Do Out-Of-Pockets Undermine Equity in Healthcare Financing? A Comparison of Healthcare Systems in Europe

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Abstract – In order to guarantee equal access to healthcare, it must be funded in an equitable manner to ensure that people are not forced to forgo healthcare and to prevent healthcare from becoming too large a financial burden for patients. This is achieved by ensuring that healthcare received by the poorest people is subsidised by wealthier people, while also ensuring that patients suffering poor health are not burdened with excessive costs for a given income. In practice, patients are required to cover some of their healthcare costs across all European healthcare systems. Since out-of-pockets are only paid by healthcare consumers, their existence may compromise equity in healthcare financing. In this article, we evaluate how out-of-pockets contribute to vertical and horizontal equity in healthcare financing for people aged 50 and over in Europe. Using concentration indices, we demonstrate that equity in financing is not respected, particularly in healthcare systems where out-of-pockets are the least regulated.

JEL: D63, I14
Keywords: out-of-pocket, equity, healthcare financing, healthcare systems

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With a view to fostering responsibility among consumers of healthcare, all European healthcare systems have introduced schemes whereby patients pay a share of their healthcare costs. In other words, all of these systems apply out-of-pockets. However, the existence of out-of-pockets can undermine equal access to healthcare if it is a contributing factor in patients forgoing healthcare or if such out-of-pockets present too great a financial burden for some individuals.

In order to guarantee access to healthcare for all, healthcare systems must ensure that they are financed in an equitable manner (Daniels, 1982; 1985; Wagstaff & Van Doorslaer, 2000; Fleurbaey & Schokkaert, 2009; Rochaix & Tubeuf, 2009). They must therefore respect the principle of vertical equity for financing, according to which healthcare of the poorest is subsidised by the wealthiest (Wagstaff & Van Doorslaer, 2000; Rochaix & Tubeuf, 2009; Jusot *et al.*, 2016). This principle demands that financial contributions to the healthcare system increase at least in proportion to income, regardless of risk or how much the healthcare system is actually used. The aim is twofold: promoting access to healthcare and ensuring that healthcare financing does not require a higher proportion of disposable income among the poorest than among the wealthiest. The idea is to ensure that accessing healthcare does not contribute to inequality in disposable income.

Guaranteeing universal access to healthcare also means not subjecting the sickest patients very high expenditure, also called "catastrophic" payments, or forcing them to forgo healthcare for financial reasons. The literature shows that the majority of individuals faced with high expenditure for healthcare are elderly individuals with health conditions requiring numerous treatments, some of which are not well covered (e.g. dental care prosthetics, etc.), as well as vulnerable hospital inpatients (Franc & Pierre, 2016; Perronnin, 2018). Therefore, vertical equity in healthcare financing is combined with the objective of achieving horizontal equity in healthcare financing, a principle that demands equal contributions to the system based on equivalent ability to pay, regardless of how much the healthcare system is used. Horizontal equity in the financing of healthcare therefore ensures that individuals are not financially responsible for their healthcare needs.

Regarding contributions to the public health insurance system, both of these principles can easily be fulfilled, since contribution amounts can be based solely on income levels, without any link to health status. Compliance with these social justice principles is less clear in cases where patients are required to cover a portion of their healthcare costs. Indeed, out-of-pockets are not only based on patients' ability to pay, but also on their actual healthcare consumption (Wagstaff & Van Doorslaer, 2000). In France, compulsory health insurance contributions have a positive effect on redistribution from the wealthiest to the poorest, while health insurance premiums and final out-of-pockets run counter to solidarity between high and low incomes (Jusot *et al.*, 2016). Using survey data from Tajikistan, Pellet (2020) also demonstrates that out-of-pockets have a negative impact on vertical equity in the financing of healthcare due to their regressive nature; in other words, they do not increase in proportion to income.

This article provides an insight into how final out-of-pockets, i.e. amounts that are not covered by public nor private health insurance, contribute to equity in healthcare financing. We assess how out-of-pockets contribute to both vertical and horizontal equity in healthcare financing, a question that has not yet been explored in the literature to our knowledge. As Europe is home to a number of different types of healthcare system, we conduct this study from a comparative perspective among European countries. We would expect out-of-pockets to have a greater negative impact on equity in insurance-based systems, where the share of private financing is greater, except if these systems implement redistributive instruments that limit direct payments based on financial resources (vertical equity) or health condition regardless of income (horizontal equity). For this reason, we explore the extent to which out-of-pockets contribute to equity in financing in several European countries for three different types of healthcare for which costs are covered differently, depending on healthcare systems: doctor visits, dental care and hospital stays. We use data from the Survey of Health, Ageing and Retirement in Europe (SHARE), which surveys Europeans aged 50 and over, a population with important healthcare needs. This survey provides harmonized information on final out-of-pockets paid by patients for these three types of healthcare across countries. In order to assess the contribution of out-of-pockets to vertical equity in financing, we use the concentration index method (O'Donnell *et al.*, 2007), which defines whether out-of-pockets increase, decrease or is constant with income, and the progressivity index, known as the "Kakwani

index" (Kakwani, 1977), which indicates the regressivity, progressivity or proportionality of out-of-pockets in relation to income. For the horizontal equity analysis, we measure differences in contributions to the healthcare system between individuals with equivalent income but with differences in health status. To this aim, we compute the concentration index for out-of-pockets in a population ranked by health status with indirect standardisation of income.

We demonstrate that out-of-pockets negatively contribute to vertical equity in financing for the three types of healthcare. For outpatient care (i.e. doctor visits and dental care), out-of-pockets are the least regressive in countries in which such healthcare is largely covered by the public system. It is the most regressive in Switzerland, where the healthcare system is largely financed by households. Out-of-pockets for hospital stays is even more regressive than out-of-pockets for outpatient care. In spite of having a healthcare system based on the universal model, Denmark and Sweden exhibit the most regressive hospital out-of-pockets among all countries in our study: this is symptomatic of a growing privatisation due to long waiting lists in the public sector (Chambaretaud & Lequet-Slama, 2003). For a given income, out-of-pockets for doctor visits and hospital stays are more concentrated among the sickest in almost all countries, which suggests that healthcare systems are not providing adequate coverage for the sickest who then become financially responsible for their poor health, which is at odds with the principle of horizontal equity. For dental care, out-of-pockets are less concentrated among those requiring more care, particularly in Czechia, where basic dental care is not subject to out-of-pockets.

The remainder of this article is structured as follows. Section 1 describes the financing of healthcare systems in Europe. Section 2 defines the concepts of vertical and horizontal equity healthcare financing and describes the methodology. Section 3 presents the data, the variables used for our analyses and the sample of interest. Results are presented in Section 4.

1. Healthcare Financing in Europe

All healthcare systems are funded by a combination of public (i.e. taxes and public insurance contributions) and private sources (i.e. private insurance premiums and out-of-pockets paid directly by households). Although European healthcare systems are largely publicly funded, they differ in terms of funding sources and healthcare provision organization. In insurance-based systems, also known as Bismarck systems, healthcare is funded by mandatory health insurance contributions from workers and dispensed by public and private service providers, while systems inspired from the assistance-based model, also referred to as the Beveridge model, are characterised by a universal healthcare system funded through taxation and healthcare dispensed by public service providers or providers under contract with the public system (Badel & Pujolar, 2008; Chambaretaud & Hartmann, 2009; Nezosi, 2021). Table 1 shows the different types of healthcare funding in the studied countries.

In insurance-based systems, healthcare expenses are usually paid by patients and are only partially reimbursed by public health insurance.[1] Cost-sharing instruments (co-payment, beneficiary co-payment and lump-sum payment) exist in all countries sharing this type of system for all three types of healthcare. However, schemes aimed at exempting patients from paying out-of-pockets or capping such out-of-pockets are based on financial resources (in Germany, Austria, Belgium, France and Czechia), health condition (in Germany, Austria, Belgium, France and Switzerland) or based on the proportion of the out-of-pocket to income, referred to as the "expenditure to income ratio", as is the case in Germany and Austria, where out-of-pockets are capped at 2% of gross annual household income. In Czechia, annual out-of-pockets are capped at an absolute threshold (Paris *et al.*, 2016; Tikkanen *et al.*, 2020). Since patients have to cover a part of their healthcare costs in these systems, the private supplementary health insurance market is particularly well developed in these countries (Figure I). In some cases, individuals are covered by their employers, which goes some way to explaining the systematic difference in coverage rates between workers (i.e. those in employment) and non-workers (i.e. those who are retired, unemployed or unable to work due to disability) revealed by the SHARE survey data. Supplementary insurance coverage rates are high in Bismarck-type systems, such as Switzerland (>75%), Belgium (>80%) and France particularly (>95%). Coverage rates are lower in other countries with a system based

1. Nowadays, the majority of systems that were initially insurance-based are now considered as hybrid systems since they also borrow characteristics from the universal model. For example, in France, the healthcare system was originally based on the Bismarck model but now also provides assistance schemes (e.g. Complémentaire Santé Solidaire, *CSS) and is also partly financed by social security contributions (i.e.* Contribution Sociale Généralisée, *CSG). Similarly, so-called assistance-based systems have an insurance-based component, since some healthcare services, such as dental care, are not included in the universal basket.*

on this model, such as Germany (<35%), Austria (<25%) and Czechia (≤10%). In Czechia, this could be explained by the fact that some types of healthcare are not subject to out-of-pockets, such as basic healthcare, which is fully covered.

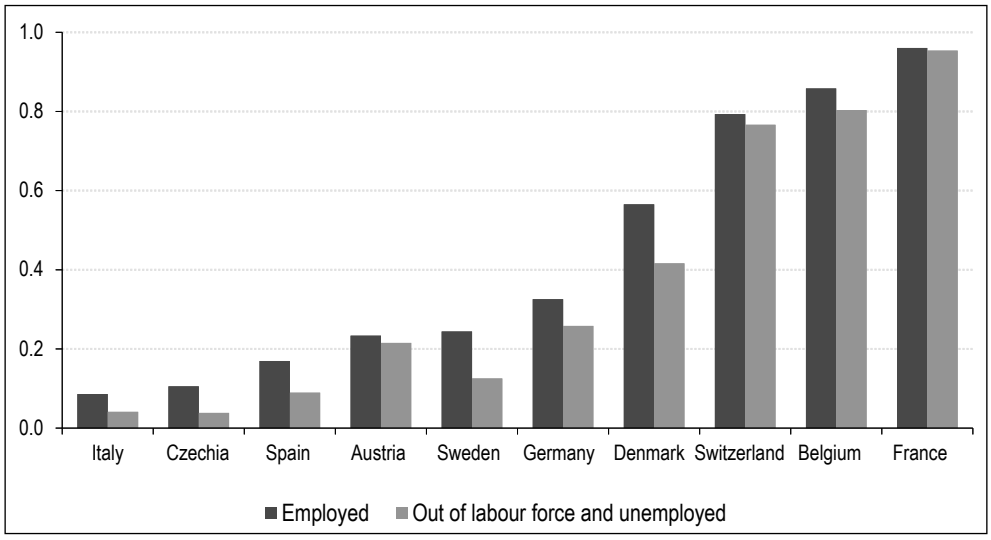
In assistance-based systems, the universal basket of healthcare services is dispensed by national health services and is generally universally accessible – in some cases, it is even free of charge – regardless of ability to pay. For this reason, doctor visits and hospital stays are not subject to cost-sharing in Denmark, Spain or Italy (Sweden is an exception among universal systems). However, private healthcare and dental care are not included in the universal basket of healthcare. Therefore, they are paid by patients in all countries and may be covered by voluntary private insurance. The use of private supplementary health insurance is far less widespread in these systems, particularly in Italy (4% among the unemployed, otherwise 9%) and Spain (9% and 17%, respectively). However, it is more common in Sweden (13% and 24%, respectively) and Denmark (42% and 57%, respectively) where the standard of living is higher. Except from Italy, systems based on the universal model do not provide any regulation towards out-of-pockets for the poorest. Exemptions for

Table 1 – **Characteristics of healthcare systems**

Country	System type		Co-payment, beneficiary co-payment and lump-sum payment			Exemption or cap for:		
	Insurance	Assistance	Doctor visits	Dental care	Hospital stays	financial resources	disease	out-of-pocket amount
Germany	X		X	X	X	E	C	C
Austria	X		X	X	X	E	E	C
Belgium	X		X	X	X	C	C	
Denmark		X		X			E	
Spain		X		X				
France	X		X	X	X	E	E	
Italy		X		X		E	E	
Czechia	X		X	X	X	E		C
Sweden		X	X	X	X		E	C
Switzerland	X		X	X	X		C	

Notes: E = exemption, C = cap.

