Distribution of out-of-pocket payments across the socio-economic gradient

A study of Dutch healthcare, 2016-2019

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Abstract

Background: National developments, such as the aging population and expensive technological innovation, threaten to harm the strong solidarity that underpins the Dutch healthcare system. Out-of-pocket payments could play an increasingly large role in the financing of Dutch healthcare. The primary aim of this study is to analyse the distribution of out-of-pocket payments, catastrophic and impoverishing payments in the Netherlands between 2016-2019. A distinction is made between payments in curative care (Zvw) and long-term care or social support (Wlz and Wmo).

Methods: Using non-public administrative microdata, containing about 93% of the entire Dutch population, average out-of-pocket, catastrophic, and impoverishing payments were examined along various socio-economic household characteristics. Regression analysis, including a two-part model, was used to analyse the relative importance of the different household characteristics in predicting out-of-pocket, catastrophic, and impoverishing payments.

Results: Out-of-pocket payments are concentrated, the top 2% of the population is responsible for almost 15% of total payments, while the bottom 8% has no payments at all. Payments in long-term care (Wlz) and social support (Wmo) are concentrated in people of lower socio-economic status. This corresponds to higher use of (more) intensive forms of healthcare. People with higher incomes use less long-term care, and if they do it is more often care at home, which comes with a lower out-of-pocket payment. During 2016-2019, average out-of-pocket payments have declined by €26. It has decreased for all income groups, in particular for people with lower income. The three poorest quintiles saw a €35 decline, while the richest two quintiles had a decrease of only €13.

In the study period, 1.5% of all households experienced catastrophic healthcare payments and an additional 0.6% of households was pushed into poverty due to healthcare payments. Respectively, this amounts to 110,000 and 40,000 households each year. Both catastrophic and impoverishing payments are highly concentrated in the lower-income quintiles and beneficiaries of social welfare. Around 94% of all households is from the poorest income quintile, while 30% is dependent on social welfare benefits. The total share of households experiencing these payments has decreased by almost a quarter between 2016 and 2019.

Contrary to the Zvw, the Wlz and Wmo show a distinct difference between the extensive and the intensive margin. People with a higher income have a reduced probability of having Wlz and Wmo out-of-pocket payments, but the height of the payments is (much) higher if incurred.

Conclusions: Total out-of-pocket payments are fairly evenly distributed across income. However, due to differences in capacity to pay, out-of-pocket payments are problematic much more often for people with a low socio-economic status. Policy wishing to consider both sustainability and accessibility of healthcare, should focus on unburdening low-income groups.

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1. Introduction

The Netherlands has a strong social insurance system, in which essential healthcare is covered for virtually the entire population (Kuipers et al., 2022). There is large risk solidarity between the healthy and the sick. Almost 85% of healthcare expenditure is collectively financed, while 60% of the costs are caused by only 5% of the population (Bakx et al., 2016). Just over 15% of total expenditure is financed non-collectively (CBS, 2019). However, national developments – such as the ageing population, expensive medical innovation, and the increasing number of chronically ill – threaten to harm the solidarity that underpins this system (WRR, 2021). As a result, policymakers are increasingly focused on out-of-pocket payments as a tool to stunt cost growth and keep healthcare affordable (Einav & Finkelstein, 2018). Out-of-pocket payments are payments made by the patient, with a direct relationship to the use of healthcare services. In the Netherlands, out-of-pocket payments have financed between 8% and 12% of total healthcare expenditure in the past 20 years (CBS, 2019). Due to the large increase in total expenditure, the absolute amount the average individual had to pay out-of-pocket has increased from around €125 in 2000 to almost €400 in 2015 (CBS, 2017).[1] If we want to determine if and to what extent out-of-pocket payments are problematic for an individual, and how regulations concerning out-of-pocket payments contribute, it is necessary to know how payments are distributed across the population. In particular, across different socio-economic groups. That is the primary aim of this study.

On average, a higher socio-economic status leads to a longer and healthier life. The inequalities in health between persons with a high and low socio-economic status are large and have been so for decades in both the Netherlands and other western welfare states (WRR, 2018). Accessible healthcare cannot be taken for granted, especially for people with a low income, but is critical to prevent or reduce further exacerbation of socio-economic inequalities (WHO, 2010). Universal health coverage states that all people should have access to health services and should not suffer financial hardship due to healthcare payments. It has become an important policy objective all around the world. High out-of-pocket payments can lead to two undesirable situations. When the payments exceed one's capacity to pay, healthcare either becomes inaccessible or the payments crowd out other necessary expenses. The former leads to an unmet need for health services, while the latter can result in financial hardship (WHO, 2019). An unmet need for health services can, in time, damage health and lead to higher future healthcare costs (Kiil & Houlberg, 2014). Financial protection from problematically high healthcare costs, especially for vulnerable groups, is an integral part of universal health coverage. It is vital to ensure that healthcare is distributed according to need and financed according to capacity to pay. The realisation of this ideal is a common challenge for both developed and developing countries (WHO, 2010).

Even though the importance of monitoring the financial protection is stressed by the World Health Organisation (WHO), relatively little is known about the distribution of out-of-pocket payments across individuals in the Netherlands. The Dutch health system's three main healthcare domains – curative, long-term, and social support – have out-of-

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[1] These amounts are in nominal terms.

pocket payments in different shapes and sizes. Empirical literature on out-of-pocket payments in the Netherlands is scarce and often only covers the macro-level or one of the domains. For example at the macro-level, The WHO and the Organisation for Economic Co-operation and Development (OECD) report on out-of-pocket payments and financial protection. Remarkably, no numbers are reported for the Netherlands regarding financial protection indicators (catastrophic and impoverishing payments) in recent reports (OECD, 2022; WHO, 2019). Statistics Netherlands (CBS) provides information on out-of-pocket payments, but only national averages.

2. Objectives and research questions

The aim of this study is twofold. One, to determine how out-of-pocket payments are distributed across people with different socio-economic characteristics in Dutch healthcare. Two, to provide insight in the financial protection against these out-of-pocket payments, measured in catastrophic and impoverishing payments. This leads to the main research question.

> *"How are out-of-pocket, catastrophic and impoverishing payments distributed across the Dutch population between 2016-2019?"*

To be able to answer the main research question, three sub-questions will be answered.

(1) *"How are out-of-pocket payments distributed in the Zvw, Wlz and Wmo healthcare domains, and have there been changes over time?"*

(2) *"How are catastrophic and impoverishing payments distributed across income groups, and have there been changes over time?"*

(3) *"What socio-economic characteristics are associated with out-of-pocket, catastrophic and impoverishing payments?"*

If out-of-pocket payments are to play a more significant role in the future financing of healthcare, a balance needs to be struck between a greater burden on healthcare users and an equitable distribution over the population as a whole. This study can inform potential policy changes regarding out-of-pocket payment regulations, by outlining distribution and financial protection of out-of-pocket payments between 2016-2019. The dataset used in this study is based on microdata directly from administrative records, compiled by Statistics Netherlands (CBS). It allows for a more comprehensive, accurate and detailed analysis than research usually conducted on out-of-pocket payments (e.g., based on household surveys). The combination with administrative microdata on income and wealth allows for a highly accurate picture of the distribution of out-of-pocket payments in relation to socio-economic status. The sample used in this study represents 93% of the entire Dutch population.

First, section three provides the theoretical framework on relevant concepts and related empirical evidence. Then, section four describes the institutional setting of the Dutch healthcare system and out-of-pocket payments. The empirical methods and results are described in sections five and six. Finally, the results, limitations and implications for policy are discussed in section seven.

3. Theoretical framework

This section provides the theoretical foundation on which the empirical research and discussion of the results of this study build. First, section 3.1 starts with an introduction to universal health coverage and equity in healthcare systems. Second, section 3.2 outlines the motives and risks of out-of-pocket payments. Finally, section 3.3 discusses the available empirical evidence on the distribution on out-of-pocket payments and financial protection in the Netherlands and similar healthcare systems.

In short, universal health coverage entails accessible and affordable health services for everyone, regardless of socio-economic status. This implies both an equitable distribution of out-of-pocket payments and protection from financial hardship due to healthcare payments. Increasing healthcare expenditure, and a related increasing burden from out-of-pocket payments, threaten to undermine the social health system in the Netherlands. The scarce literature available on out-of-pocket payments and financial protection indicators (catastrophic and impoverishing payments) is not enough to draw conclusions on the distribution and financial protection in the Dutch healthcare system. This study aims to address this knowledge gap.

