have an additional health insurance. This also includes households consisting of one adult (e.g. single-person households, single parents). Robust standard errors are given in the corresponding columns and *, **, *** denote 10%, 5% and 1% significance levels.

# 7 Discussion, Limitations and Conclusions

We start with the discussion of the results of our study. In all expenditure categories our results show the strong impact of household structures on the probability part of the model and partially on the conditional expenditures. Couples and the increase of the household size by children increase the risk of OOPHE. The average household of couples has 1.8 children until the age of 18 which makes it to the largest observation unit in the sample. Only one household member with non-zero OOPHE is sufficient to classify the total observation unit as expenditure-household which may explain their higher probability of OOPHE. This is in contrast to the findings of Bilger and Chaze where individuals living alone demonstrate a higher probability and higher expected consumption. However, they are examining total costs of health care instead of OOPHE (Bilger and Chaze, 2008). Single parents predominantly decrease the probability of OOPHE and never determine the level of expenditures. This result may reflect their lower income level, utilization of health care in the public sector or actual lower utilization of health care services (Rubin and Koelln, 1993).

Age effects are observable in both parts of the analysis with an increasing impact the older the household members are. The effects of increasing age on OOPHE are consistent with previous literature (Bilger and Chaze, 2008; Corrieri et al., 2010; You and Kobayashi, 2011). Furthermore, the age class of 25 to 45 covers most years of maternity and the related excess expenditures of preventive and follow-up medical examination. These female specific expenditures and gender-specific morbidities support higher probability of female householders regarding total OOPHE and OTC pharmaceuticals (Corrieri et al., 2010). Bilger and Chaze (2008) show a higher expected probability and expected consumption for women in all age classes with a local consumption maximum at the age of 32 (Bilger and Chaze, 2008). A systematic review of the elderly aged (65+) in OECD countries illustrated significant gender inequalities due to females lower participation rate in the labor market which reduces their social protection. Further explanatories are females higher consumption of medication including alternative medicine, female specific morbidities with higher OOPHE-shares and their longer life-expectancy (Corrieri et al., 2010; Costa-Font et al., 2007).

The existing literature shows mixed results on the effects of income on OOPHE. Income is considered to be a strong determinant in the demand of private health care (Propper, 2000). Furthermore, an increase in income raises OOPHE in WHO countries (Ahmed et al., 2006; Jowett et al., 2003; Musgrove et al., 2002). However our findings do not support previous results consistently except for total OOPHE. Significance in the subgroup of total OOPHE may be related to higher private expenditures for dental services and health spas. The household income does not affect the OOPHE-level for physician services and prescription fees but increases the probability of consuming OTC pharmaceu-

ticals and physician services. This may reflect the properties of the well-covered benefit catalogue of the public health insurance system. Expenses for prescription fees and physician services presume an actual need due to illness which is uncoupled from income or further socio-economic factors. An equal distribution of treatment needs of the included households may reduce the income effect. OTC pharmaceuticals include prevention and may also display an impatience tradeoff: Some medical products offer the opportunity to trade off invested time until treatment with combined higher compensation properties against immediate treatment with higher OOPHE-burdens. This tradeoff may be influenced by income and supports the significance in both parts of OTC pharmaceuticals. The non-significance of income in prescription fees might reflect a prescribing behavior of physicians. A Dutch study argued that the awareness of patients financial problems seem to increase the prescription of fully reimbursed drugs which is in line with our findings (Kasje et al., 2002).

Tertiary education strongly increases the probability and the conditional level of total OOPHE and physician services. This positive association between OOPHE and higher education is in line with findings from Switzerland (Bilger and Chaze, 2008). A higher level of education may improve the awareness of a healthier lifestyle and prevention measures which influences consumption and expenditure decisions (Corrieri et al., 2010).

Lower urbanization decreases the probability and/or the conditional expenditures in total OOPHE and OTC pharmaceuticals. This reflects the lower concentration of private health care facilities in regions with a lower degree of urbanization. Farmers predominantly located in regions with low-urbanization are insured at SVB which is also considered with limited proportion of cost sharing compared to the other public health insurance institutions.