Figure I – **Supplementary health insurance coverage in Europe**



Notes: The coverage rate is the proportion of individuals with a supplementary health insurance at the time of the survey. It is calculated for the employed on one hand, for the unemployed and those out of labour market, i.e. retirees, those seeking employment or those unable to work due to disability, on another hand.
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.

chronic diseases are provided for in Denmark, Italy and Sweden, but not in Spain. Lastly, the annual out-of-pocket is capped in Sweden for doctor visits for all individuals and for hospital stays for patients aged over 85 (Paris *et al.*, 2016; Tikkanen *et al.*, 2020).

Beyond this typology, healthcare systems differ according to the weight out-of-pockets represent in the overall healthcare system's funding. Figure II shows the proportion of each funding source for each country (OCDE, 2024). Among all countries, Switzerland's healthcare system has the highest share of private funding: 46% of its funding comes from households, among which 27% come from private supplementary insurance and 19% from out-of-pockets. Like Denmark and Sweden, Spanish and Italian healthcare systems are based on the universal model. However, the share of private funding is greater in those countries. In Spain and Italy, funding from households accounts for 42% and 39% of total funding respectively and out-of-pockets making up a similar proportion as observed in Switzerland (18% and 19%, respectively). In Denmark and Sweden, the share of healthcare system funding that comes from households is 25% and 26%, respectively, 12% and 13% of which comes from out-of-pockets. Among the studied countries, France's healthcare system is the least dependent on out-of-pockets, which account for 8% of total funding, due to the key role of private supplementary insurance.

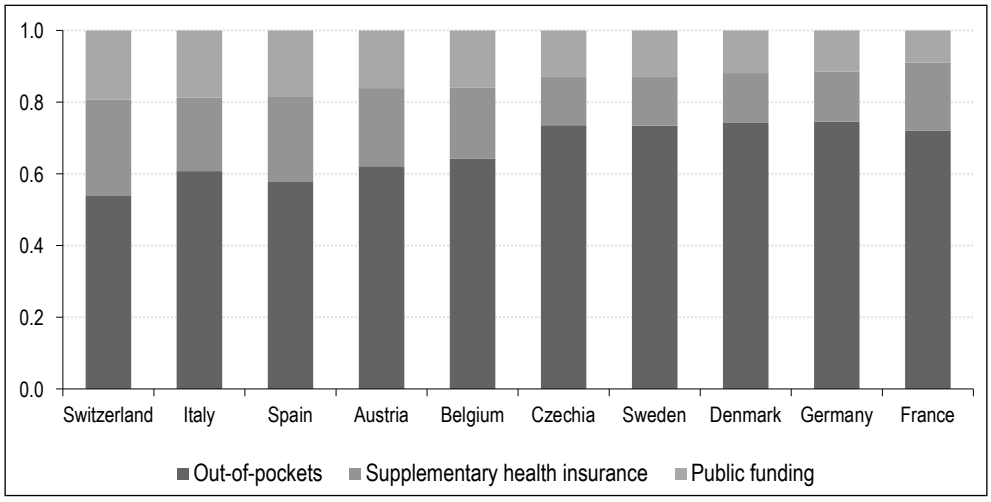
Out-of-pockets account for a different share of households' budget depending on the country. On average, 3% of households' consumption is allocated to healthcare out-of-pockets in OECD countries, with dental care being among the top sources of healthcare expenditure (Berchet & Morgan, 2018). Given that healthcare expenditure increases with age due to higher needs, out-of-pockets for people aged over 50 may be higher than for the general population, unless the healthcare system provides redistribution from the healthiest to the least healthy. By aggregating annual out-of-pockets for doctor visits, dental care and hospital stays to be paid by patients over the age of 50 in the SHARE survey, we estimate that out-of-pockets account for a proportion of individual income ranging from 1% in Denmark to 6.4% in Italy (Figure III). In all countries, dental care generates the greatest out-of-pockets, followed by hospital stays and then doctor visits, with the exception of Italy where hospital out-of-pockets represent the smallest share of total out-of-pockets. However, these statistics cannot be used to assess the equity of healthcare financing in these countries. This point is further discussed in the following section.

2. Methodology

2.1. Vertical Equity in Healthcare Financing

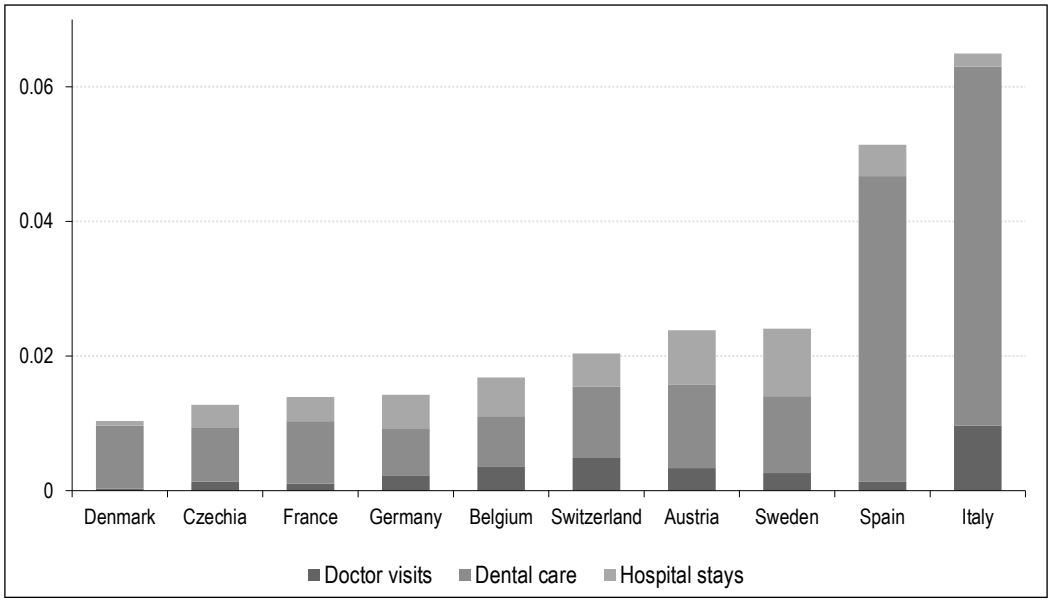
The concept of vertical equity requires unequal treatment of unequal situations. Vertical equity in healthcare financing involves that individuals contributes in line with their ability to pay: financing increases at least in proportion to a person's contributive capacity (Wagstaff *et al.*, 1989; Wagstaff & Van Doorslaer, 2000; Rochaix & Tubeuf, 2009).

Figure II – **Composition of healthcare systems' funding in Europe**



Notes: Public funding includes public insurance contributions and taxes. Each source of funding is interpreted as the percentage of total costs of the healthcare system.
Source: OECD, *Dépenses de santé et financement: Indicateurs des dépenses de santé, 2023* (Healthcare expenditure and financing: healthcare expenditure indicators, 2023).

Figure III – **Composition of average annual out-of-pockets in Europe**



Notes: The ratio of annual out-of-pockets on total annual income is broken down into the following three types of healthcare: doctor visits (dark grey), dental care (medium-grey) and hospital stays (light grey).
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.

2.1.1. Concentration Curve

From a graphical point of view, it is possible to show the distribution of out-of-pockets within the population ranked by income using a concentration curve (O'Donnell *et al.*, 2007). Concentration curves show the cumulative proportion of out-of-pockets based on income percentile, ranked from the lowest to the highest income on the x-axis. The concentration curve for out-of-pockets is compared with the "perfect equality" situation, represented by the diagonal line,[2] where all individuals pay the same out-of-pocket amount, regardless of income. If the concentration curve does not differ significantly from the diagonal, this means that the out-of-pockets' distribution reflects perfect equality. If the concentration curve is above (or below) the diagonal, this means that out-of-pockets are more concentrated among the poorest (or wealthiest) people.

2.1.2. Concentration Index

In order to know if concentration curves are significantly different from the diagonal, we calculate the concentration index (CI) for out-of-pockets (O'Donnell *et al.*, 2007). Inspired from the Gini index, it is equal to twice the area contained between the diagonal and the concentration curve for out-of-pockets, i.e.:

$$CI = \frac{2cov\left(y_j, x\right)}{\mu_{y_j}} \quad ,$$

where y_j is the amount of the out-of-pockets for healthcare type j, x is the rank within the population ranked by income and μ_{y_j} is the average amount of out-of-pockets for healthcare type j in the whole population. The concentration index ranges between −1 and 1, with a positive (or negative) value indicating that out-of-pockets are more concentrated among the wealthiest (or poorest) people. The absolute value of the concentration index increases with the distance between the diagonal and the concentration curve. A null index suggests that out-of-pockets are distributed equally across the population. As the population is ranked by income level, standard errors are corrected for autocorrelation of errors at the income level.

2.1.3. Progressivity Index

In order to conclude on the contribution of out-of-pockets to vertical equity in financing, the degree of progressivity of out-of-pockets is assessed by comparing the concentration curve for out-of-pockets with the Lorenz curve, i.e. the concentration curve for income levels. In other words, it determines whether out-of-pockets contribute to inequalities in standards of living. If the concentration curve for out-of-pockets is the same as the Lorenz curve, out-of-pockets increase in proportion to income and are neutral in terms of contribution to income inequality. If the

2. In a graph with population ranked by income on the x-axis and the cumulative proportion of out-of-pockets on the y-axis, the diagonal line contains all points where x% of the population pays x% of total out-of-pockets in the population.

concentration curve for out-of-pockets is above (or below) the Lorenz curve, out-of-pockets increase less (or more) when compared with income, meaning that out-of-pockets are regressive (or progressive) and increase (or decrease) income inequality. The degree of progressivity is measured by the progressivity index, also known as the Kakwani index (Kakwani, 1977), which, in our case, measures the area between the concentration curve for out-of-pockets and the Lorenz curve. Concretely, this is the difference between the concentration index (CI) and the Gini index (GI), which indicates the degree of income inequality in the population (i.e. the concentration index of the Lorenz curve), i.e.:

$$KI = CI - GI = \frac{2cov\left(y_j, x\right)}{\mu_{y_j}} - \frac{2cov\left(r, x\right)}{\mu_r},$$

where r is income and μ_r its average value in the population. The Gini index ranges from 0 to 1, with 0 indicating no income inequality in the population. The Kakwani index (KI) can therefore range from −2 to 1, with a positive (or negative) value indicating that out-of-pockets are progressive (or regressive) with respect to income and a null value indicating that out-of-pockets increase exactly in proportion with income.