3.1. Universal health coverage and (equity in) healthcare systems

The circumstances in which people grow, live, work and age are essential determinants of health (CSDH, 2008). Someone with higher socio-economic status, on average, lives a healthier and longer life. The inequalities in health between people of high and low socio-economic status are large and have been so for decades in both the Netherlands and other western welfare states (WRR, 2018). Healthcare is only one of many ways to promote and sustain health but is critical to prevent or reduce further exacerbation of socio-economic inequalities. Acknowledging this, universal health coverage has become an important policy objective all around the world. Universal health coverage states that all people should have access to health services and should not suffer financial hardship due to healthcare payments. Member States of the World Health Organization (WHO) recognize that a well-functioning health financing system is vital to universal health coverage (WHO, 2010).

In line with universal health coverage, equity is often regarded as an important policy objective in healthcare systems. There is an important distinction between equity and equality. Equality alludes to the *same* quantity, while equity means a *fair distribution* of quantity (Van de Voorde & Bouckaert, 2022). Consequently, the term inherently necessitates a moral judgement on what is considered as distributively fair. Governments and policymakers generally have an egalitarian view on healthcare, with Rawls's distributive justice as a moral foundation (Wagstaff & Van Doorslaer, 2000; Van de Voorde & Bouckaert, 2022). This implies that access to healthcare is every citizen's right, comparable with the right to vote. This view points to a predominantly publicly financed system, where healthcare is distributed according to need (equity in utilisation) and financed according to capacity to pay (equity in financing) (Williams, 1993). The realisation and maintenance of this ideal, however, is a common challenge for both developed and developing countries. The availability and inefficient use of resources, and an (over)reliance on direct payments impede countries from moving towards universal health coverage. Countries closer to universal health coverage often struggle with an

aging population, making it harder to maintain funding for their traditional – wage-based – insurance system (WHO, 2010).

Health systems are principally financed through four sources: General taxation, social insurance premiums, private insurance premiums, and out-of-pocket payments. General taxation entails public government funds. Social insurance premiums are compulsory and levied on residents' earnings, often by employers. Private health insurance premiums are paid by individuals to insurers and can be both compulsory and voluntary. Out-of-pocket payments are payments made by the patient and have a direct relationship to the use of healthcare services. It can take on many forms – including deductibles, co-payments, income-dependent or fixed contributions – as long as they are incurred due to use of healthcare. The relative importance of each source varies across countries (Wagstaff & Van Doorslaer, 2000).

The Netherlands is one of the largest per capita spenders on healthcare in the world and second in the EU behind only Germany (OECD, 2022). It has a strong social insurance system, in which essential health services are covered for virtually the entire population (Kuipers et al., 2022). There is a strong solidarity between those in good and in bad health. Exemplary is the means of financing the gap in costs. The most expensive 5% of the population is responsible for over 60% of total expenditure, while the bottom half only accounts for less than 3% (Bakx et al., 2016). In contrast, the system is largely collectively financed through social insurance premiums, general taxes, and mandatory basic health insurance, together responsible for 83% of total financing. The remaining non-collective financing sources are voluntary health insurance (5%), out-of-pocket payments (10%) and other sources (2%) (CBS, 2019). National developments threaten to harm the solidarity that underpins this system. Total health expenditure is rising due to an ageing population, expensive medico-technological innovation, and an increasing demand for healthcare services. Simultaneously, the ageing of the population reduces the ratio of working versus non-working, aggravating the burden on the individual worker (WRR, 2021). The combination of higher expenditure and less shoulders that carry this burden, necessitates evaluation of the healthcare system financing. In light of these developments, the attention of policy makers is increasingly focused on cost-sharing as a potential way to stunt the cost growth and keep healthcare affordable and sustainable in the long-term (Einav & Finkelstein, 2018).

3.2 Motives and risks of out-of-pocket payments

Out-of-pocket payments are payments made by the patient that have a direct relationship to the use of healthcare services. This direct relationship is crucial to discern out-of-pocket payments from other finance mechanisms such as insurance premiums (OECD, 2011). Out-of-pocket payments are grounded on three main motives: affordability, fairness, and support for solidarity.

Out-of-pocket payments contribute to the affordability of healthcare in multiple ways. First, they are a direct source of financing that burden the individual that uses care, instead of the entire system. Second, they stimulate critical assessment of one's healthcare use, mitigating moral hazard. The assumption is that, because of the out-of-pocket payments, insured persons are more likely to forgo or reduce unnecessary care (Maarse & Koolman, 2018). Empirically, cost-sharing has indeed been shown to reduce spending, for example in the renowned RAND-experiment in the United States (Manning et al., 1987) and in the Netherlands by Remmerswaal, Boone and Douven (2019a). Third,

out-of-pocket payments can be used as a steering mechanism. The preferred healthcare provider or type of medication can be made more appealing to the patient when other, non-preferred options include (larger) out-of-pocket payments (Maarse & Koolman, 2018). This also allows for a better negotiation position for the third-party payer (often an insurer) in a competitive health insurance market, incentivising healthcare providers to be responsive to price and quality demands (Van de Ven, Schut & Rutten, 1994). Besides affordability, out-of-pocket payments are motivated by a sense of fairness. A healthcare user benefits from care that is paid for largely by others, thus it is only fair that the user contributes. Sometimes healthcare services replace other costs, for example in long-term care when a patient lives in a nursing home and no longer has costs for housing. In such a case it is generally deemed fair that the patient pays out-of-pocket. Finally, a health insurance system depends on solidarity between the healthy and the sick. Out-of-pocket payments reduce this solidarity, but in the end, payments by (frequent) healthcare users can help to maintain support for the insurance system as a whole (Maarse & Koolman, 2018).

Increasing use of out-of-pocket payments in OECD-countries has raised concerns about the burden on different social subgroups and the inequity this can create (Corrieri et al., 2010). Out-of-pocket payments risk creating one of two undesirable situations. When the payments exceed one's capacity to pay, healthcare either becomes inaccessible or crowds out other necessary expenses. The former leads to an unmet need for health services, while the latter can result in financial hardship (WHO, 2019). An unmet need for health services arises when a person avoids necessary care. Over time, avoidance of necessary care can lead to health damage and higher future healthcare costs (Kiil & Houlberg, 2014). Liquidity constraints are more stringent in low socio-economic groups, making (high) out-of-pocket payments a potential health threat through postponement or avoidance of necessary care (Gross, Layton & Prinz, 2022). Empirically, the majority of studies find that vulnerable groups (low-income, education, social status and health status) reduce their healthcare use more strongly than the general population does in response to out-of-pocket payments (Kiil & Houlberg, 2014). This result could be an indication that the reduction in healthcare use is not due to elimination of moral hazard, but due to budget or liquidity constraints. Therefore, the reduction in use may well be avoidance of necessary healthcare and suggests an increase in inequity. Financial hardship can in turn lead to or deepen poverty, undermine health, and exacerbate health and socioeconomic inequalities. The WHO reports that even in Europe's richest countries people are pushed into poverty due to payments for health services. Financial hardship is heavily concentrated among the poorest households (WHO, 2019).

When policy is aimed at changing the level or method of raising out-of-pocket payments, equity ought to be considered. It comes down to striking a balance between fair contributions by users of healthcare and the rest of the population, while considering socio-economic differences. Section 7.5 discusses the results from this study and their implications concerning equity.

3.3 Evidence on out-of-pocket payments

This section describes what is known about the distribution of out-of-pocket payments and financial protection (catastrophic and impoverishing payments) in the Netherlands, and how this compares internationally.

3.3.1 Distribution of out-of-pocket payments

Empirical studies on distribution of out-of-pocket payments find results in line with the theoretical expectations. The financial burden of healthcare spending was highest in lower-income, lower education and high age groups (Bakx et al., 2020; Brabers et al., 2021). Relatively little is known about recent financial protection (measured using two indicators: catastrophic and impoverishing payments) in the Netherlands. Compared internationally, catastrophic and impoverishing payments were relatively low in 2015.