Households insured at BVA or SVA are faced with an identical percentage of deductibles. However, BVA- households show in 3 out of 4 expenditure subgroups a significantly higher probability of OOPHE while SVA remains insignificant. BVAs higher demand of OOPHE may depend on the household structure (higher percentage of households with children), the increased age of the members, a higher income and/or a stronger need of health care services. Further, the results show differing time restrictions and opportunity costs between both employment groups. While individuals insured at BVA experience a stronger social protection by the employer, self-employed individuals usually have a reduced time to verify the most adequate treatment. In the Austrian health care system, BVA-members receive a continuation of payments in the first three days of sickness by the employer. In case of long-lasting illness the public health care institution commits themselves to sick allowances up to 52 weeks with an extension to 78 weeks depending on the severity of illness. In contrast, individuals insured at SVA receive sickness benefits from the fourth day after illness until a maximum of 26 weeks if and only if they have an additional insurance. This allows BVA-households to invest more time in

comparing private and public health care facilities which may result in extended doctoral visits inducing more OOPHE-burdens. SVAs significant affection in the level of OTC pharmaceuticals displays their higher opportunity costs in receiving immediate treatment combined with a lower willingness of waiting. Overall, we have to admit that different cost sharing arrangements are only one consequence of the public insurance status. Farmers, public workers, employers differ in other conditions/characteristics of health care utilization (e. g. opportunity cost of waiting time) and these might also change their utilization behavior. Our data do not allow controlling for these characteristics.

The higher probability of physician service expenditures of BVA-households and their negative effects on the conditional expenditures compared to SVA-households might show a stronger risk aversion which is secured by additional private health insurances.

Possibly the most interesting result is the positive co-movement of OOPHE and additional health insurance contracts. In total OOPHE and physician services two additional health insurances increased the probability of having OOPHE significantly however leaving the conditional part unaffected except for total OOPHE subcategory. Additional insurance contracts seem to stimulate the purchase of services and products which are not born by private or public insurances but result in negligible cost sharing. General OOPHE and additional health insurances behave complementary in the first part of the model and additional health insurance contracts do not protect households from additional costs as would be expected.

The discussion of the regression results is one important dimension of the assessment of the value added by our paper. In addition to this task it is also necessary to discuss more explicitly the validity of the data coming from the household budget survey to study different aspects of OOPHE. In the following we tackle several dimensions of this data source without being comprehensive. Our empirical approach is guided by a utility based model of health care utilization. We assume that individuals choose those pathways through the health care system which maximize their net utility. This is a strong assumption, because the utilization of health care services in many cases results from an imperfect physician-patient agency relationship. To replicate this model empirically it would be necessary to have a rich data set, which has to include information on all possible utilization paths. This information should also entail prices and quantities (e.g. physician contacts, hospital days) of utilization in the different pathways. The household budget survey only includes private OOPHE. The restricted information from the data set has important implications. The differentiation between prices and quantities is not possible. No distinction is possible whether the OOPHE comes from one treatment episode, from parts of a treatment episode or from several treatment episodes. There exists no possibility to discriminate between the outside option (not to consume health care goods at all) and the pathway $(j = 0)$. In addition, the differentiation between OOPHE of type 2 and 3 is only possible for pharmaceuticals, but not for total OOPHE and other subcategories

of services. This has important implications for the use of the double hurdle approach in the empirical estimation, a point we will mention later.

The expenditure estimates in the household budget survey are a combination of two different methods of information gathering: the recall and the diary method. The general advantages/disadvantages of these data sources of consumption expenditures are discussed in the literature (Ahmed et al., 2006; Crossley and Winter, 2013; Neter, 1970). Much less evidence is available on possible biases in the context of health care utilization. The majority of the studies focusing on this question only identify the directions of the bias in OOPHE estimates (Lu et al., 2009; Zuvekas and Olin, 2009). Lavado et al. (2012) are the first which come up with quantified effects of this bias. They did a meta-analysis of household expenditure studies all over the world. In the end they asked: To which extent do different forms of household surveys change the expenditure share of OOPHE? The answer is given by a multivariate regression including 214 studies. They find significant and stable effects of important survey characteristics on the OOPHE-share. Other factors held constant, a one-unit increase in the number of health questions was accompanied by a 1 % increase in the OOPHE share. Increasing the number of questions on the consumption (with holding the number of health expenditure questions constant) resulted in a 0.2 % decrease in OOPHE-share. A one-month increase in the recall period reduces the OOPHE-share by 6 %. Surveys based on diaries generate a lower expenditure share compared to interviews over a recall period. In addition to the possibility of estimation bias it seems to be clear that the two methods of data gathering produce data with different statistical characteristics; e. g. we would expect that the number and significance of zeros, the skewness of the sample, the size of the standard deviation is different in the diary method compared to the recall methods. On the other hand, these characteristics are crucial for the choice of the econometric approach (Jones, 2000).