2.1.4. Barriers to Accessing Healthcare

Regarding out-of-pockets, the issue of vertical equity in healthcare financing needs to be tackled in the light of access to healthcare. Indeed, if there are barriers to healthcare access for the poorest, a higher concentration of out-of-pockets among the wealthiest people could be attributable to greater use of healthcare. In this case, under-concentration of out-of-pockets among the poorest cannot (solely) be attributed to a redistributive instrument (*Complémentaire santé solidaire* in France), but may also be explained by the fact that the poorest consume less healthcare than their health status needs it. If there were no barrier to healthcare access, the concentration curve for out-of-pockets would be further away from the Lorenz curve, making out-of-pockets more regressive, and all the more so with healthcare inequality. In other words, where barriers to healthcare access exist, the degree of out-of-pocket's regressivity is probably underestimated. In order to discuss the underestimation of our findings with respect to vertical equity for each type of healthcare, we explore the existence of access barriers by evaluating horizontal equity in healthcare use (Wagstaff & Van Doorslaer, 2000; O'Donnell *et al.*, 2007; Fleurbaey & Schokkaert, 2009). We check whether or not wealthier people are more likely to access healthcare for a given need. In this regard, we use the indirect standardisation method[3] to correct healthcare use for differences in needs for healthcare. Healthcare use is defined as the probability of having consumed a type of healthcare at least once during the last 12 months and the need for healthcare is measured by a health status score.[4] Findings regarding vertical equity in the financing of each type of healthcare are presented in Section 4.1 and are discussed in the light of barriers to healthcare access.

2.2. Horizontal Equity in Healthcare Financing

The fact that vertical equity in the healthcare financing is respected is not a guarantee of equity among individuals with the same income. In other words, even if financial contribution increases with income, two individuals with the same income level may be paying different contributions, thereby violating horizontal equity in healthcare financing according to which equal individuals must be treated equally (Wagstaff & Van Doorslaer, 2000). In principle, there is no horizontal inequity in public insurance contributions since they are based solely on income and do not depend on health status (although age is taken into account in some systems). Regarding out-of-pockets, differences in amounts for a given income should be expected given potential differences in individuals' health status for the same income, unless we assume that public health insurance compensates for these differences by paying more for the sickest (exemption from co-payment in the case of a chronic illness in France or capping of annual out-of-pockets via a safety net in Belgium, for example).

Out-of-pockets contribute to horizontal equity in healthcare financing if, for a given income, the amount of out-of-pockets does not change based on any other criterion, e.g. health status. It therefore implies exploring the concentration of out-of-pockets within the population ranked from the worst to the best health status for a given income (see Section 3.2.3). To do so, we use the indirect standardisation method to correct out-of-pocket amounts for differences in income, i.e. compute out-of-pockets paid by individuals if they were treated as individuals with the same income (O'Donnell *et al.*, 2007). It is also possible to use direct standardisation, which involves correcting out-of-pockets for differences in income by income sub-group.

3. This method is also used to analyse horizontal equity in financing and is described in Section 2.2.
4. The structure of the health score is described in detail in Section 3.2.3.

Since the indirect standardisation method can be used on individual data rather than aggregated data, it is preferred over the direct method that provides a less precise standardisation (Wagstaff & Van Doorslaer, 2000). Standardised out-of-pockets paid by individual i for each healthcare type j, denoted as y_{ij}^{s}, is calculated as follows:

$$y_{ij}^{s} = y_{ij} - \hat{y}_{ij} + \overline{y}_{j},$$

where y_{ij} is the observed out-of-pocket amount, $\hat{y}_{ij}$ is the predicted out-of-pocket amount on income and $\overline{y}_{j}$ is the average out-of-pocket. Then, we compute a concentration index with this standardised out-of-pocket measure in the population ranked by health status. Standard errors of concentration indices are corrected for autocorrelation of errors at the health status score level.

If the concentration curve for standardised out-of-pockets does not diverge significantly from the diagonal, the distribution of out-of-pockets is perfectly equal, which means that all individuals pay the same amount regardless of their health status for a given income. This situation fulfils the principle of horizontal equity in healthcare financing. If the concentration curve for out-of-pockets is above the diagonal (i.e. positive concentration index), this means that out-of-pockets are more concentrated among the sickest for a given income. This corresponds to a situation of great horizontal inequity in financing as the sickest patients are required to pay out-of-pockets to meet their healthcare needs even though they have the same ability to pay as other individuals with the same income. If the concentration curve for out-of-pockets is below the diagonal (i.e. negative concentration index), this means that out-of-pockets are more concentrated among people in better health. This situation is conceivable in the context of preventative care since they avoid the deterioration of health.

3. Data

3.1. The Survey of Health, Ageing and Retirement in Europe (SHARE)

This study is based on data from the SHARE survey (Börsch-Supan *et al.*, 2013),[5] which provides information regarding employment, living conditions and the health status of individuals aged 50 and over in 27 European countries. Only data from Waves 5, 6 and 7[6] (conducted between 2013 and 2017) are used since questions regarding healthcare costs asked in the previous waves are not comparable. By restricting our sample to respondents who answered all of the questions that we are interested in, we obtain a total sample of 89,079 observations for 50,336 individuals living in 10 European countries: Austria, Belgium, Czechia, Denmark, France, Germany, Italy, Spain, Sweden and Switzerland.

3.2. Variables of Interest

3.2.1. Out-of-Pockets

The SHARE survey provides information regarding out-of-pockets after public and private healthcare insurance coverage for three types of healthcare: doctor visits (including visits to a general practitioner, a specialist and/or outpatient and emergency consultations at the hospital), dental care and hospital stays. For each type of healthcare, the question providing the out-of-pocket amounts is as follows: "*Overall, how much did you pay yourself during the last twelve months for [healthcare type], that is how much did you pay without getting reimbursed? Only include the amount you were ultimately required to pay out of pocket.*" The amount of out-of-pocket is a continuous variable with a minimum value of 0 for individuals who have not declared any out-of-pocket (cost of healthcare covered in full or no consumption of healthcare).

Where the amount of out-of-pocket represents an important share of income, it is considered a "catastrophic" expenditure. The literature generally applies a threshold of 10% of total income or 40% of disposable income (i.e. income without expenditure that cannot be reduced, or "ability to pay") to define a catastrophic amount (O'Donnell *et al.*, 2007; Cylus *et al.*,

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5. This paper uses data from SHARE Waves 5, 6 and 7 (10.6103/SHARE.w5.800, 10.6103/SHARE.w6.800, 10.6103/SHARE.w7.800, 10.6103). See Börsch-Supan et al. *(2013) for methodological details. The SHARE data collection has been funded by the European Commission, DG RTD through FP5 (QLK6-CT-2001-00360), FP6 (SHARE-I3: RII-CT-2006-062193, COMPARE: CIT5-CT-2005-028857, SHARELIFE: CIT4-CT-2006-028812), FP7 (SHARE-PREP: GA N°211909, SHARE-LEAP: GA N°227822, SHARE M4: GA N°261982, DASISH: GA N°283646) and Horizon 2020 (SHARE-DEV3: GA N°676536, SHARE-COHESION: GA N°870628, SERISS: GA N°654221, SSHOC: GA N°823782, SHARE-COVID19: GA N°101015924) and by DG Employment, Social Affairs & Inclusion through VS 2015/0195, VS 2016/0135, VS 2018/0285, VS 2019/0332, and VS 2020/0313. Additional funding from the German Ministry of Education and Research, the Max Planck Society for the Advancement of Science, the U.S. National Institute on Aging (U01_AG09740-13S2, P01_AG005842, P01_AG08291, P30_AG12815, R21_AG025169, Y1-AG-4553-01, IAG_BSR06-11, OGHA_04-064, HHSN271201300071C, RAG052527A) and from various national funding sources is gratefully acknowledged (see www.share-project.org).*

6. Wave 7 is based around two sub-surveys: the main questionnaire, submitted to all longitudinal participants in the survey, and the SHARELIFE retrospective questionnaire, which gathers data from participants regarding their life trajectories. Two types of participant were involved in this second questionnaire: new entrants in Wave 7 and former participants who did not participate in the previous version of this questionnaire in Wave 3. We exclude these two categories of respondents from the sample of interest because the main questionnaire they were asked to complete was adapted to limit the total duration of the survey and does not include information regarding out-of-pockets.

2018; Wagstaff, 2019). Based on the available information in SHARE, we calculate the expenditure to income ratio by comparing healthcare expenditure with total income and therefore use the 10% threshold to draw a conclusion as to the catastrophic nature of out-of-pockets. For each country, the expenditure to income ratio for each quartile is shown in the Appendix and discussed in Section 3.3.

It is worth noting that the use of declared out-of-pockets may induce some bias. More specifically, there may be a memory bias related to healthcare consumption, but the direction of this bias is not clear. On one hand, we can expect that individuals who consume a lot of healthcare may forget some costs. Knowing that healthcare consumption is positively correlated with income, it could be the case that the wealthiest people underestimate their out-of-pocket amounts. Ultimately, out-of-pockets may appear less concentrated among the wealthiest than they actually are and could therefore look less favourable to vertical equity than they should be. On the other hand, it could be assumed that less frequent consumers underestimate their out-of-pockets if they are less accustomed to monitoring their healthcare expenditures. In this case, out-of-pockets would seem more favourable to vertical equity than it should be. Since healthcare consumption is also correlated with health status, out-of-pockets may also be underestimated among the sickest (resp. least sick) if people with high (resp. low) out-of-pockets underestimate the amount. Thus, the distribution of out-of-pockets is artificially more (resp. less) horizontally equitable. In the end, it is impossible to establish the impact of memory bias on the estimation of out-of-pockets' contribution to equity in healthcare financing. Nevertheless, declared out-of-pockets from the SHARE survey are the best measure we can use for the purposes of this analysis. First, there is no administrative data source allowing to observe final out-of-pockets (i.e. after all coverage tools) for a representative sample of people aged 50 and over. Secondly, since the objective of this study is to compare the contribution of out-of-pockets to equity in healthcare financing across European healthcare systems, a harmonised measure of out-of-pockets across European countries is necessary.

3.2.2. Contributive Capacity

Data from the SHARE survey provide detailed information regarding different categories of household income (wages and other income). We use the household's standard of living, calculated by dividing the total annual household income (total of all sources of income reported by the household) by the number of consumption units. The number of consumption units is measured as follows: the first member of the household counts as 1 unit and all other members of the household count as 0.5 (Hourriez & Olier, 1998). Vertical equity analyses are performed using the percentiles of this continuous standard of living variable as a ranking variable. The mean standard of living and its distribution in quartiles are shown for the overall sample in Table 2 and are available for each country within the sample in Online Appendix S2 (see Tables S2-1 to S2-10 – link to the Online Appendix at the end of the article).

3.2.3. Health Status

In order to analyse horizontal equity in healthcare financing, a continuous health status variable is required in order to rank the population according to health status on a precise scale, in this case percentiles (Wagstaff & Van Doorslaer, 1994). We achieve this by constructing a continuous score by predicting the individual's perceived health status with various reported health status indicators and socio-demographic characteristics. Our selection of health indicators is based on health status measurement tools developed by The EuroQol Group (EuroQol Research Foundation, 2018). Their indicator, referred to as EQ-5D, includes several health-related dimensions: mobility, self-care, daily activities, pain/discomfort and anxiety/depression.

SHARE data provide information regarding limitations in daily activities, particularly in terms of mobility and self-care. More specifically, each respondent states whether or not she has difficulties with bathing, dressing, using the bathroom, transferring, maintaining continence and eating. This measure of limitations in daily activities therefore covers the first three dimensions used in EQ-5D. Respondents are also asked about whether or not they are experiencing pain. Mental health status is approximated using a standard European measure, the EURO-D, which is based on the responses to questions concerning depression, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment, and tearfulness (Prince *et al.*, 1999). Lastly, we include a variable that counts the number of chronic illnesses diagnosed by a doctor, which is often used in the literature to approximate health status (Perronnin *et al.*, 2006; Devaux *et al.*, 2008; Pellet, 2020).