Remmerswaal & Boone (2019b) report some numbers on out-of-pocket payments in the Zvw in 2013. Almost two out of three young males (25 years old) spent less than €50 on (curative) Zvw healthcare. In contrast, only one out of six 70-year-old males spent less than €50. Even though average (Zvw) healthcare costs are above the deductible threshold (€815 on average, deductible was €350), Over three quarters of 25-year-old males did not exceed the mandatory deductible in 2013. This implies that healthcare expenditure is concentrated in the other quarter of this group. A study by Bakx et al. (2020) examined out-of-pocket payments in long-term care (Wlz) and social support (Wmo) in the elderly population. They found large differences in out-of-pocket payments across individuals and a higher financial burden for low incomes. This is mainly caused by differences in health and healthcare use. Almost 60% of the elderly does not use any nursing home care in the last five years of life, while 8% spend all of their final years in a nursing home. Brabers et al. (2021) examined (total) out-of-pocket payments, with a focus on users of medical aids, but non-users were also included. Of the group that uses medical aids, 61% had out-of-pocket payments on either medical aids or other care. Medical aid users have a median payment of €320, while non-medical aid users (with any out-of-pocket payments) pay only €160. One in every twenty medical aid users had payments above €1000. On average, this group is older, in worse health, suffers a chronic or physical condition more often, and has a lower income.

On a national scale, around 10% of total health expenditure was financed by out-of-pocket payments in 2019. Between 2000-2020, this percentage fluctuated between 8 and 12. However, because total health expenditure increased strongly between 2000 and 2015, the average amount spent out-of-pocket did increase from around € 125 to over € 400 a year (CBS, 2019). In the Netherlands, out-of-pocket payments are relatively low and are well below the weighted EU-average (14.9%), only Luxembourg and France have lower out-of-pocket payments with 8.4% and 8.9% respectively (OECD, 2022).

3.3.2 Financial protection

Financial protection entails the extent to which people are protected from barriers to access healthcare or experience financial hardship due to healthcare payments. More general metrics – such as out-of-pocket spending in absolute terms or simply related to income – are not always sufficiently sensitive to allow differentiation in and between high-income countries. Two indicators have been developed in order to measure financial protection in a way that is also relevant to countries in Europe. This allows production of actionable evidence to inform policy (WHO, 2019). The indicators are known as catastrophic and impoverishing (healthcare) payments. Both indicate what share of the population suffers from problematic out-of-pocket payments. Catastrophic payments indicate high healthcare payments relative to income in a given year, usually over 40% of some measure of income. Impoverishing payments cause someone's income to drop below

a poverty line or basic needs minimum when healthcare payments are subtracted from income. Section 5.3.3 elaborates on these indicators.

Evidence on catastrophic and impoverishing payments is very limited. Recent reports by the OECD (2022) and the WHO (2019) do not report any numbers for catastrophic or impoverishing payments in the Netherlands. The only evidence I have been able to find is in the database of the 'European Health Information Gateway' of the WHO. In 2015, the incidence of catastrophic healthcare payments on a national level was 0.5%, while impoverishing payments occurred even less with 0.11%. Both numbers are the lowest of all countries that reported a value in 2015 (WHO, n.d.). In the European Union, with the Netherlands excluded, the incidence of catastrophic health spending ranges from 1% to 16%, while impoverishing health spending ranges from 0.3% to 5.9% (WHO, 2019). In 2015 (or the closest available year), countries that are relatively similar to the Netherlands in terms of healthcare and social welfare (Belgium, Germany, Switzerland, and Sweden) report catastrophic payments between 1.6% and 5.4% and impoverishing spending between 1% and 1.9%. In 2019, catastrophic payments range between 1.6% and 5.2% and impoverishing spending between 1% and 1.5% (WHO, n.d.).

One consequence of insufficient financial protection is inaccessibility and avoidance of healthcare. Consequently, evidence on avoidance due to financial reasons could serve as an indication of the level of financial protection. A Dutch study finds that 3% of interviewed respondents refrain from visiting a GP due to (potential future) costs. Specifically, young adults and people with lower income are most likely to avoid healthcare in fear of potential costs (Van Esch et al., 2015). Internationally, a systematic review by Corrieri et al. (2010) finds that low income, low education, and high age are most often associated with high out-of-pocket payments relative to income. A Belgian study specifically aimed at accessibility of healthcare in relation to financing, concludes that there are more unmet healthcare needs in groups with lower income and lower education levels. Single-person households are also at a higher risk (Bouckaert et al., 2020).

4. Institutional setting

This section briefly describes the Dutch healthcare system, and more elaborately the regulations regarding out-of-pocket payments between 2016-2019 (the study period). The Dutch healthcare system is regulated by four legal regimes: curative care by the Health Insurance Act (*Zorgverzekeringswet,* Zvw), long-term care by the Long-term Care Act (*Wet langdurige zorg,* Wlz), social support by the Social Support Act (*Wet maatschappelijke ondersteuning,* Wmo), and youth care by the Youth Act (*Jeugdwet*) (VWS, 2016). Youth care will not be discussed, as the Youth Act does not permit out-of-pocket payments.

4.1 Curative care – the Zvw

The Netherlands has a social health insurance system with both public and private elements. All residents of the Netherlands are legally obliged to take out basic health insurance.[2] Health insurers are obliged to accept applicants, at the same price, regardless of their health status, age, or other background characteristics (a community-rated premium). The coverage of the basic health insurance is determined by law. On top of the basic health insurance, people can opt for additional private health insurance. This is left entirely up to health insurers and the private market (VWS, 2016). This study does not have data on private health insurance, any possible out-of-pocket payments in connection to these insurances are therefore omitted.

The Zvw knows various out-of-pocket payments. The most important is the mandatory deductible. The government determines the height of the mandatory deductible for all Zvw insured care under the basic health insurance. A deductible is a fixed amount that needs to be paid before any insurance benefits are paid. The mandatory deductible is €385 from 2016 onward. Additionally, someone can decide to take on a voluntary deductible of up to €500, in exchange for a lower insurance premium. Both the mandatory and the voluntary deductible are applicable to healthcare from the basic health insurance for every individual 18 years or older, with some exceptions for specific types of care.[3] Exceptions include general practitioner care, maternity care, multidisciplinary care, and district nursing (Rijksoverheid, n.d.). Table A-4.1 provides a complete overview.

On top of the deductible, the Zvw has additional payments – in the form of fixed amounts (co-payments) or a percentage of total costs (coinsurance) – that always need to be paid out-of-pocket before the deductible kicks in. This concerns certain medical aids, non-hospital pharmacy, patient transportation, and maternal care. In the specific case of maternal care there is only a co-payment and no further deductible (Rijksoverheid, n.d.). Table A-4.2 provides a complete overview.

4.2 Long-term care – the Wlz

Long-term care applies when someone requires permanent or ongoing care and supervision. It is meant for the most vulnerable groups, such as people with (long-term) psychogeriatric, physical or psychological disabilities. Long-term care is publicly organised in the Long-term Care Act. All residents of the Netherlands are automatically

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[2] There is a small exception for religious objections to insurance, for which there is a replacement system. In 2019, the vast majority of the population (99.8%) had taken out insurance (Ministry of Health Welfare and Sport, 2020).

[3] Individuals younger than 18 do not have to pay for healthcare.

insured. It can take place at home, but also in nursing homes or other permanent residencies (VWS, 2016).

The out-of-pocket payment for the Wlz is dependent on the contributory household income. This consists of income and wealth, two years prior. There are two main categories. First, there is the low contribution. If a patient uses Wlz care but does not live in an institutional household fulltime (such as a nursing home), the low contribution applies. This is the case if the patient has a complete nursing package at home (VPT), makes use of the modular package at home (MPT) or a personal budget (PGB). If a patient lives in an institutional household, and either their partner lives at home or the patient regularly incurs costs for raising a child, the low contribution applies. In 2019 this contribution was maximised at €860 a month (€10,340 a year). If the situations of the low contribution do not apply, the high contribution will take effect after six (2016-2018) or four months (2019). In 2019, this payment was maximised at €2365 a month (€28,375 a year). Table 4.2.1 shows an example calculation.

Throughout the period 2016-2019, there have been multiple changes to the calculation of the payment, all lowering the final amount owed. These are indicated with a 'c' (changed, other than indexation) or 'n' (newly introduced) in table 4.2.2. In 2018, the marginal tariff for the low contribution was lowered from 12.5% to 10%. Also, a deduction of max. €1700 (on contributory income) was introduced to compensate elderly who used to be eligible for a cancelled type of allowance. In 2019, the marginal tariff on wealth (*vermogensinkomensbijtelling*, VIB) was reduced from 8% to 4%.