Another important aspect is the adequate reference unit of OOPHE. In the Austrian household survey this is the total household. No information is available on OOPHE disaggregated for the different household members. In addition, the information on the socio-economic characteristics of the household members is limited. This is especially true for important predictors of individual health expenditures. In our opinion, there is no clear answer to the question, whether we should use the individual or the household as a reference unit for OOPHE. It seems to be clear that the household is an adequate reference unit for equity/equality considerations. As far as the determinants of OOPHE are concerned many different aspects have to be kept in mind. If health expenditures are public goods on the household level, this would be a strong argument to use the household as a reference unit. But this assumption is not very realistic. The vast majority of the health care goods financed out-of-pocket are private goods on an individual basis. Individuals utilize the health care system and not households. Of course the individual decision to use the health care sector is influenced by household characteristics (Jacobson, 2000), but

that is not an argument to study OOPHE on the household level, it is just an argument to include household characteristics in the empirical estimation on the individual and the household level. For many purposes it seems to be appropriate to use the individual as a reference unit. This is especially true for demand and utilization studies in the health care sector. On the other hand, the household level could deliver additional insights on the determinants of OOPHE. But overall we have to be cautious in the interpretation of the results on the household level. In particular, we are not allowed to draw conclusions of statistical interference from the macro level of a household to the micro level of an individual (ecological fallacy problems).

As already mentioned, general consumption surveys only include rudimental information on socio-economic characteristics which are important for explaining the utilization of health care services. This statement is also valid for the Austrian household budget survey. Crucial socio-economic and socio-demographic characteristics to explain the determinants of OOPHE are missing and lead to a low explanatory power of the used covariates. Such characteristics are indicators for the health status, indicators for the need of long term care and the individual disease profile over a longer or medium time period (e. g. the OOPHE in the past).

All in all the specific characteristics of the data basis are a big challenge to the econometric modelling of OOPHE. The health econometrics literature on this topic (see the seminal contributions by (Jones, 2000; Madden, 2008; Mihaylova et al., 2011)) proposes clear criteria which allow to choose between different types of econometric approaches (Sample Selection vs. Two-Part Models). The impossibility to separate the different pathways in our data completely (especially to differentiate zero expenditures from zero consumption), the choice of the household as a reference unit and the aggregation of data based on diaries and on the recall system is a backlash to apply these criteria. The general problems of finding the appropriate econometric approach in clear structured decisions of participation and intensity (see Madden (2008) for the smoking example) are multiplied in our data set.