Perceived health is predicted by these health-related dimensions using a linear model,

estimated using the ordinary least squares method:

$$Y_{it} = \alpha + \beta_1 AVQ_{it} + \beta_2 MC_{it} + \beta_3 EUROD_{it} + \beta_4 Pain_{it} + \beta_5 X'_{it} + \partial_t + \varepsilon_{it}$$

where Y_{it} is the general health status reported by individual *i* during period *t* on a scale from 1 to 5, with 1 indicating a poor health status and 5 an excellent one; AVQ_{it} is a variable indicating the number of functional limitations in the activities mentioned above (0 to 6); MC_{it} is a variable indicating the number of chronic illnesses; $EUROD_{it}$ is a mental health variable with values from 0 to 12 (1 point for each affected mental health characteristic reported by the individual); $Pain_{it}$ is a binary variable that takes the value of 1 if the individual reports experiencing pain or 0 if not; X'_{it} is the vector of socio-demographic characteristics that are predictive of perceived health (i.e. age, gender); ∂_t is an effect specific to year *t* in which the individual is observed; ε_{it} is a normally distributed error term. Coefficients, standard errors and predicted averages for perceived general health by country are available in Online Appendix S1 (see Table S1-1).

3.3. Description of the Population

All countries included, the total population has more women (55%) than men. The average age of individuals is 67 years, 26% of the population is employed and the average annual income is 27,722 euros (Table 2). 35% of individuals are covered by supplementary private health insurance and 32% report a poor or acceptable health status, 38% report a good health status and 30% a very good or excellent one. The predicted health status score (see Section 3.2.3) is between 3 and 5 on average. Access to healthcare, i.e. consumption of a given type of care at least once during the year, is highest for doctor visits (89%), followed by dental care (57%) and then hospital stays (9%). The proportion of healthcare consumers who have null annual out-of-pockets, in other words, whose healthcare expenditure is covered in full by the public system and/or supplementary private insurance, is higher for hospital stays (66%) than for doctor visits (57%) and dental care (26%). On average, doctor visits generate the lowest out-of-pocket (83 euros). It is higher for hospital stays (138 euros) and dental care (376 euros).

In the sample as a whole and when each country is taken separately, individuals in the first income quartiles are older, are less likely to be employed, are in worse health. Those income groups also contain more women than other quartiles (see Online Appendix S2, Tables S2-1 to S2-10 for the detailed breakdown by country). The poorest people are less likely to be covered by supplementary health insurance than the wealthiest and income-based differences are particularly high in Austria, Belgium, Denmark and Germany, where coverage rates for people falling into the first income quartile are at least 20 percentage points lower than for those in the last quartile. In addition, coverage rate varies widely from one country to the other and between healthcare system types. France, Belgium and Switzerland, which have insurance-based systems, have the highest coverage rates of the sample with 96%, 81% and 77% of individuals having a supplementary health insurance, respectively. Conversely, in countries with a universal healthcare system, supplementary insurance is not as necessary for covering healthcare expenditure and rates are broadly lower, with 5% of the population covered in Italy, 10% in Spain and 16% in Sweden.

At least 85% of individuals have visited a doctor at least once in the last 12 months. Among healthcare consumers, the poorest are more likely to report a null out-of-pocket than the wealthiest, with the exception of Denmark, where the proportion of individuals reporting an out-of-pocket is 95% across all income quartiles. The average out-of-pocket amount among healthcare consumers decreases with income, except in Sweden and Czechia, where individuals falling into the first and last quartiles report a higher annual out-of-pocket than those in the middle quartiles. However, out-of-pockets represent a greater financial burden for the poorest individuals since the out-of-pocket to income ratio decreases with income, with the exception of the two countries with a Beveridge-type universal system: Denmark and Spain (see Appendix, Figures A-I to A-III). In all countries, no income group reaches the 10% threshold that determines whether an out-of-pocket is considered as a catastrophic amount. The out-of-pocket to income ratio for doctor visits represents a maximum of 2% of income for all income groups.

In all countries, dental care use increases with income, even though the population with the lowest income is older and in poorer health. Dental care therefore appears to be particularly prone to barriers to healthcare access. The proportion of individuals reporting full coverage of expenses for dental care is 26% on average across the sample, but this proportion varies widely between countries. In Denmark, Italy, Sweden and Switzerland, it is below 10%,

Table 2 – **Descriptive statistics**

	1st quartile	2nd quartile	3rd quartile	4th quartile	Total
Individual characteristics					
Women	0.59	0.55	0.53	0.52	0.55
Age	69.57	68.72	66.30	64.71	67.36
Workers	0.14	0.18	0.30	0.41	0.26
Income per consumption unit (in €)	9,678	15,770	21,895	64,641	27,722
Supplementary health insurance	0.28	0.33	0.37	0.42	0.35
Health status					
Poor	0.12	0.09	0.06	0.05	0.08
Moderate	0.31	0.27	0.22	0.18	0.24
Good	0.36	0.39	0.40	0.38	0.38
Very good	0.15	0.18	0.23	0.27	0.20
Excellent	0.06	0.07	0.10	0.13	0.10
Predicted score	2.83	2.95	3.07	3.16	3.00
Healthcare use					
Doctor visits	0.89	0.90	0.89	0.88	0.89
Dental care	0.46	0.55	0.61	0.65	0.57
Hospital stays	0.10	0.10	0.08	0.07	0.09
Null out-of-pocket					
Doctor visits	0.65	0.62	0.60	0.59	0.61
Dental care	0.67	0.59	0.54	0.51	0.58
Hospital stays	0.97	0.97	0.97	0.98	0.97
Null out-of-pocket if healthcare is used					
Doctor visits	0.61	0.58	0.55	0.53	0.57
Dental care	0.29	0.26	0.24	0.25	0.26
Hospital stays	0.69	0.64	0.65	0.66	0.66
Average annual out-of-pocket (in €)					
Doctor visits	56.76	69.11	79.69	90.24	73.74
Dental care	147.13	186.07	251.87	269.89	212.83
Hospital stays	14.53	8.63	9.10	10.02	10.59
Average annual out-of-pocket if healthcare is used (in €)					
Doctor visits	63.93	76.76	89.65	102.98	83.00
Dental care	320.24	338.74	414.68	414.58	376.33
Hospital stays	165.24	101.99	138.36	150.66	138.46
Number of observations	22,765	22,607	21,818	21,889	89,079

Notes: The average value of each variable for the first (second, third, fourth) income quartile is reported in column 1, (2, 3, 4). The predicted health score ranges between 1 and 5.
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over, all countries.

while it reaches 64% in France. The expenditure to income ratio for dental care decreases with income in all countries. In Italy and Spain, out-of-pockets for dental care represent 12% and 13% of the income of individuals in the first quartile, respectively, which means that dental care out-ok-pocket meets the catastrophic threshold for the poorest individuals

In universal healthcare systems, such as those found in Denmark, Italy and Spain, the proportion of full coverage among individuals who stayed at the hospital during the year is close to 100%. However, the Swedish system, which is based on the same model, presents the lowest proportion of null out-of-pockets (23%). The link between annual out-of-pocket amounts and income is less homogeneous between countries for hospital stays than for dental care or doctor visits. In Belgium, Denmark and Germany, the average out-of-pocket decreases in line with income, whereas it increases in France, Spain and Switzerland. In the remaining countries, the average out-of-pocket is higher in the first and last quartiles. The threshold for catastrophic out-of-pockets is not reached for hospital expenditure.

4. Results

4.1. Vertical Equity in Healthcare Financing

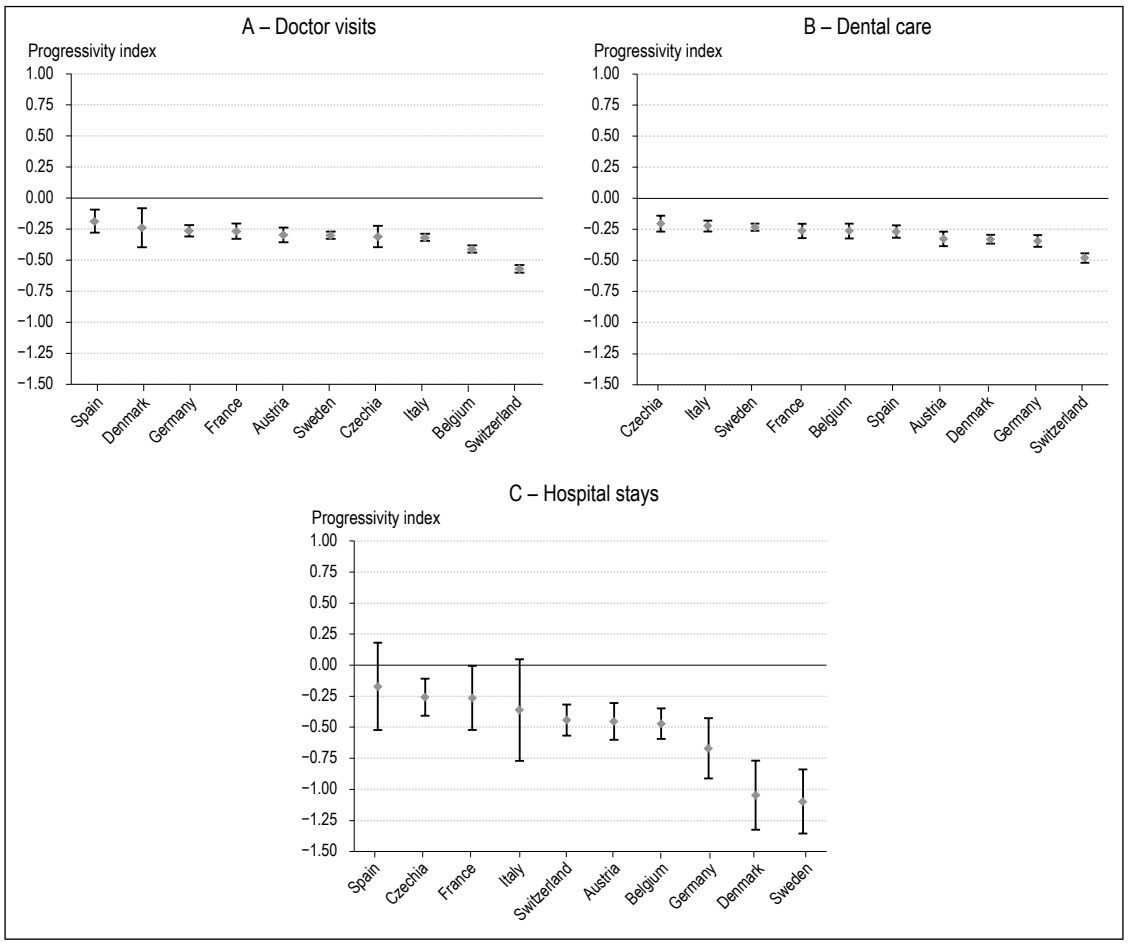
Results regarding the vertical equity analysis are summarised in Figure IV. Concentration curves

are presented in the Appendix (see Figures A-IV to A-VI). For each country, the progressivity index is represented along with 95% confidence intervals. Figure IV-a (or IV-B, IV-C) shows the progressivity index of the out-of-pocket for doctor visits (or dental care, or hospital stays). The concentration index for out-of-pockets for each healthcare type, the Gini index and the progressivity index are available in Online Appendix S3 (see Table S3-1). We comment our findings from the point of view of access to healthcare. Concentration indices for healthcare use with standardisation on the need for healthcare can also be found in Online Appendix S3 (see Table S3-2).