Table 4.2.2 can be used to calculate someone's contribution. One should read the table by adding (+), subtracting (–) or multiplying (x) the amount of the relevant parameter. All applicable parameters for the low contribution contain a sign in the left column. If there is none, it is not applicable. For example, the marginal tariff on wealth is applicable to both the low and the high contribution, while the MPT/PGB deduction is only applicable to the low contribution. For example, a household existing of two people in which one person uses long-term care in 2019. Both people are eligible for retirement benefits and live at home. They have a household income of €40,000 and €100,000 in wealth (two years ago, t-2). A personal care budget (PGB) is used to arrange the necessary long-term care. They are not eligible for compensation of the former elderly allowance. Their annual payment would be €1,890. Table 4.2.1 shows this example calculation.

TABLE 4.2.1: Example calculation of low contribution, based on Table 4.2.2.

	Amount	Type	Dependent on
=	€40,000	Starting amount	Taxable household income (t-2)
+	€2,000 (4% of €100,000 - €50,000)	Tariff on wealth (4% of wealth – threshold)	Household wealth above threshold (t-2)
–	€6,100	MPT/PGB deduction	Fixed amount
=	€35,900	Contributory income	
x	10%	Marginal tariff	Contributory income
=	€3,590		
–	€1,700	MPT/PGB deduction	Fixed amount
=	€1,890	Annual payment	

TABLE 4.2.2: Wlz-payment scheme for 2019
Reported amounts correspond to 2019 (source cak.nl)

Contribution type			Financial consequence	Parameter
Low	*High*			
=	=		(Starting amount)	Taxable household income in year t-2
+	+	c	4% marginal tariff on household wealth above a threshold (until 2018: 8%)	threshold depends, €25,000 if single household, €50,000 if multi-person household
				threshold* is raised by an additional €10,000 if non-eligible for retirement, single €20,000 if non-eligible for retirement, other
–	–	n	€1,700 max deduction	Compensation former elderly allowance (since 2018)
–			€6,100 deduction	in case of MPT/PGB
	–		€ x deduction	taxes paid (t-2)
	–		€ x deduction	health insurance premiums paid
	–		15% of current income (t-1)	deduction if person is currently working
	–		25% of income above liberalisation threshold (t-2)	threshold* depends, €6,600 if non-eligible for retirement, single €8,700 if eligible for retirement, single €13,400 if non-eligible for retirement, other €10,400 if eligible for retirement, other
	–		€3,700 deduction (single) €5,800 deduction (other)	basic needs deduction
	–		€1,000 if eligible €2,000 if non-eligible	deduction, if household is (non-)eligible for retirement benefits
=	=		**Contributory income**	
x		c	10.0% marginal tariff (until 2017: 12.5%)	marginal tariff low contribution
=	=		(Final amount)	Annual out-of-pocket payment
–			€1700 deduction	in case of MPT or PGB
Max. €10,340 (a year)	Max. €28,375 (a year)			

c = changed in study period (other than indexation)
n = newly introduced in study period
* if household is (non-)eligible for retirement benefits, and either single-person or other (multiple persons).
Numbers were rounded off to hundreds.

4.3 Social support – the Wmo

The Social Support Act 2015 (Wmo) is different from the other two healthcare acts. It is not technically insured care, but a provision provided by municipalities. The Wmo mandates municipalities to provide support to people with disabilities. Examples include people with physical, mental or psychological disabilities, such as the (slightly) disabled and the elderly. This support is aimed at enabling people to participate in society and to continue living at home. In addition, the municipality can offer protected housing and shelter from the Wmo to people who have no possibilities or are unable to live at home (referred to as 'protected living') (VWS, 2016). Protected living is for adults with mental or psychosocial problems who need full-time care or support. It means that these people can often continue to live in their own homes with healthcare or social workers coming by. As a result, they maintain their social network and continue to participate in society (Rijksoverheid, n.d.).

The Wmo has two main types of provisions: general and customised. A general provision is available to all inhabitants. Examples are a coffee morning at the community centre, a grocery or meal service, or transport for all citizens aged 75 and older. A customised provision is tailored to one's specific needs. This could, for example, include help with cleaning, assistance with administration, or a package with multiple forms of support. It also includes protected living or shelter for the homeless, people with mental disabilities or victims of domestic violence (VWS, 2016). General and customised provisions have different regulations regarding out-of-pocket payments.

General provisions have no specific regulations. Costs for general provisions are typically low, and few (substantial) out-of-pocket payments are charged in practice (Soeters & Verhoeks, 2015). The dataset used in this study lacks information on general provisions, therefore these are not included in the analysis. Customised provisions that involve protected living follow the Wlz payment scheme, similar to the one outlined in section 4.2. All other customised provisions had two out-of-pocket payment regimes in the study period (2016-2019).

4.3.1 Standardised framework (2016-2018)

Between 2016 and 2018, the determination of out-of-pocket payments was quite complex, and could differ depending on which municipality someone lived in. The Wmo gave municipalities freedom if and how to impose out-of-pocket payments within a standardised framework. Within this framework certain parameters can be adjusted up to a maximum. A municipality can set the out-of-pocket payment up to a maximum tariff for every four weeks (amount A). This maximum was different for single-person and multi-person households. When a household's income is above a threshold (B), the out-of-pocket payment may increase with a marginal tariff (C), based on the income above the threshold. The threshold must be at least 120% of the social minimum and is lower for households that are eligible for retirement benefits and those that are not. Thus, a retirement-eligible household with an income above the threshold will pay more than a non-eligible household. The marginal tariff (C) is maximised. Figure 4.3.1 shows the mechanism graphically. Additionally, the Wmo has an 'anti-accumulation regulation', which states that no out-of-pocket payment is required for a customised provision when someone in the same household already has out-of-pocket payments for long-term care in the Wlz (Soeters & Verhoeks, 2015).
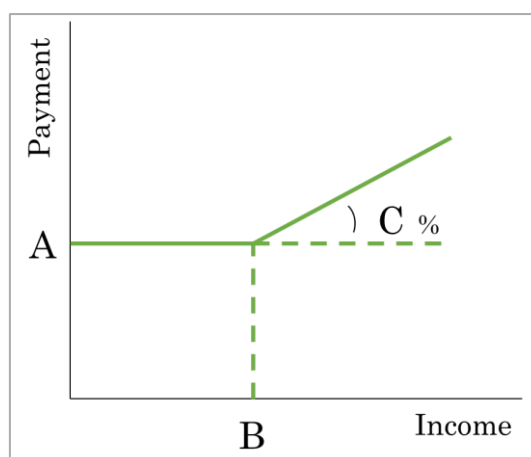
FIGURE 4.3.1: Standardised framework for Wmo-payments 2016-2018

As of 2017, three changes were made mainly aimed at couples with only one income and a chronically ill person, but other households also profited. For single-person households, maximum tariff (A) was lowered from €19.40 to €17.50 every four weeks. For multi-person households, maximum tariff (A) was lowered from €27.80 every four weeks, to €17.50 (if eligible for retirement benefits). If a household was not eligible for retirement benefits, the maximum tariff (A) was €0, while the income threshold (B) was increased by about €7,000.[4] For all types of households, the marginal tariff maximum (C) was decreased from 15% to 12.5%. The government estimated almost 300,000 households were to profit from these measures (*Kamerstukken II*, *34 550, nr.10*, 2016).

4.3.2 Fixed monthly payment (2019)

The complexity and the differences between municipalities were seen as undesirable. Therefore, the government simplified the Wmo payment from 2019 onward (Staatsblad, 2018). A fixed monthly payment, with a maximum of €17.50 every four weeks, was introduced for all households. Municipalities are allowed to lower this amount for their residents, potentially even exempting any payment.

4.4 Intermediate summary

Out-of-pocket payment regulation varies across the different healthcare domains. Payments in curative care (Zvw) and social support in 2019 (Wmo, protected living excluded) are not income-dependent, while payments in long-term care (protected living included) and social support between 2016-2018 are income-dependent. The Zvw has not seen any major changes in 2016-2019, while the Wlz and Wmo have seen decreases. Table 4.4 summarises all out-of-pocket payments.