These arguments are strong votes for efforts to create a new set of data on health spending in Austria which avoids the disadvantages/weaknesses of the existing data bases.
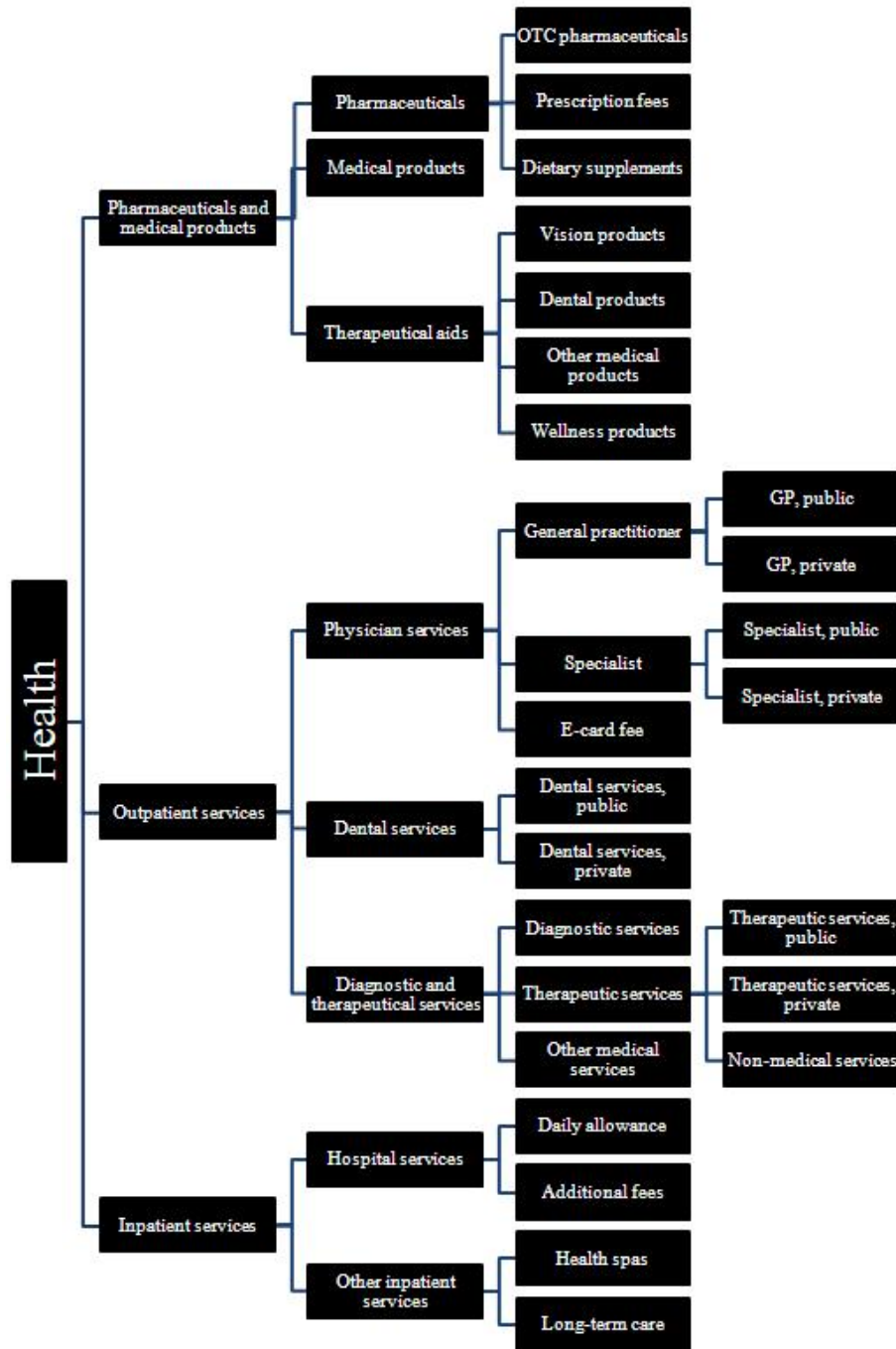
# 8 Appendix



Figure 2A: Aggregation levels of different OOPHE (Statistik Austria, 2011)

Table A2: OOPHE, household characteristics, insurance characteristics and the degree of urbanization

| | Prescription fee Average exp. | OTC pharmaceuticals Average exp. | Physician services Average exp. | Inpatient services Average exp. | Therapeutic aids Average exp. | Other expenditures Average exp. | Total OOP Average exp. |
|---|---|---|---|---|---|---|---|
| *Household characteristics* | | | | | | | |
| Singles | 4.85 | 7.24 | 12.35 | 2.55 | 30.31 | 12.70 | 69.99 |
| Couples | 11.77 | 12.24 | 21.99 | 5.23 | 56.57 | 20.35 | 128.20 |
| Couples & children | 5.21 | 13.82 | 25.49 | 4.02 | 54.39 | 19.15 | 122.29 |
| Single parents | 2.41 | 9.57 | 15.62 | 4.57 | 34.06 | 13.19 | 79.48 |
| *Insurance characteristics* | | | | | | | |
| GKK | 6.66 | 10.05 | 15.90 | 3.65 | 41.75 | 15.85 | 93.97 |
| BVA | 7.61 | 15.17 | 33.03 | 4.00 | 56.51 | 21.65 | 137.98 |
| SVA | 6.76 | 12.01 | 20.59 | 5.96 | 59.92 | 20.33 | 125.73 |
| SVB | 6.82 | 6.62 | 26.66 | 6.46 | 51.63 | 10.03 | 108.21 |
| Add. Health insurance (1)[a] | 8.30 | 13.38 | 23.83 | 5.98 | 60.95 | 25.41 | 137.84 |
| Add. Health insurance (2)[b] | 7.62 | 12.62 | 27.30 | 5.25 | 56.43 | 23.62 | 133.05 |
| *Degree of Urbanization* | | | | | | | |
| High urbanization | 6.69 | 11.55 | 22.11 | 4.06 | 48.19 | 18.99 | 111.65 |
| Average urbanization | 7.43 | 11.13 | 20.30 | 4.40 | 48.08 | 15.97 | 107.53 |
| Low urbanization | 6.61 | 10.52 | 17.16 | 3.64 | 43.23 | 16.14 | 97.35 |
| Total | 6.85 | 11.05 | 19.74 | 3.99 | 46.26 | 17.20 | 105.08 |