4.1.1. Doctor Visits

In Czechia, Sweden and Denmark, the concentration curve for doctor visits' out-of-pockets does not deviate significantly from the diagonal. Concentration indices are not far from 0 at the 5% level, which means that out-of-pockets do not change with income. Concentration indices for the other countries are positive and deviate significantly from 0, at least at the 5% level. Conversely, the concentration curve crosses the diagonal in Austria, Spain and Switzerland which compromises the interpretation of concentration indices. Only Belgium, France, Germany and Italy have concentration curves that sit significantly below the diagonal without crossing it, demonstrating that out-of-pockets are more concentrated among the wealthiest, particularly in France and Germany (concentration index >0.2). However, although out-of-pockets are more concentrated among the wealthiest individuals in some countries, this does not confirm vertical equity in financing since the progressivity index for out-of-pockets for doctor visits is negative and significant in all countries, which suggests a regressive structure of out-of-pockets. In other words, although out-of-pockets are more concentrated among the wealthiest people, they represent a greater burden among the poorest. Figure IV-A shows that Switzerland, where healthcare financing is more largely based on private sources, is the country in which out-of-pockets are the most regressive (progressivity index <−0.5), while the lowest levels of regressivity are observed in Spain (−0.2 <progressivity index<0) and Denmark (−0.3 <progressivity index <−0.2),

Figure IV – **Vertical equity in healthcare financing**



where healthcare systems are based on a universal model. The level of regressivity of out-of-pockets also appears to be underestimated, as the wealthiest individuals are greater consumers of healthcare than the poorest among those in need of a particular type of healthcare across all countries, with the exception of Denmark, Germany and Spain.

4.1.2. Dental Care

Regarding dental care, the concentration index for out-of-pockets is positive in all countries (at the 1% level), which indicates greater concentration of out-of-pockets among those with the highest incomes. From a graphical point of view, the concentration curve for out-of-pockets is below the diagonal, except in Austria, Switzerland and Belgium, where the concentration curve crosses it. As is the case for doctor visits, concentration of out-of-pockets among the wealthiest people is no guarantee of vertical equity in the healthcare financing since dental out-of-pockets are regressive. In all countries, the progressivity index is negative and deviates significantly from 0, revealing that out-of-pockets do not increase in proportion to income. Out-of-pockets for dental care therefore contribute to the inequity in healthcare financing, particularly in Switzerland (progressivity index = 0.488). The regressivity of dental care out-of-pockets also appears to be underestimated, since concentration indices for standardised healthcare use are positive and even more so than for doctor visits. With equal need for healthcare, the use of healthcare is more concentrated among the wealthiest people, particularly in Italy and Spain (concentration index >0.1). Dental out-of-pockets would therefore represent a heavier burden on the budgets of the poorest if they were to consume as much care as their health status demands.

4.1.3. Hospital Stays

In all countries, the concentration index for hospital out-of-pockets does not deviate significantly from 0 (95% confidence interval). This finding suggests that out-of-pockets for hospital stays are equally distributed along the income distribution, which means that the annual amount of out-of-pocket is independent of income. However, this does not show vertical equity in financing, since this not only requires that the amount of the out-of-pocket increases with income, but also that the share of income allocated to out-of-pockets increases with ability to pay. Figure IV-C shows that, with the exception of Spain and Italy, out-of-pockets for hospital stays are regressive, since the progressivity index is significantly negative (at the 5% level). It is the most regressive in Sweden and Denmark (progressivity index <−1) and the least regressive in Czechia and France (−0.3 <progressivity index <0). The regressive structure of out-of-pockets once again appears to be underestimated in view of the higher concentration of use for a given level of healthcare need among the wealthiest people in Austria (at the 1% level), but appears to be overestimated in Sweden (at the 1% level) and in Germany (at the 5% level) where use is more concentrated among the poorest for a given need.

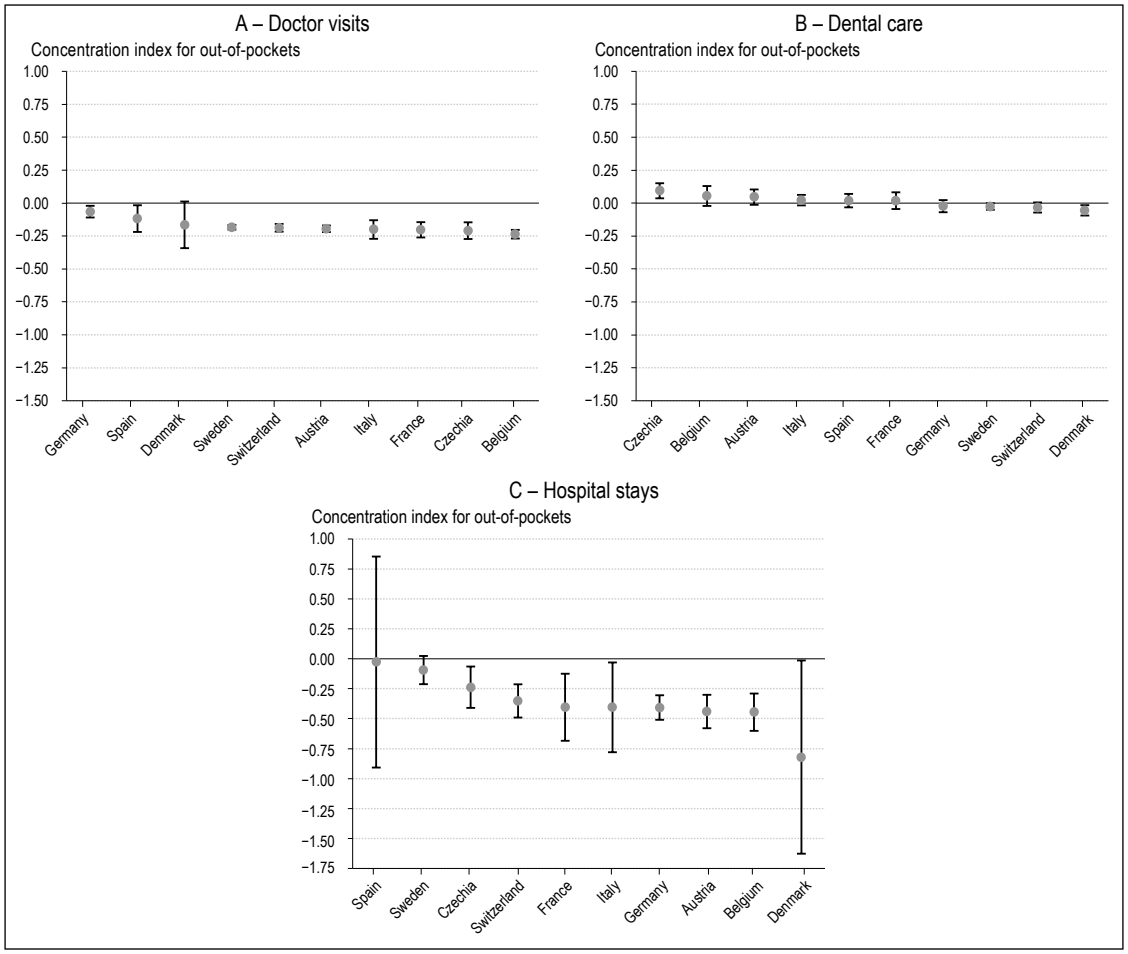
4.2. Horizontal Equity in Healthcare Financing

Results regarding the horizontal equity analysis are summarised in Figure V. For each country, concentration indices for out-of-pockets according to health status with standardisation on income are shown along with 95% confidence intervals. Figure V-A (or V-B, or V-C) shows concentration indices of doctor visits' out-of-pockets (or dental care, or hospital stays). Standardised concentration indices for each healthcare type can be found in Online Appendix S3 (see Table S3-3). The corresponding concentration curves are presented in the Appendix (see Figures A-VII to A-IX).

4.2.1. Doctor Visits

For a given income, the concentration index for doctor visits out-of-pockets according to health status is negative and deviates significantly from 0 at the 5% level in all countries except Denmark (1% level). From a graphical point of view, we observe that the concentration curve of the out-of-pocket crosses the diagonal in Germany and Denmark, giving non-interpretable results for these countries. For the remaining countries, a negative concentration index means that out-of-pockets for doctor visits are more concentrated among the sickest and therefore contribute negatively to horizontal equity in healthcare financing. This finding suggests that the sickest are offered inadequate financial healthcare coverage. Indeed, inequity is the most pronounced in Bismarck-type insurance-based systems, such as Austria, France, Czechia and Belgium where the concentration index is below −0.2, in spite of the existence of exemption schemes or a disease-based cap. In Spain, Sweden and Italy, where healthcare systems are based on a Beveridge-type universal model, inequity is less prevalent (−0.2< concentration index <−0.1). It is also the case as in Switzerland where the healthcare system is predominately based on private insurance.

Figure V – **Horizontal equity in healthcare financing**



4.2.2. Dental Care

Concerning dental care, out-of-pockets are more concentrated among the sickest in Denmark (at the 5% level), Sweden (at the 5% level) and Switzerland (at the 10% level), while they are more concentrated among the healthiest in Czechia (at the 5% level) for a given income. However, concentration indices can only be interpreted in Denmark and Czechia as they are the only countries in which the concentration curve does not cross the diagonal. In Denmark, the sickest patients are more heavily exposed to the financial burden associated with their dental care. In the case of Czechia, the concentration of out-of-pockets among the healthiest for a given income could suggest redistribution from the healthiest to the sickest by the system. However, we cannot ignore the existence of other potential channels, such as prioritisation of other healthcare types by the sickest patients to the detriment of dental care with a given budget, or lower use of preventative dental care among the sickest because of the positive correlation between health status and preventative behaviours.

4.2.3. Hospital Stays

Out-of-pockets for hospital stays are more concentrated among the sickest (at least at the 5% level) in all countries, with the exception of Spain and Sweden, where the concentration index for out-of-pockets does not deviate significantly from 0. In the case of hospital stays, the concentration index has higher values than for other healthcare types, which indicates greater horizontal inequity. This difference can be explained by the fact that hospital stays are more likely to involve individuals in poor health than other types of healthcare, since they are essentially curative, while consultations with doctors and dental care may have a prevention component. For that reason, hospital out-of-pockets contribute more heavily to horizontal inequity in healthcare financing. As for dental care, inequity is the most pronounced in Denmark (concentration index <-0.8) and the least pronounced in Czechia ($-0.4 <$ concentration index <-0.3).

5. Discussion

For individuals aged 50 and over, out-of-pockets for doctor visits have a regressive structure,

suggesting that expenditure coming out of patients' pockets does not increase in proportion with income. This means that, although out-of-pockets are more heavily concentrated among the wealthiest people, doctor visits expenditure to income ratio remains higher for the poorest, which means that out-of-pockets contribute negatively to vertical equity in healthcare financing. The regressivity of out-of-pockets is the least pronounced in Spain and Denmark, where doctor visits are included in the basket of universal healthcare. It is more pronounced in Sweden, where cost-sharing is implemented for this type of healthcare without any exemptions based on financial resources, and in Italy, where coverage from supplementary insurance is very poor. Switzerland, where healthcare financing relies heavily on private sources and in the absence of exemptions subject to financial resources, is the country in which out-of-pockets contribute the most to vertical inequity in healthcare financing. Out-of-pockets for dental care are also regressive in all countries, especially in Switzerland. Czechia is the only country considered in this study that does not implement co-payment for basic dental care, which could explain why out-of-pockets take on a less regressive structure there than in other countries. However, it is important to note that the use of dental care is more concentrated among the wealthiest individuals for a given healthcare need. This finding implies that the regressivity observed for out-of-pockets is underestimated, i.e. that out-of-pockets for dental care should represent a larger proportion of the poorest individuals' income if they consume as much dental care as their health status needs it. Regarding hospital stays, out-of-pockets contribute negatively to vertical equity in healthcare financing in all countries except from Spain and Italy. Despite their universal system, Sweden and Denmark have a highly regressive out-of-pocket structure. This finding is consistent with a "two-speed" system created by excessive waiting lists in public hospitals and a growing privatisation of the system without exemptions based on financial resources (Chambaretaud & Lequet-Slama, 2003). In Sweden, the safety net provided for old age individuals at the hospital does not allow to meet vertical equity since the cap is not based on income.