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[4] For multi-person households (not eligible for retirement benefits) it was around €28,000 in 2016 and was increased to €35,000 in 2017.

Domain	Out-of-pocket payments mechanisms	Applicable for…	Maximum annual payment		Income-dependent
Zvw	Mandatory deductible	All Zvw insured care, except for categories listed in table A-4.1	2016-2019	€ 385	No
	Voluntary deductible	If a voluntary deductible is chosen, same application as mandatory deductible (above)	2016-2019:	€ 500	No
	Co-payments for specific types of care*	Among others: certain medical aids, maternity care, patient travel, pharmaceuticals		Differs per type of care	No
Wlz	Low contribution	When a patient lives in a nursing home and… - Partner lives at home, or… - Regularly incurs costs to raise a child When patient or partner of patient has VPT, part-time residence in a nursing home, MPT, or PGB	2016: 2019:	€ 10,065 € 10,340**	Yes
	High contribution	If situations above do not apply, high contribution will be owed after 6 months (2015-2018) or after 4 months (2019)	2016: 2019:	€ 27,615 € 28,375**	Yes
Wmo	Low/High contribution	When a customised provision consists of protected living, the Wlz-contribution mechanism (above) applies	Wlz-mechanism (above)		Yes
	Co-payment	Customised provision (not protected living)	2016-2018: 2019:	(no max.) € 230	Yes No
	General provisions*				No

All numbers have been rounded to five euros.
*Omitted in this study. See table A-4.2 for a complete list including details on the types of care and the height of the co-payments.
**Increase due to indexation in the years between 2016 and 2019.

5. Empirical strategy

5.1 Data

The data used for the analyses is non-public administrative microdata acquired from Statistics Netherlands (CBS) including healthcare costs, healthcare use, and income for the years 2016-2019. The data include every individual registered in the *Basisregistratie Personen*, the national persons register of the Dutch government. The dataset contains information on demographic and socio-economic characteristics, income and wealth, healthcare use and out-of-pocket payments on healthcare.

Though the microdata is on an individual level, analyses will be done on the household level. Economic choices are often made collectively within a household, using the pooled resources of all household members. Additionally, living in a multi-person household significantly impacts expenses on basic needs, usually lowering these expenses. Both are relevant when gauging the impact that out-of-pocket payments have. It is consistent with literature on out-of-pocket payments and with the methodology used by the WHO in measuring financial protection.[5] For example, take a family with two parents and one adult child living together. One parent works full-time, the other parent is permanently incapacitated to work, while the child is a student without income. Healthcare costs incurred by any household member will most likely burden the entire household income, regardless of who incurs the cost. It would be unfair to claim problematic healthcare costs for the student, if in practice his parents cover all costs.

5.1.1 Sample selection

The process of sample selection is shown in figure 5.1.1. The sample used consists of a large set of the Dutch population between 2016-2019. However, some specific exclusions have been made. Most importantly, institutional households and student households. Institutional households are vastly different from regular private households. Examples are nursing homes, revalidation centres or penitentiaries. Both income and consumption are hard to interpret in these households. Some people have neither income nor costs, while others have income but transfer all of it to their institution. Demarcations of households are also problematic, often leading to households that do not adhere to the assumptions of pooled resources and collective decision making. For example, out-of-pocket payments are very unlikely to burden all members in such a household, and a single member of the household is unable to access total income. All of the above can distort fair interpretation of outcomes. By default, Statistics Netherlands (CBS) excludes institutional households from their statistical analyses (CBS, 2021a). I have chosen to also exclude student households, as they suffer from similar problems with regards to the assumptions of a household. Additionally, they often lack regular income but have other sources (e.g., student loans or transfers from parents) that largely determine their socio-economic status and capacity to pay for healthcare in case of need. These are not visible in the administrative data, potentially leading to faulty interpretations.

Other, smaller exclusions have also been made. First, households that missed crucial information – on either out-of-pocket payments, income or other socio-economic characteristics – were removed. Second, some individuals report a negative value for out-

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[5] See, for example, Edmonds & Hajizadeh (2019) for literature on (catastrophic) out-of-pocket payments. The methodology of the WHO can be found in 'A new approach to measuring financial protection in health systems' (2016).

of-pocket payments due to corrections in connection to previous years. Because it is unclear what the correct amount in each year is, these individuals and their households are removed from the sample in all years. Third, some households report negative values for disposable income. There are various causes for this, but mostly it derives from self-employed entrepreneurs that invest in their company. In the administrative records, this could cause their income to be negative in that year, in accordance with tax regulations. This, however, does not reflect their actual income or socio-economic position. Households with a negative income are therefore removed from the sample. Figure 5.1.1 shows the process of exclusions and their respective sizes. The final sample size is 29,545,712 households, consisting of 63,970,627 individuals. This corresponds to 93% of the total population.[6]
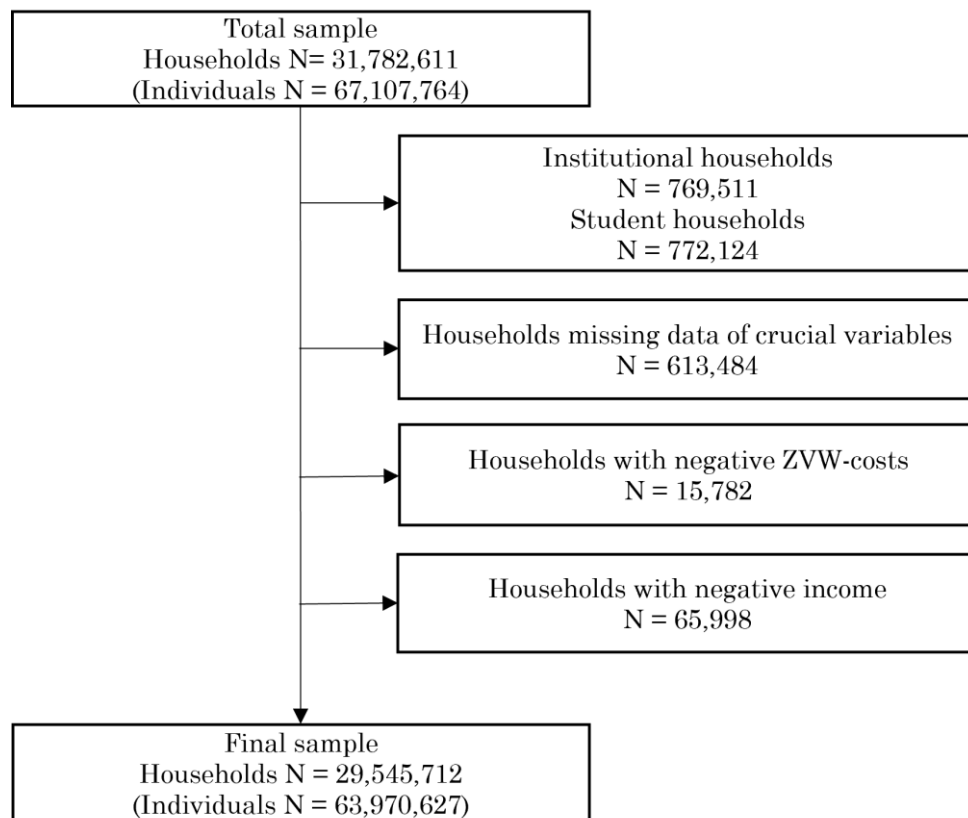
FIGURE 5.1.1: Process of sample selection

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[6] The total Dutch population between 2016-2019 was 68.5 million. Source: CBS (n.d.) "Bevolkingsteller". cbs.nl.