Notes: a) (1) refers to one adult of the household with additional health insurance, b) (2) all adults of the household have an additional health insurance. This also includes households consisting of one adult (e.g. single-person households, single parents).

# References

Ahmed, N., Brzozowski, M., and Crossley, T. F. (2006). Measurement errors in recall food consumption data. Technical report, Institute for Fiscal Studies, Working Paper.

Baji, P., Pavlova, M., Gulácsi, L., and Groot, W. (2012). Changes in equity in out-of-pocket payments during the period of health care reforms: Evidence from Hungary. *International Journal for Equity in Health*, 11(1):1–11.

Barros, P. P. and Siciliani, L. (2011). Public and Private Sector Interface. In: Mark V. Pauly, Thomas G. Mcguire and Pedro, P. Barros, (eds.) *Handbook of Health Economics*, 2, Elsevier: Amsterdam et al., 927-1001.

Bilger, M. and Chaze, J.-P. (2008). What drives individual health expenditure in Switzerland? *Swiss Journal of Economics and Statistics*, 144(III):337–358.

Chaze, J.-P. (2005). Assessing household health expenditure with box-cox censoring models. *Health Economics*, 14(9):893–907.

Chernew, M. E. and Newhouse, J. P. (2012). Health care spending growth. In: Mark V. Pauly, Thomas G. Mcguire and Pedro, P. Barros, (eds.) *Handbook of Health Economics*, 2, Elsevier: Amsterdam et al., 1-43.

Corrieri, S., Heider, D., Matschinger, H., Lehnert, T., Raum, E., and Konig, H. (2010). Income-, education-and gender-related inequalities in out-of-pocket health-care payments for 65+ patients - a systematic review. *International Journal for Equity in Health*, 9(1):20.

Costa-Font, J., Kanavos, P., and Rovira, J. (2007). Determinants of out-of-pocket pharmaceutical expenditure and access to drugs in Catalonia. *Applied Economics*, 39(5):541–551.

Crossley, T. F. and Winter, J. K. (2013). Asking Households about Expenditures: What Have We Learned? NBER Working Paper 19543.

Cuong, N. V., Hanh, N. T., Nguyet, P. M., and Nga, N. T. (2010). The impact of compulsory health insurance on health care utilization and out-of-pocket payments: New evidence for Vietnam. Research Proposal.

Goddard, M. and Smith, P. C. (1998). Equity of access to health care. Technical report, Centre for Health Economics, University of York, Discussion Paper.

Gouveia, M. (1997). Majority rule and the public provision of a private good. *Public Choice*, 93(3-4):221–244.

Jacobson, L. (2000). The family as producer of health - an extended grossman model. *Journal of Health Economics*, 19(5):611–637.

Jones, A. M. (2000). Health econometrics. In: Culyer, Anthony J. and Newhouse, Joseph, P. (eds.) *Handbook of Health Economics*, 1, Elsevier: Amsterdam et al., 1265-344.

Jones, G., Savage, E., and Van Gool, K. (2008). The distribution of household health expenditures in Australia. *Economic Record*, 84(s1):S99–S114.

Jowett, M., Contoyannis, P., and Vinh, N. D. (2003). The impact of public voluntary health insurance on private health expenditures in Vietnam. *Social Science & Medicine*, 56(2):333–342.

Kasje, W. N., Timmer, J., Boendermaker, P., and Haaijer-Ruskamp, F. (2002). Dutch GPs' perceptions: the influence of out-of-pocket costs on prescribing. *Social Science & Medicine*, 55(9):1571–1578.