For a given income, out-of-pockets for doctor visits and for hospital stays are more concentrated among the sickest in almost all countries, with some exceptions, which casts doubt on the existence of horizontal equity in healthcare financing. In Spain and Sweden, out-of-pockets for hospital stays is not more concentrated among the sickest, which could suggest that their healthcare systems cover healthcare costs of the sickest to ensure that they are not financially responsible for their poor health status (e.g. health shield for hospital out-of-pockets for patients aged over 85). The same is true for doctor visits in Denmark, where the distribution of out-of-pockets standardised on income does not differ from perfect equality. In the other countries, tools such as out-of-pockets exemption for the sickest could be considered or improved in order to reduce horizontal inequity in healthcare financing. In the case of dental care, out-of-pockets are more concentrated among the sickest in Denmark. In Czechia, they are more concentrated among healthier people for a given income, suggesting a potential redistribution of healthcare financing from the healthiest to the sickest individuals. However, it is important to consider other potential factors such as greater avoidance of dental care among individuals in poor health who already have an important expenditure to income ratio for other healthcare types, or a lower dental care use among the sickest patients due to the positive correlation between health status and prevention behaviours.

This study has some limitations. First, the use of self-declare out-of-pockets could induce a source of bias for the vertical equity analysis if out-of-pockets are systematically misreported for some individuals (e.g. those who make very little use of healthcare or, on the opposite, heavy healthcare consumers). Nevertheless, the data allows us to observe final out-of-pockets in a harmonized way, between European countries, unlike administrative data. Next, horizontal equity in healthcare financing could incorrectly give the impression of being respected if people in good (or poor) health over-use (or under-use) healthcare due to the positive correlation between health status and preference for health. In this case, out-of-pockets could even be more concentrated among healthier people. In the same way as the existence of barriers to healthcare access among the poorest individuals tends to result in the overestimation of vertical equity healthcare financing, failure to observe preferences for health would result in overestimating horizontal equity. Lastly, the sickest individuals might be less well represented in the sample if they are not in a position to respond (e.g. in hospital or an institution, etc.). As a result, individuals in better health, whose annual out-of-pocket amount is expected lower, are over-represented in the sample. This selection limits the external validity of our findings, since

equity measures are performed on a population in better health than the overall population of individuals aged 50 and over.

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This study's findings suggest that vertical equity in financing is less respected in insurance-based healthcare systems compared to universal-type systems despite the existence of redistributive tools. In universal systems, vertical equity in financing appears to be fulfilled for outpatient care but less for hospital stays, which illustrates the need for these systems to adapt to their gradual privatisation by offering exemption schemes for the poorest individuals. Regarding horizontal inequity in healthcare financing, universal systems appear to perform better for doctor visits and hospital stays. However, this is not systematically the case for dental care, which suggests that additional efforts should be concentrated on this type of care, which is usually poorly covered, in the ten European systems that we analysed. □

Link to the Online Appendix:
www.insee.fr/en/statistiques/fichier/8186100/ES542_Jusot-Lemoine_OnlineAppendix.pdf

BIBLIOGRAPHY

Badel, M. & Pujolar, O. (2008). Systèmes de santé et accès aux soins : diversité des modèles et enjeux actuels. *Bulletin de droit comparé du travail et de la sécurité sociale*, 105–125. https://shs.hal.science/halshs-01075418/

Berchet C. & Morgan D. (2018). Comparaisons internationales des dépenses de santé à la charge directe des patients dans les pays de l'OCDE. *Actualité de Dossier en Santé Publique* N° 102. https://www.hcsp.fr/Explore.cgi/Telecharger%3FNomFichier%3Dad1021054.pdf

Börsch-Supan, A., Brandt, M., Hunkler, C., Kneip, T., Korbmacher, J. M., Malter, F., Schaan, B., Stuck, S. & Zuber, S. (2013). Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE). *International Journal of Epidemiology*, 42(4), 992–1001. https://doi.org/10.1093/ije/dyt088

Chambaretaud, S. & Lequet-Slama, D. (2003). Les systèmes de santé nationaux du nord de l'Europe et l'influence des modèles libéraux durant la crise des années quatre-vingt-dix. *Revue française des affaires sociales*, 4, 399–422. https://doi.org/10.3917/rfas.034.0399

Chambaretaud, S. & Hartmann, L. (2009). Participation financière des patients et mécanismes de protection en Europe. *Pratiques et organisation des soins*, 1, 31–38. https://doi.org/10.3917/pos.401.0031

Cylus, J., Thomson, S. & Evetovits, T. (2018). Catastrophic health spending in Europe: Equity and policy implications of different calculation methods. *Bulletin of the World Health Organization,* 96(9), 599–609. https://doi.org/10.2471/blt.18.209031

Daniels, N. (1982). Equity of access to health care: some conceptual and ethical issues. *The Milbank Memorial Fund Quarterly. Health and Society*, 51–81. https://www.jstor.org/stable/3349700

Daniels, N. (1985). *Just Health Care*. Cambridge: Cambridge University Press.

Devaux, M., Jusot, F., Sermet, C. & Tubeuf, S. (2008). Hétérogénéité sociale de déclaration de l'état de santé et mesure des inégalités de santé. *Revue française des affaires sociales*, 1, 29–47. https://doi.org/10.3917/rfas.081.0029

EuroQol Research Foundation (2028). EQ-5D-3L User Guide. https://euroqol.org/publications/user-guides

Fleurbaey, M. & Schokkaert, E. (2009). Unfair Inequalities in Health and Health Care. *Journal of Health Economics*, 28(1), 73–90. https://doi.org/10.1016/j.jhealeco.2008.07.016

Franc, C. & Pierre, A. (2016). Conséquences de l'assurance publique et complémentaire sur la distribution et la concentration des restes à charge. *Revue d'Épidémiologie et de Santé Publique*, 64, S105. https://doi.org/10.1016/j.respe.2015.07.025

Hourriez, J.-M. & Olier, L. (1998). Niveau de vie et taille du ménage : estimations d'une échelle d'équivalence. *Économie et Statistique*, 308(1), 65–94. https://doi.org/10.3406/estat.1998.2591

Jusot, F., Legal, R., Louvel, A., Pollak, C. & Shmueli, A. (2016). À quoi tient la solidarité de l'assurance maladie entre les hauts revenus et les plus modestes en France ? *Revue française d'économie*, 31(4), 15–62. https://doi.org/10.3917/rfe.164.0015

Kakwani, N. C. (1977). Measurement of tax progressivity: an international comparison. *The Economic Journal*, 87(345), 71–80. https://www.jstor.org/stable/2231833

Nezosi, G. (2021). *La protection sociale*. La Documentation française. https://doi.org/10.3917/ldf.nezos.2021.01

O'Donnell, O., Van Doorslaer, E., Wagstaff, A. & Lindelöw, M. (2007). Analyzing Health Equity Using Household Survey Data: A Guide to Techniques and their Implementation. *World Bank Publications*. https://doi.org/10.1596/978-0-8213-6933-3

OCDE (2024). *Dépenses de santé et financement : Indicateurs des dépenses de santé. Statistiques de l'OCDE sur la santé* (Base de donnée). https://doi.org/10.1787/data-00349-fr

Paris, V., Hewlett, E., Auraaen, A., Alexa, J. & Simon, L. (2016). Health care coverage in OECD countries in 2012. *Documents de travail de l'OCDE sur la santé* N° 88. Paris: Éditions OCDE. https://doi.org/10.1787/5jlz3kbf7pzv-en

Pellet, S. (2020). Reste à charge et équité du système de santé : le cas du Tadjikistan. *Revue économique*, 71(5), 865–893. https://www.jstor.org/stable/26956212

Perronnin, M. (2018). Iniquités des restes à charge selon la santé et le niveau de vie. Enseignements des travaux récents de l'Irdes. *Actualité de Dossier en Santé Publique*, 102, 24–29. https://www.hcsp.fr/Explore.cgi/Telecharger?NomFichier=ad1022429.pdf

Perronnin, M. & Tubeuf, S. (2006). Construction d'un indicateur continu d'état de santé agrégeant risque vital et incapacité. *Questions d'économie de la Santé*, 107. http://hdl.handle.net/2078/219646

Prince, M., Reischies, F. M., Beekman, A. T., Fuhrer, R., Jonker, C., Kivelä, S., Lawlor, B. A., Lobo, A., Magnusson, H., Fichter, M. M., Van Oyen, H., Roelands, M., Skoog, I., Turrina, C. & Copeland, J. R. M. (1999). Development of the EURO–D scale–a European Union initiative to compare symptoms of depression in 14 European centres. *The British Journal of Psychiatry*, 174(4), 330–338. https://doi.org/10.1192/bjp.174.4.330

Rochaix, L. & Tubeuf, S. (2009). Mesures de l'équité en santé. *Revue économique,* 60(2), 325–344. https://doi.org/10.3917/reco.602.0325

Tikkanen, R., Osborn, R., Mossialos, E., Djordjevic, A. & Wharton, G. (2020). International Health Care System Profiles. *The Commonwealth Fund*.

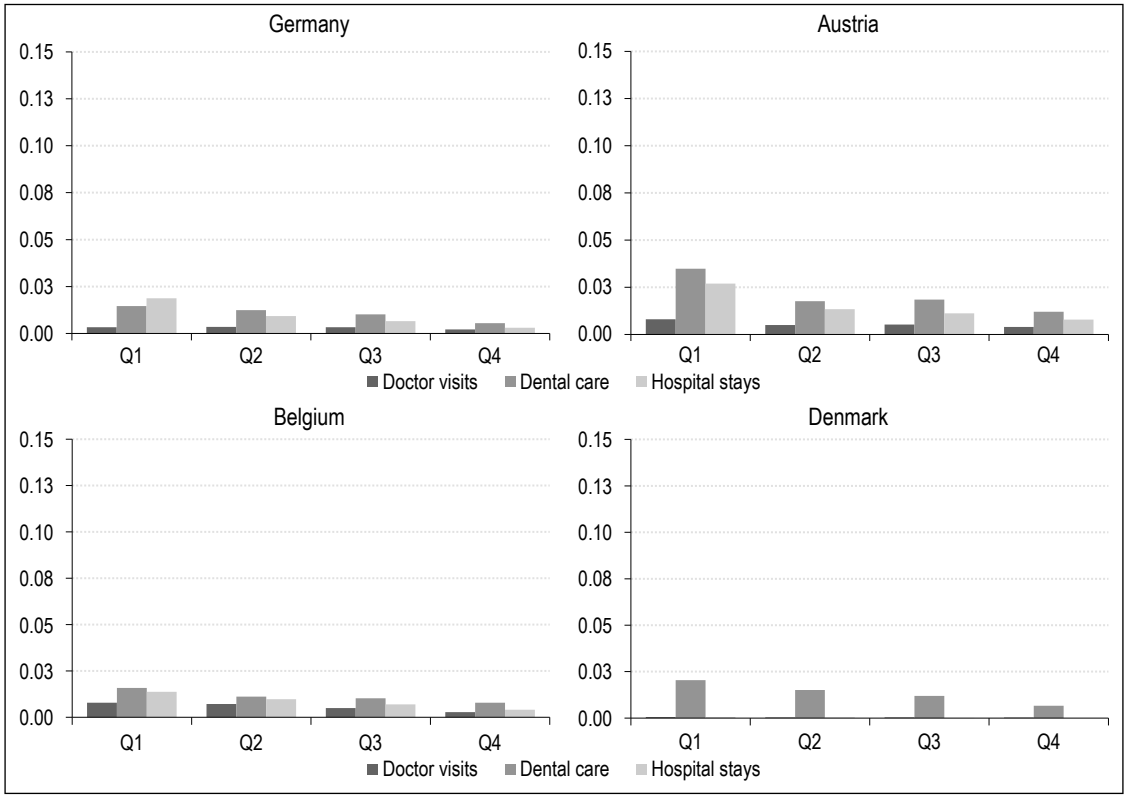
Wagstaff, A., Van Doorslaer, E. & Paci, P. (1989). Equity in the finance and delivery of health care: some tentative cross-country comparisons. *Oxford Review of Economic Policy*, 5(1), 89–112. https://doi.org/10.1093/oxrep/5.1.89