Variable	Share of households	Number of households
Number of adults in the household		
1	41.0%	12,099,539
2	47.8%	14,134,180
3	7.8%	2,305,332
4+	3.4%	1,006,661
	100.0%	29,545,712
Number of children in the household		
0	75.6%	22,326,985
1	10.4%	3,072,454
2	10.4%	3,062,466
3	3.0%	873,477
4+	0.7%	210,330
	100.0%	29,545,712
Age category		
18-34	19.5%	5,763,049
35-49	32.1%	9,478,990
50-64	21.8%	6,430,188
65-79	19.9%	5,864,615
80+	6.8%	2,008,870
	100.0%	29,545,712
Primary type of household income source		
Wage	53.0%	15,661,883
Retirement benefits	26.9%	7,936,607
Profits from self-employment	6.7%	1,990,725
Social welfare benefits	4.2%	1,246,910
Sickness or incapacity benefits	3.5%	1,041,289
Wages director and major shareholder	2.3%	666,140
Other welfare benefits	1.5%	450,833
Unemployment benefits	0.9%	271,248
Income from wealth	0.7%	206,333
Other income from self-employment	0.3%	73,744
	100.0%	29,545,712
Income quintiles		*Average standardised disposable income**
Poorest	20.0%	€ 14,700
Second poorest	20.0%	€ 21,200
Middle	20.0%	€ 27,100
Second richest	20.0%	€ 34,100
Richest	20.0%	€ 57,200
	100.0%	€ 30,900
Wealth quintiles		*Average wealth (without house)**
Poorest	20.0%	€ -17,500
Second poorest	20.0%	€ 3,200
Middle	20.0%	€ 16,000
Second richest	20.0%	€ 47,700
Richest	20.0%	€ 557,500
	100.0%	€ 121,500

Rounded to hundreds

5.2 Description of variables

5.2.1 Out-of-pocket payments

Zvw payments consist of both mandatory and voluntary deductible payments made by a household in a given year. Payments in the Wlz and the Wmo (only applicable for protected living) are the income-based contributions actually billed to the household.[7] Other payments in the Wmo include the co-payment for customised provisions (2016-2018) and the fixed monthly payment (2019). In some places, payments in the Wmo have been split up in protected living (VBL), which follows the Wlz mechanism for out-of-pocket payments, and other customised provisions (ZTH).

It is important to note that the data only covers healthcare costs from the basic insurance, not any possible supplementary insurances. Also, the out-of-pocket payments of some types of care that are covered under basic insurance are not available. These include co-payments for specific medical aids, maternity care, patient travel, and medicine in the Zvw, and out-of-pocket payments for general provisions in the Wmo. Table A-4.2 provides a detailed overview on the missing Zvw co-payments. Additionally, any co-payments due to non-contracted care are also unknown. Not being able to take these payments into account impacts the interpretation of the results. This is discussed further in section 7.3.

5.2.2 Socio-economic characteristics

In this study, household income is defined as standardised disposable household income. Disposable income is used to best approach the financial constraint a household acts under. Disposable household income includes income from employment, own business and wealth, and income consisting of benefits, pensions and received partner alimony. Partner alimony paid and premiums and taxes on the income are deducted. Income insurance premiums refer to premiums paid for social insurance, national insurance and private insurance in connection with unemployment, sickness and disability. The (estimated) premium for the compulsory basic health insurance is also deducted from income. Any received healthcare allowance (*zorgtoeslag*) has been added to income. Standardisation is done to enhance comparability between households. The CBS-equivalence method has been used for standardisation (CBS, 2019). Table A-5.2 provides the equivalence factors used for the most common households. If a household composition is not shown in the table, equation A-5.3.1 is used to determine the factor.

Wealth is defined as the total value of bank and savings deposits, bonds and shares, business assets and other household assets. To best approach the wealth that is at the disposal of a household, for example to pay for healthcare, the value of an owned home and connected mortgage debts have been excluded.

Primary type of household income source is determined by the income source that contributes most to total household income. The most common types are wage from employment and retirement benefits. Not all categories are reported in the regression tables but are used as controls. These categories either represent a very small group of the population (<2.5%) or are comprised of multiple subtypes (making interpretation of little use). An example is the category 'other social benefits', which contains multiple types of benefits with a relatively low number of users, most importantly the Work and Employment Support for Young Disabled Persons Act (Wajong). Others include the Act

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[7] Protected living as defined in section 4.3.

Income provision for older and partially disabled unemployed workers (IOAW), Income Support Act for Older and Partially Incapacitated Self-employed Persons Act (IOAZ), Self-employment Assistance Decree (Bbz), Work and Income for artists (WWIK) and war and resistance pensions. It is also the residual category if the origin of a benefit is unknown.

5.2.3 Other household characteristics

Other household characteristics include age and household size. The age of a household is determined by the average of all adults in the household. Household size is split up between the number of adults in the household and the number of children (aged under 18) in the household. These have been added to the models separately.

5.3 Statistical methods

To answer the main research question, I employ both descriptive statistics and regression analysis. First, average out-of-pocket, catastrophic, and impoverishing payments are estimated across income quintiles and over time (2016-2019). Then, Ordinary Least Squares (OLS), Linear Probability (LPM), Logit and Two-part models (TPM) are used to isolate the relative importance of various socio-economic characteristics associated with out-of-pocket, catastrophic, and impoverishing payments. Below, I first describe the regressions used on out-of-pocket payments in the separate healthcare domains in section 5.3.1 and 5.3.2. Then, the construction of catastrophic and impoverishing payments is described in detail in section 5.3.3. Finally, the regressions used for catastrophic and impoverishing payments are described in section 5.3.4.

5.3.1 Out-of-pocket payments: OLS-models

First, an OLS regression is performed. Formally:

$$y_{h_{ij}} = \beta_0 + \beta_1 * I_{h_{ij}} + \beta^\top * X + \varepsilon \tag{1}$$

There are four dependent variables ($y_{h_{ij}}$): the household out-of-pocket payments of household h_{ij} for household i in year j, in the three domains (Zvw, Wlz, Wmo) separately and total payments. The main variable of interest is $I_{h_{ij}}$ which represents the income quintile of household h_{ij}. Other regressors are expressed as X, a vector of independent variables. These include the average age of all adults in the household, wealth quintile, primary type of income source of the household, number of adults and children in the household and year dummies.

The aim of the regressions is to estimate the relationships of socio-economic household characteristics on out-of-pocket payments. The selected independent variables are all expected to have a relationship with the dependent variables. However, I do not interpret these relationships as causal. The zero conditional mean assumption – the independent variables are uncorrelated with the error term – is very unlikely to hold. Clear examples of omitted variables are healthcare use and health status, which are likely to influence both out-of-pocket payments and interact with factors such as income and household type. The results from all regressions (including those below), should therefore be interpreted as associations.

5.3.2 Out-of-pocket payments: Two-part models

When dealing with health expenditure data, an OLS regression might not be the most suitable estimator. Health expenditure usually displays two statistical features. First, the

distribution is highly skewed, a small part of the population is responsible for a disproportionately large part of total expenditure. An OLS regression is sensitive to outliers, giving them excessive influence in the estimation of parameters, potentially creating a bias (Liu et al., 2018). Second, health expenditure often contains a substantial number of zeros. OLS assumes that the outcome variable has a continuous distribution, ignoring the excessive mass at zero, another potential source of bias (Deb & Norton, 2018). This study concerns out-of-pocket payments in three different healthcare domains. These payments exhibit similar features to health expenditure, but the right-hand tail is not as flat and long (due to maximums imposed on payments). Also, Zvw-payments are not extremely skewed. Figure A-5.4.1 shows the distributions of all households with non-zero payments, per domain and in total. Payments in the Wlz and Wmo clearly adhere to both features, with high shares of zero's (90%+) and long tails with outliers. Payments in the Zvw do not exhibit both features as excessively but are still clearly not normally distributed.

When an outcome variable displays these two statistical features, a two-part model is a more flexible and appropriate estimator (Deb & Norton, 2018). A two-part model decomposes the estimation. First, the probability of incurring any non-zero out-of-pocket payments is estimated, dealing with the large mass at zero. Then, using only observations with non-zero payments, step two uses a generalised linear model (GLM) to estimate the level of out-of-pocket payments. This technique also provides the opportunity to separately evaluate what influence covariates have on the extensive margin (what increases the chance of having non-zero out-of-pocket payments?) and on the intensive margin (what level of out-of-pocket payments is predicted?).

Three additional modelling choices must be made in the two-part model compared to the OLS model. One, whether to use a logit or a probit for the first step. Generally, differences between both estimators are negligible. A probit model assumes normally distributed standard errors, while a logit assumes a logistic distribution. Figure A-5.4.1 indicates evidence to reject the assumption of normality. However, non-normality is not considered to be a serious problem when using larger samples (Mishra et al., 2018). To be on the safe side, I use a logit model in step one.