Köhlmeier, J. (2012). Economic determinants of out-of-pocket expenditure in health care financing: A worldwide perspective. Unpublished Thesis, University of Innsbruck.

Lavado, R. F., Brooks, B. P., and Hanlon, M. (2012). Estimating health expenditure shares from household surveys. *Bulletin of the World Health Organization*, 91:519–524.

Leive, A. and Xu, K. (2007). Coping with the out-of-pocket health payments: applications of Engel curves and two-part models in six African countries. WHO-HSF, Discussion Paper 7.

Li, S. M., Moslehi, S., and Yew, S. L. (2012). Public-private mix of health expenditure: A political economy approach and a quantitative exercise, Monash University, Discussion Paper 11/12.

Lu, C., Chin, B., Li, G., and Murray, C. J. (2009). Limitations of methods for measuring out-of-pocket and catastrophic private health expenditures. *Bulletin of the World Health Organization*, 87(3):238–244D.

Madden, D. (2008). Sample selection versus two-part models revisited: The case of female smoking and drinking. *Journal of Health Economics*, 27(2):300–307.

Matsaganis, M., Mitrakos, T., and Tsakloglou, P. (2009). Modelling health expenditure at the household level in Greece. *The European Journal of Health Economics*, 10(3):329–336.

Mihaylova, B., Briggs, A., O'Hagan, A., and Thompson, S. G. (2011). Review of statistical methods for analysing healthcare resources and costs. *Health Economics*, 20(8):897–916.

Musgrove, P., Zeramdini, R., and Carrin, G. (2002). Basic patterns in national health expenditure. *Bulletin of the World Health Organization*, 80(2):134–146.

Neter, J. (1970). Measurement errors in reports of consumer expenditures. *Journal of Marketing Research*, VII:11–25.

Newhouse, J. P. and the Insurance Experiment Group, R. C. I. E. (1993). Free for all?: Lessons from the RAND health insurance experiment. Harvard University Press.

Norton, E. C., Wang, H., and Stearns, S. C. (2006). Out-of-pocket health care expenditures. *Swiss Journal of Economics and Statistics*, 142(V):3–11.

OECD-Health-Data (2012). http://www.oecd.org/health/health-systems/oecdhealth data.htm.

OECD-Health-Data (2013). http://www.oecd.org/health/health-systems/oecdhealth data.htm.

Propper, C. (2000). The demand for private health care in the UK. *Journal of Health Economics*, 19(6):855–876.

Rubin, R. M. and Koelln, K. (1993). Determinants of household out-of-pocket health expenditures. *Social Science Quarterly*, 74(4):721–735.

Statistik-Austria (2011a). Konsumerhebung 2009/10: Codebuch für detaillierte Mikro-daten, http://www.ifarm.at/web_de/statistiken/soziales/verbrauchsausgaben/konsum erhebung_2009_2010/index.htm.

Statistik-Austria (2011b). Konsumerhebung 2009/10: Mikrodaten.

Statistik-Austria (2011c). Konsumerhebung 2009/10: Standard-Dokumentation, Metainformationen (Definitionen, Erläuterungen, Methoden, Qualität), http://www.ifarm.at/web_de/statistiken/soziales/verbrauchsausgaben/konsumerheb ung_2009_2010/index.htm.

Statistik-Austria (2013). Gesundheitsausgaben in Österreich, https://www.statistik.at/ web_de/statistiken/gesundheit/gesundheitsausgaben.

Theurl, E. (2007). Die Ordnung des Gesundheitswesens. In: DirningerChristian, Nautz Jürgen, Theurl Engelbert, Theurl Theresia (eds) *Zwischen Markt und Staat - Geschichte und Perspektiven der Ordnungspolitik in der Zweiten Republik,* Böhlau Verlag, Wien, 451-552.

Versicherungsverband-Österreich (2013). Daten von Taten - Jahresbericht 2012. Wien.

Wagstaff, A. and Van Doorslaer, E. (2000). Equity in health care finance and delivery. In: Culyer, Anthony J. and Newhouse, Joseph, P. (eds.) *Handbook of Health Economics*, 1, Elsevier: Amsterdam et al., 1803-1862.

Xu, K., Evans, D. B., Kawabata, K., Zeramdini, R., Klavus, J., and Murray, C. J. (2003). Household catastrophic health expenditure: a multicountry analysis. *The Lancet*, 362(9378):111–117.