Wagstaff, A. & Van Doorslaer, E. (1994). Measuring inequalities in health in the presence of multiple-category morbidity indicators. *Health Economics*, 3(4), 281–291. https://doi.org/10.1002/hec.4730030409

Wagstaff, A. (2019). Measuring catastrophic medical expenditures: Reflections on three issues. *Health Economics*, 28(6), 765–781. https://doi.org/10.1002/hec.3881

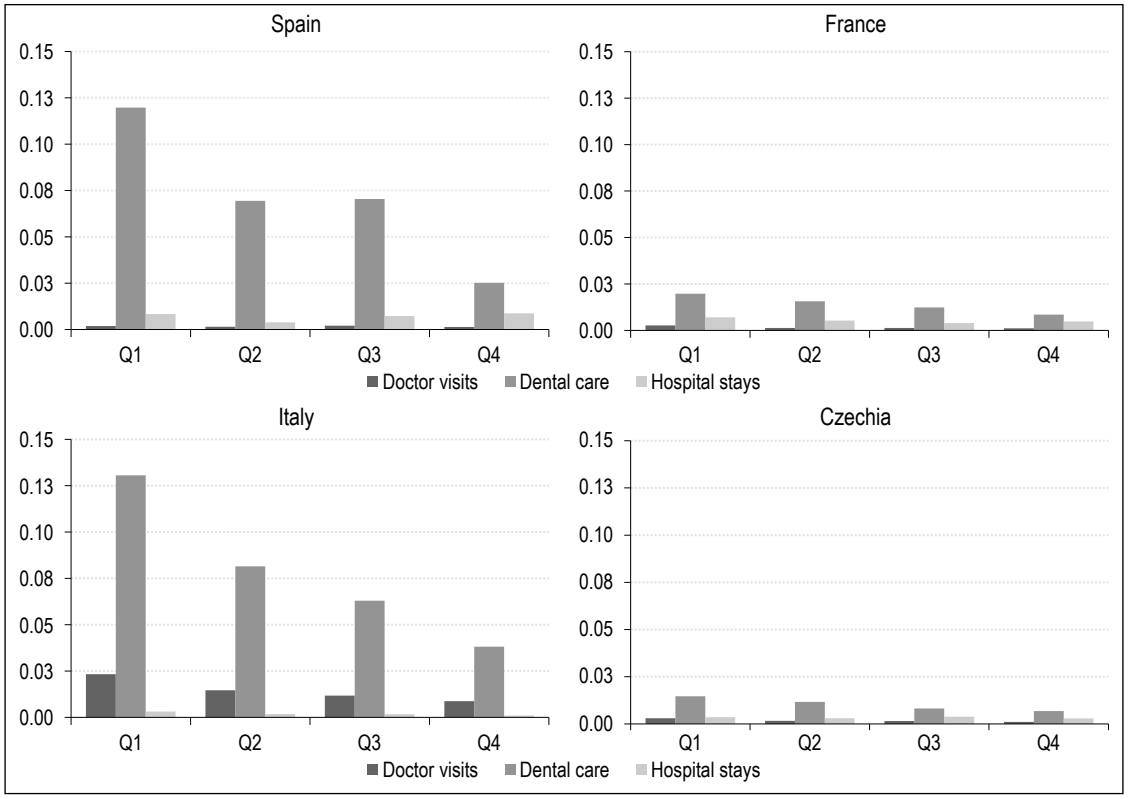
APPENDIX

Figure A-I – **Out-of-pockets to income ratio by income quartile – Germany, Austria, Belgium and Denmark**



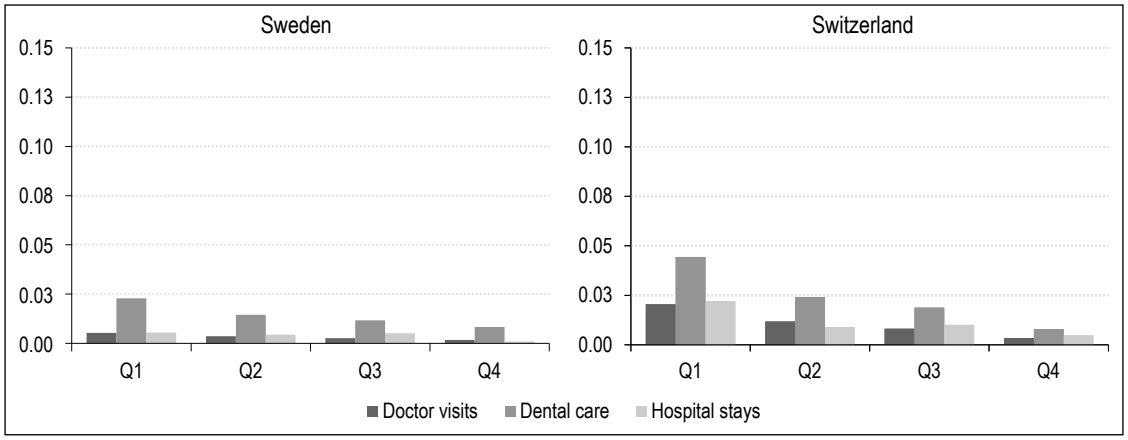
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.

Figure A-II – **Out-of-pockets to income ratio by income quartile – Spain, France, Italy, Czechia**



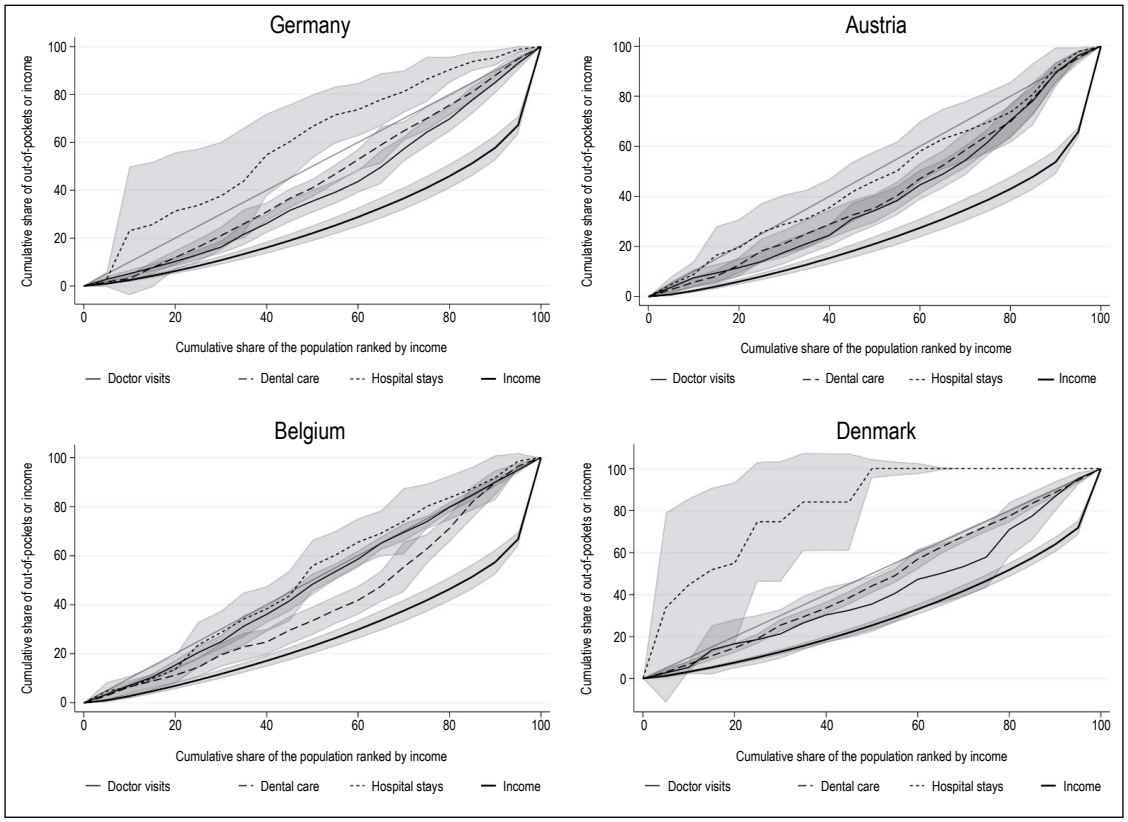
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.

Figure A-III – **Out-of-pockets to income ratio by income quartile – Sweden and Switzerland**



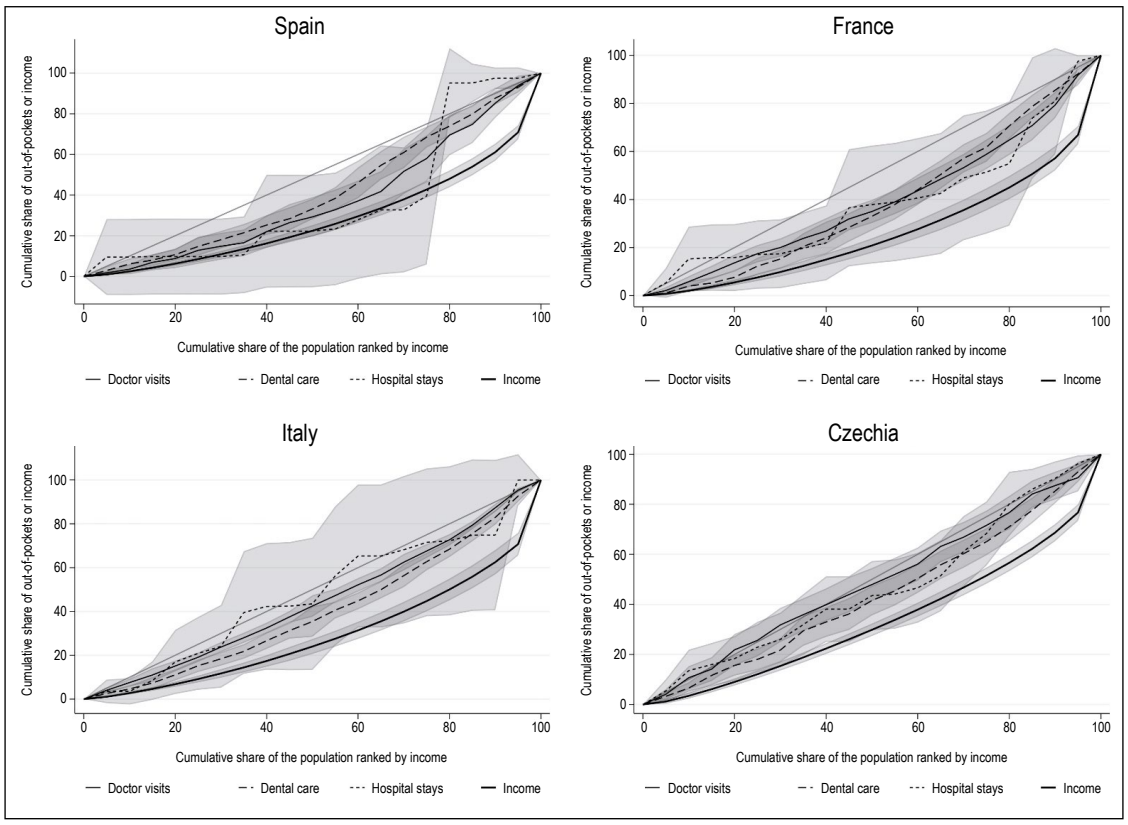
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.