The second choice regards the link function used for the GLM. The link function transforms the linear predictor (the sum of the independent variables multiplied by their coefficient) to be able to appropriately fit the distributional properties of the outcome variable. Highly skewed data, such as health expenditure, often fit best with a log link function, which uses the natural logarithm of the expected value of the dependent variable to model the linear index (Deb & Norton, 2018).

The third choice is the distributional family. When the appropriate distribution family is chosen, the (OLS) assumption of homoskedasticity can be relaxed. Homoskedasticity assumes that the variance of the error term is constant, regardless of the values of the independent variables. However, Deb & Norton (2018) state that it is more likely and more intuitive that higher expected values of expenditure also have a higher variance. Based on their study, a Gamma distribution is most appropriate in this case. Additionally, robust standard errors are employed.

Interpretation of a two-part model is less intuitive than an OLS model. Produced coefficients cannot be interpreted directly (in terms of magnitude). Also, the marginal effect of an independent variable can differ across different values (e.g., the effect of

income on healthcare payments is stronger at a higher age). To make interpretation more intuitive, I have chosen to inspect the marginal effects for both a young (aged 18-34) and old (aged 80+) single-person household. The socio-economic characteristics associated with higher out-of-pocket payments may vary between both age groups, which can be uncovered by the marginal effects. The most common type of income source for both age groups is used, wage from employment (18-34) and retirement benefits (80+). The baseline for both households is the lowest (poorest) income and wealth quintile.

5.3.3 Financial protection indicators (catastrophic and impoverishing payments)

To determine whether healthcare payments form a barrier to access or lead to financial hardship, financial protection metrics offer more insight than out-of-pocket payments alone. Two indicators are commonly used: catastrophic ($CATA_{h_{ij}}$) and impoverishing ($IMP_{h_{ij}}$) healthcare payments. Both indicators rely on a household's capacity to pay for healthcare ($CTP_{h_{ij}}$), which I define as the available disposable income after subtracting basic needs consumption. Formally:

$$CTP_{h_{ij}} = Y_{h_{ij}} - B_{h_{ij}}$$

Where $Y_{h_{ij}}$ is disposable household income, $B_{h_{ij}}$ is basic needs budget, both for household i in year j. The definition of the basic needs budget, or poverty line, is subjective. It can be based on national poverty lines, actual patterns of household spending or more basic needs. Incidence of catastrophic and impoverishing payments are highly sensitive to the choice of poverty line (WHO, 2019). I use the basic needs budget that was determined by the Netherlands Institute for Social Research (SCP). It includes the minimum spending on unavoidable necessities such as food, clothing, housing and utilities. Spending on some other costs that are difficult to avoid, such as insurance, transport, and personal care are also included (table A-5.3.1 provides the composition in detail). It is particularly useful for this study, as healthcare costs are not included. This budget therefore reflects what a household's basic needs are, the remainder of which can and should be used for healthcare payments. The basic needs budget was adjusted for inflation. This budget (B_{h_i}) is €12,468 for a single-person household (in 2017) and is transformed to other household compositions through the CBS-equivalence scale (CBS, 2019; Goderis et al., 2018). See equation A-5.3.2 for the calculation of the equivalence factor, and table A-5.3.3 for inflation adjusted numbers. Note that studies by the WHO, based on household surveys, calculate the capacity to pay differently. They use average spending on food, housing and utilities by households between the 25th and 35th consumption percentile as the basic needs budget. The assumption is that these households are able to meet, but not necessarily exceed their basic needs. A detailed comparison of definitions is provided in Table A-5.3.4. Implications for interpretation are discussed in section 7.3.

Out-of-pocket payments are defined as catastrophic payments when they are 40% or more of a household's capacity to pay. This is in line with the WHO-definition (WHO, 2019). Formally:

$$CATA_{h_{ij}} = \begin{cases} 1, if\ OOPP_{h_{ij}} \geq 0.40 * CTP_{h_{ij}} \\ 0\ otherwise \end{cases}$$

Where $OOPP_{h_{ij}}$ represents total out-of-pocket payments of household i in year j. As defined above, $CTP_{h_{ij}}$ represents a household's capacity to pay. The intuition behind catastrophic

payments is that a household is burdened by healthcare payments to such an extent that it threatens to crowd out other basic needs (Hsu et al., 2018). Both the definition used for household resources and the catastrophic threshold are normative and somewhat arbitrary. Household resources generally range from total household income to some form of capacity to pay.[8] The threshold for catastrophic payments commonly ranges between 5%-40%. A lower threshold is used more often if the household resources definition is broader. In my study (and in the WHO-methodology), the definition of capacity to pay is rather narrow compared to studies that use, for example, total household income. As a consequence of the aforementioned, catastrophic payment results are sensitive to these choices. In line with recommendations by Hsu et al. (2018), the results for several thresholds and a catastrophic incidence curve are reported in the appendix (Table A-5.3.5 and Figure A-5.3.6).

Payments are qualified as impoverishing when total out-of-pocket payments exceed a household's capacity to pay. In that case, a household is pushed below the poverty minimum due to the healthcare payments. If a household is already below the poverty minimum before healthcare expenses, the payments are considered 'further impoverishing' (WHO, 2019). Formally:

$$IMP_{h_{ij}} = \begin{cases} 1, if \ CTP_{h_{ij}} \geq 0 \ \ and \ CTP_{h_{ij}} - OOPP_{h_{ij}} \leq 0 \\ 0 \ otherwise \end{cases}$$

Again, $OOPP_{h_{ij}}$ and $CTP_{h_{ij}}$ represent total out-of-pocket payments and capacity to pay of household i in year j. Figure 5.3 graphically explains (further) impoverishing payments.

FIGURE 5.3: Graphical representation of catastrophic and impoverishing payments.
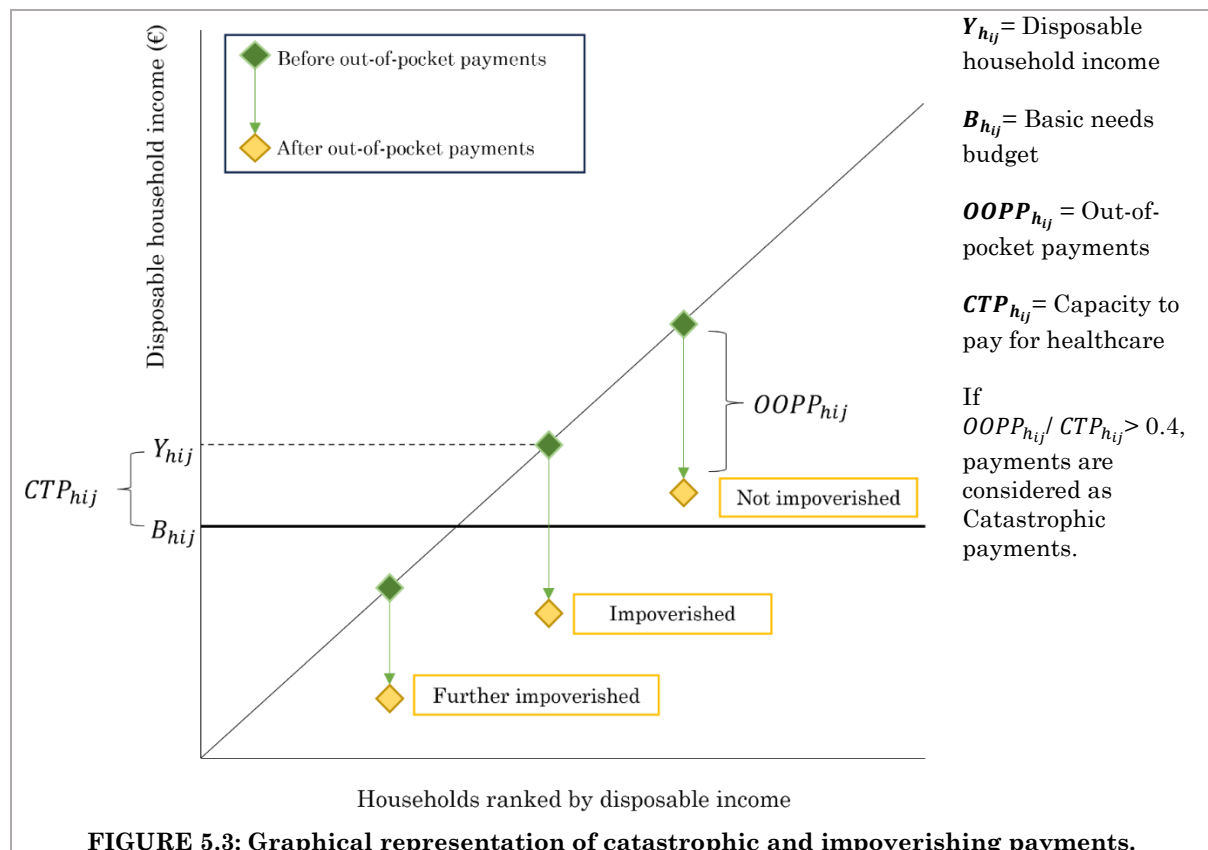
[8] Where capacity to pay is some form of income minus basic needs.