You, X. and Kobayashi, Y. (2011). Determinants of out-of-pocket health expenditure in China. *Applied Health Economics and Health Policy*, 9(1):39–49.

Zuvekas, S. H. and Olin, G. L. (2009). Validating household reports of health care use in the medical expenditure panel survey. *Health Services Research*, 44(5p1):1679–1700.

2014-04 **Alice Sanwald, Engelbert Theurl:** What drives out-of pocket health expenditures of private households? - Empirical evidence from the Austrian household budget survey

2014-03 **Tanja Hörtnagl, Rudolf Kerschbamer:** How the value of information shapes the value of commitment or: Why the value of commitment does not vanish

2014-02 **Adrian Beck, Rudolf Kerschbamer, Jianying Qiu, Matthias Sutter:** Car mechanics in the lab - Investigating the behavior of real experts on experimental markets for credence goods

2014-01 **Loukas Balafoutas, Adrian Beck, Rudolf Kerschbamer, Matthias Sutter:** The hidden costs of tax evasion - Collaborative tax evasion in markets for expert services

2013-37 **Reto Stauffer, Georg J. Mayr, Markus Dabernig, Achim Zeileis:** Somewhere over the rainbow: How to make effective use of colors in meteorological visualizations

2013-36 **Hannah Frick, Carolin Strobl, Achim Zeileis:** Rasch mixture models for DIF detection: A comparison of old and new score specifications

2013-35 **Nadja Klein, Thomas Kneib, Stephan Klasen, Stefan Lang:** Bayesian structured additive distributional regression for multivariate responses

2013-34 **Sylvia Kaufmann, Johann Scharler:** Bank-lending standards, loan growth and the business cycle in the Euro area

2013-33 **Ting Wang, Edgar C. Merkle, Achim Zeileis:** Score-based tests of measurement invariance: Use in practice

2013-32 **Jakob W. Messner, Georg J. Mayr, Daniel S. Wilks, Achim Zeileis:** Extending extended logistic regression for ensemble post-processing: Extended vs. separate vs. ordered vs. censored

2013-31 **Anita Gantner, Kristian Horn, Rudolf Kerschbamer:** Fair division in unanimity bargaining with subjective claims

2013-30 **Anita Gantner, Rudolf Kerschbamer:** Fairness and efficiency in a subjective claims problem

2013-29 **Tanja Hörtnagl, Rudolf Kerschbamer, Rudi Stracke, Uwe Sunde:** Heterogeneity in rent-seeking contests with multiple stages: Theory and experimental evidence

2013-28 **Dominik Erharter:** Promoting coordination in summary-statistic games

2013-27 **Dominik Erharter:** Screening experts' distributional preferences

2013-26 **Loukas Balafoutas, Rudolf Kerschbamer, Matthias Sutter:** Second-degree moral hazard in a real-world credence goods market

2013-25 **Rudolf Kerschbamer:** The geometry of distributional preferences and a non-parametric identification approach

2013-24 **Nadja Klein, Michel Denuit, Stefan Lang, Thomas Kneib:** Nonlife ratemaking and risk management with bayesian additive models for location, scale and shape

2013-23 **Nadja Klein, Thomas Kneib, Stefan Lang:** Bayesian structured additive distributional regression

2013-22 **David Plavcan, Georg J. Mayr, Achim Zeileis:** Automatic and probabilistic foehn diagnosis with a statistical mixture model

2013-21 **Jakob W. Messner, Georg J. Mayr, Achim Zeileis, Daniel S. Wilks:** Extending extended logistic regression to effectively utilize the ensemble spread

2013-20 **Michael Greinecker, Konrad Podczeck:** Liapounoff's vector measure theorem in Banach spaces *forthcoming in Economic Theory Bulletin*

2013-19 **Florian Lindner:** Decision time and steps of reasoning in a competitive market entry game *forthcoming in Economics Letters*

2013-18 **Michael Greinecker, Konrad Podczeck:** Purification and independence

2013-17 **Loukas Balafoutas, Rudolf Kerschbamer, Martin Kocher, Matthias Sutter:** Revealed distributional preferences: Individuals vs. teams *forthcoming in Journal of Economic Behavior and Organization*

2013-16 **Simone Gobien, Björn Vollan:** Playing with the social network: Social cohesion in resettled and non-resettled communities in Cambodia