Figure A-IV – **Concentration curves for out-of-pockets and Lorenz curve within the population ranked by income – Germany, Austria, Belgium and Denmark**



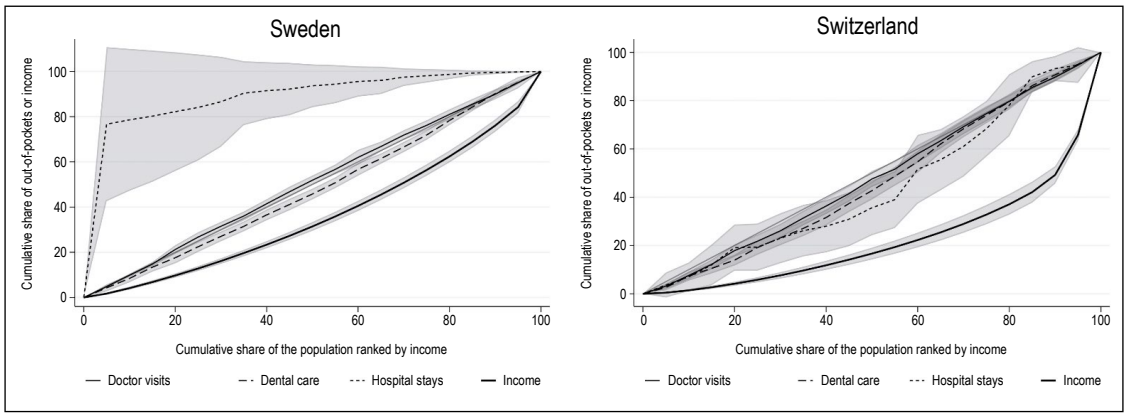
Notes: For each healthcare type, the concentration curve represents the cumulative share of out-of-pockets for each percentile of the population ranked by income from the lowest to the highest. The grey areas represent confidence intervals at 95%.
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.

Figure A-V – **Concentration curves for out-of-pockets and Lorenz curve within the population ranked by income (Spain, France, Italy and Czechia)**



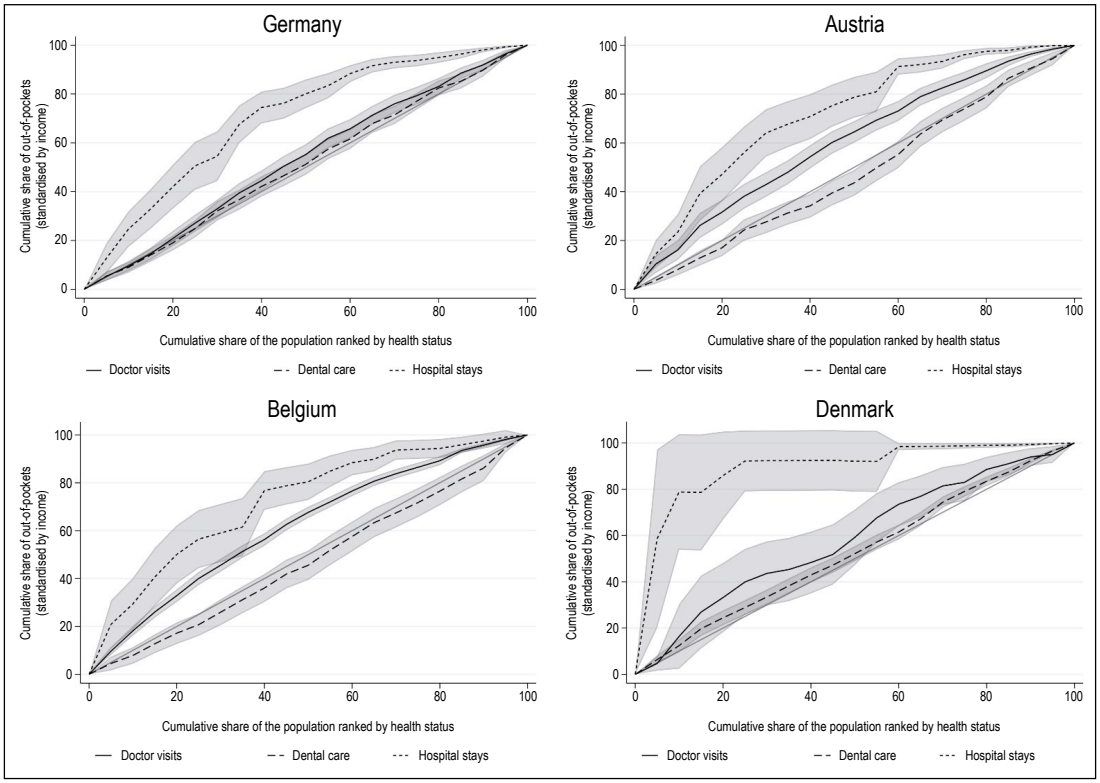
Notes: For each healthcare type, the concentration curve represents the cumulative share of out-of-pockets for each percentile of the population ranked by income from the lowest to the highest. The grey areas represent confidence intervals at 95%.
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.

Figure A-VI – **Concentration curves for out-of-pockets and Lorenz curve within the population ranked by income – Sweden and Switzerland**



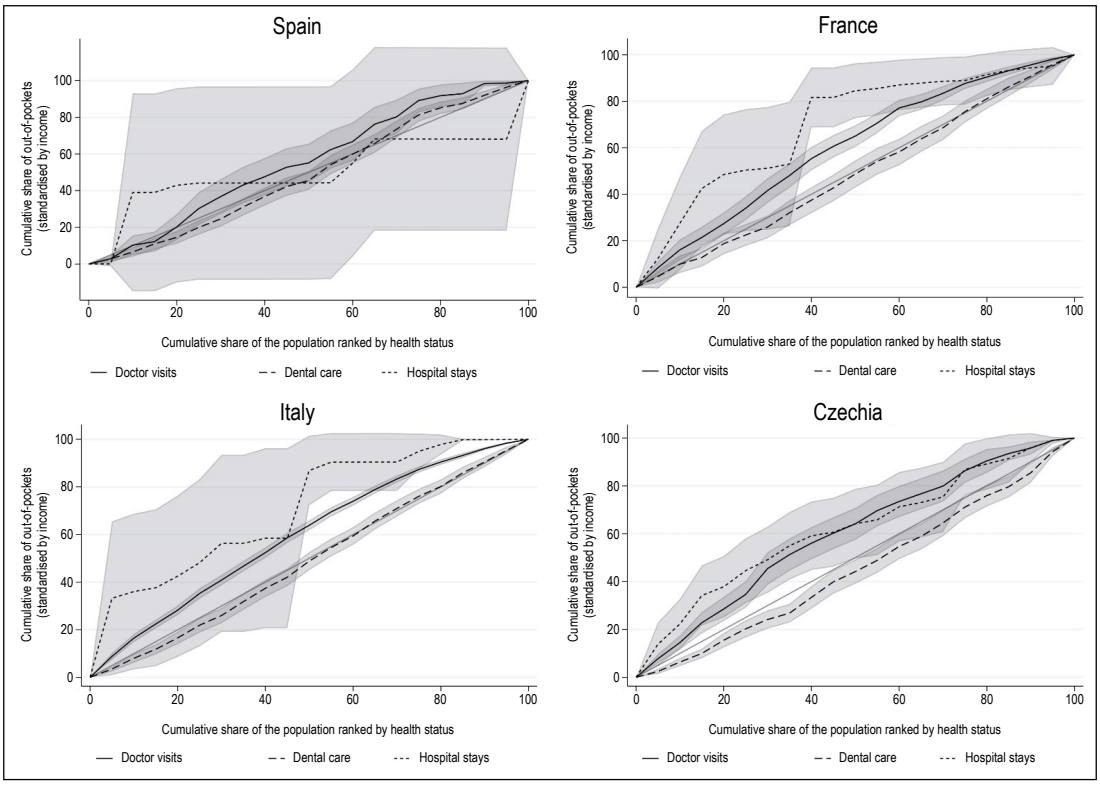
Notes: For each healthcare type, the concentration curve represents the cumulative share of out-of-pockets for each percentile of the population ranked by income from the lowest to the highest. The grey areas represent confidence intervals at 95%.
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.

Figure A-VII – **Concentration curves for out-of-pockets within the population ranked by health status for a given income – Germany, Austria, Belgium and Denmark**



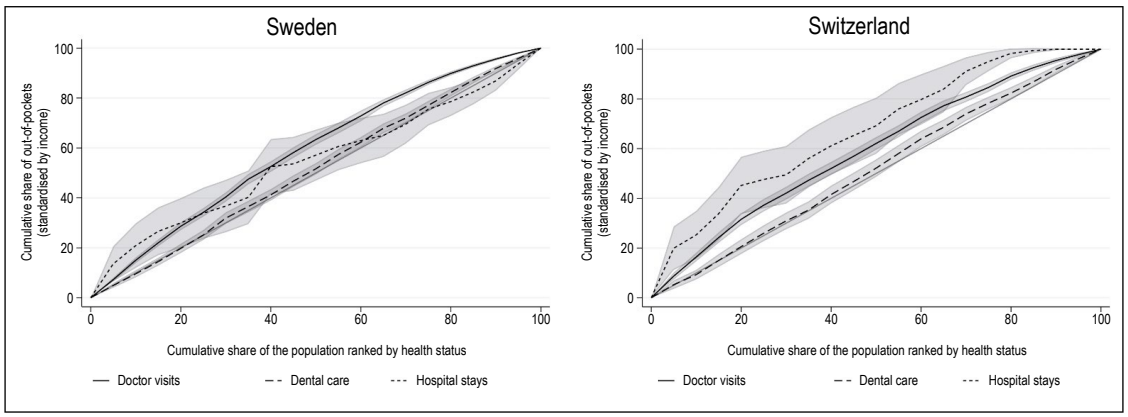
Notes: For each healthcare type, the concentration curve represents the cumulative share of out-of-pockets for each percentile of the population ranked by health status from the poorest to the best. The grey areas represent confidence intervals at 95%.
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.

Figure A-VIII – **Concentration curves for out-of-pockets within the population ranked by health status for a given income – Spain, France, Italy and Czechia**



Notes: For each healthcare type, the concentration curve represents the cumulative share of out-of-pockets for each percentile of the population ranked by health status from the poorest to the best. The grey areas represent confidence intervals at 95%.
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.

Figure A-IX – **Concentration curves for out-of-pockets within the population ranked by health status for a given income – Sweden and Switzerland**



Notes: For each healthcare type, the concentration curve represents the cumulative share of out-of-pockets for each percentile of the population ranked by health status from the poorest to the best. The grey areas represent confidence intervals at 95%.
Source and sample: *Survey of Health, Ageing and Retirement in Europe*, 2013-2017, individuals aged 50 and over.