2013-15 **Björn Vollan, Sebastian Prediger, Markus Frölich:** Co-managing common pool resources: Do formal rules have to be adapted to traditional ecological norms? *published in Ecological Economics*

2013-14 **Björn Vollan, Yexin Zhou, Andreas Landmann, Biliang Hu, Carsten Herrmann-Pillath:** Cooperation under democracy and authoritarian norms

2013-13 **Florian Lindner, Matthias Sutter:** Level-k reasoning and time pressure in the 11-20 money request game *published in Economics Letters*

2013-12 **Nadja Klein, Thomas Kneib, Stefan Lang:** Bayesian generalized additive models for location, scale and shape for zero-inflated and overdispersed count data

2013-11 **Thomas Stöckl:** Price efficiency and trading behavior in limit order markets with competing insiders *forthcoming in Experimental Economics*

2013-10 **Sebastian Prediger, Björn Vollan, Benedikt Herrmann:** Resource scarcity, spite and cooperation

2013-09 **Andreas Exenberger, Simon Hartmann:** How does institutional change coincide with changes in the quality of life? An exemplary case study

2013-08 **E. Glenn Dutcher, Loukas Balafoutas, Florian Lindner, Dmitry Ryvkin, Matthias Sutter:** Strive to be first or avoid being last: An experiment on relative performance incentives.

2013-07 **Daniela Glätzle-Rützler, Matthias Sutter, Achim Zeileis:** No myopic loss aversion in adolescents? An experimental note

2013-06 **Conrad Kobel, Engelbert Theurl:** Hospital specialisation within a DRG-Framework: The Austrian case

2013-05 **Martin Halla, Mario Lackner, Johann Scharler:** Does the welfare state destroy the family? Evidence from OECD member countries

2013-04 **Thomas Stöckl, Jürgen Huber, Michael Kirchler, Florian Lindner:** Hot hand belief and gambler's fallacy in teams: Evidence from investment experiments

2013-03 **Wolfgang Luhan, Johann Scharler:** Monetary policy, inflation illusion and the Taylor principle: An experimental study

2013-02 **Esther Blanco, Maria Claudia Lopez, James M. Walker:** Tensions between the resource damage and the private benefits of appropriation in the commons

2013-01 **Jakob W. Messner, Achim Zeileis, Jochen Broecker, Georg J. Mayr:** Improved probabilistic wind power forecasts with an inverse power curve transformation and censored regression

University of Innsbruck

Working Papers in Economics and Statistics

Alice Sanwald, Engelbert Theurl

What drives out-of pocket health expenditures of private households? - Empirical evidence from the Austrian household budget survey

**Abstract**
Out-of-pocket health expenditures (OOPHE) are a substantial source of health care financing even in health care systems with an established role of prepaid financing. The empirical analysis of OOPHE is challenging, because they are fixed in an interaction with other sources of health care financing. We analyze to what extent a set of socio-economic and socio-demographic covariates of private households in influences the OOPHE-patterns in Austria. Our empirical research strategy is guided by the approach Propper (2000) used to study the demand for private health care in the NHS. We use cross-sectional information provided by the Austrian household budget survey 2009/10. We apply a Two-Part Model (Logit/OLS with log-transformed dependent variable or Logit/GLM). We present results for total OOPHE and for selected OOPHE-subcategories. Overall, we find mixed results for the different expenditure categories and for the two decision stages. Probability and level of OOPHE increase with the household size and the level of education, while household income shows mixed results on both stages. Private health insurance and OOPHE seem to be complements, at least for total OOPHE and for OOPHE for physician services, while this relationship is insignificant for pharmaceuticals. Different forms of public insurance have an effect on the total OOPHE-level, for physician services and pharmaceuticals on both stages. To some extent the participation decision is influenced in a different way compared to the intensity decision. This is especially true for age, sex, household structure and the status of retirement. It turns out, that the explanatory power of the used variables is low for OOPHE for pharmaceuticals. A splitting up of pharmaceuticals into prescription fees and direct payments gives better insights into the determinants. We conclude: It is necessary to investigate subcategories of OOPHE. It also turns out, that systematic covariates explain only a very small part of the variation in the OOPHE-patterns. Finally, we also conclude that information on OOPHE from general household budget surveys are of limited value when studying the determinants.