As stated before, both indicators are sensitive to the choice of poverty line, and the basic needs included. Potentially problematic is the fact that some long-term care or social support services can include basic needs such as food or even housing, the two most important aspects of the basic needs budget. These costs would be replaced by the out-of-pocket payment, but the indicators do not pick up on this. This could lead to unfairly marking a household as having catastrophic or impoverishing payments. The Wlz and protected living from the Wmo mainly suffer this problem. As a robustness check, both indicators were also analysed using only Zvw and Wmo (customised provisions) payments. Services included in these payments rarely replace basic needs, mitigating the problem.

5.3.4 Financial protection regressions

The financial protection indicators – catastrophic and impoverishing payments – are all binary outcome variables. First, a linear probability model is estimated. Formally:

$$P\left(z_{h_{ij}} = 1 \middle| X\right) = \beta_0 + \beta_1 * I_{h_{ij}} + \beta^{\top} * X + \varepsilon \tag{2}$$

Where $P\left(z_{h_{ij}} = 1 \middle| X\right)$ is the conditional probability of the binary outcome $z_{h_{ij}}$ being 1 given the vector of independent variables X. Binary outcome $z_{h_{ij}}$ is either catastrophic ($CATA_{h_{ij}}$) or impoverishing ($IMP_{h_{ij}}$) payments. The vector of independent variables (X) match those used in equation (1).

A linear probability model has two issues. One, it assumes homoskedasticity. Two, the predicted probabilities can fall outside of the [0,1] range. Additionally, the linear probability model assumes constant marginal effects. This means that the effect of income on healthcare payments is assumed to be the same for a young household as well as an older household. I expect the effects to be greater at older ages (because healthcare use is greater). Therefore, I also use a logit model similar to step one of the two-part models. A logit model does not assume homoskedasticity and predicted probabilities are always in the appropriate range (Wooldridge, 2010). However, interpretation of a logit model is more difficult because the marginal effect of an independent variable can differ across different values. Again, I inspect the marginal effects for both a young (aged 18-34) and old (aged 80+) single-person household. The most common type of income source is used, wage from employment (18-34) and retirement benefits (80+). The baseline for both households is the lowest (poorest) income and wealth quintile.

6. Results

6.1 Concentration of healthcare use and out-of-pocket payments

Table 6.1.1 presents the average annual household out-of-pocket payments across income groups and in total, between 2016 and 2019. Table 6.1.2 contains the number of households with non-zero payments, and the related average payment of those households. If we only consider the averages over the whole population, a household spends €401 on Zvw, €33 on Wlz, and €31 on Wmo. This adds up to €465 annually. There are great disparities between households, however. Total payments are highly concentrated, largely due to Wlz and Wmo payments (figure 6.1.1). The top 2% of households have an average €3450 out-of-pocket payments and are burdened with almost 15% of all out-of-pocket payments. Conversely, 8% of households have no payments at all. The median household spends exactly €385, the mandatory deductible threshold for a single-person household. Note that this figure does not include student or institutional households, types who are expected to be on the extreme ends of the distribution.

Figures 6.1.2 and 6.1.3 show the share of households with non-zero out-of-pocket payments and the average out-of-pocket payment respectively, ranked by disposable household income (standardised for household size). Each bar represents 2% of the total population. Both are presented, because of the large mass of zero's (especially in Wlz and Wmo payments). Zvw is used by a large portion of households at all points of the income distribution. The poorest 2% seem to be somewhat of a downward outlier, both in terms of use and in absolute payment. Only 80% of these households use Zvw, compared to around 90% for all other levels of income. Their average payment is €360, while all other levels of income are above €445. Wlz and Wmo customised provisions (ZTH, excluding protected living) are mostly used by the bottom half. Wmo protected living (VBL) is almost exclusively used by a small number of households near the bottom of the distribution. The distribution of healthcare use and out-of-pocket payments largely follow a similar pattern, except for the outliers between the 3rd and 6th percentiles. These are primarily driven by Wlz and Wmo protected living payments. Overall, out-of-pocket payments are relatively equally distributed across income groups.

However, disposable income differs greatly between income groups. Figure 6.1.4 shows how large out-of-pocket payments are relative to a household's disposable income. The poorer a household is, the larger the financial burden of out-of-pocket payments. On average, the poorest two percent of the population spends almost 10% of their disposable income on out-of-pocket payments. This is considerably more than all other income groups.

TABLE 6.1.1: Average annual household out-of-pocket payments

	ZVW					WLZ				
	2016	2017	2018	2019	Total	2016	2017	2018	2019	Total
N	7,298,610	7,373,785	7,442,066	7,435,658	29,545,712	7,298,610	7,373,785	7,442,066	7,435,658	29,545,712
Poorest	€ 361	€ 361	€ 369	€ 370	€ 365	€ 64	€ 50	€ 48	€ 46	€ 52
Second poorest	€ 401	€ 399	€ 396	€ 395	€ 398	€ 35	€ 30	€ 29	€ 28	€ 30
Middle	€ 400	€ 401	€ 401	€ 402	€ 401	€ 27	€ 25	€ 24	€ 23	€ 25
Second richest	€ 412	€ 414	€ 412	€ 415	€ 414	€ 30	€ 27	€ 26	€ 26	€ 27
Richest	€ 424	€ 426	€ 425	€ 429	€ 426	€ 37	€ 33	€ 31	€ 31	€ 33
Total	€ 400	€ 400	€ 401	€ 402	€ 401	€ 39	€ 33	€ 32	€ 31	€ 33

	WMO (protected living)					WMO (other customised provisions)				
	2016	2017	2018	2019	Total	2016	2017	2018	2019	Total
N	7,298,610	7,373,785	7,442,066	7,435,658	29,545,712	7,298,610	7,373,785	7,442,066	7,435,658	29,545,712
Poorest	€ 38	€ 38	€ 38	€ 39	€ 38	€ 43	€ 34	€ 35	€ 27	€ 35
Second poorest	€ 4.9	€ 5.8	€ 5.6	€ 5.1	€ 5.4	€ 58	€ 45	€ 45	€ 20	€ 42
Middle	€ 1.5	€ 1.7	€ 1.3	€ 1.4	€ 1.5	€ 32	€ 24	€ 25	€ 6.1	€ 22
Second richest	€ 0.5	€ 0.6	€ 0.5	€ 0.5	€ 0.5	€ 18	€ 14	€ 13	€ 2.6	€ 12
Richest	€ 0.4	€ 0.5	€ 0.4	€ 0.4	€ 0.4	€ 8.9	€ 6.6	€ 6.4	€ 1.2	€ 5.8
Total	€ 9.1	€ 9.3	€ 9.2	€ 9.3	€ 9.2	€ 32	€ 25	€ 25	€ 11	€ 23

Numbers rounded to integers, below € 10 rounded to one decimal.

TABLE 6.1.2: Average annual out-of-pocket payments for households with non-zero payments.

	ZVW					WLZ				
	2016	2017	2018	2019	Total	2016	2017	2018	2019	Total
Poorest	€ 407	€ 407	€ 416	€ 417	€ 412	€ 3,277	€ 2,705	€ 2,337	€ 2,137	€ 2,595
(users)	1,296,342	1,308,369	1,321,651	1,316,973	5,243,335	28,585	27,357	30,303	32,084	118,329
Second poorest	€ 440	€ 440	€ 439	€ 440	€ 440	€ 2,814	€ 2,392	€ 2,053	€ 1,905	€ 2,267
(users)	1,329,813	1,339,557	1,343,951	1,335,857	5,349,178	18,390	18,445	20,728	21,894	79,457
Middle	€ 443	€ 445	€ 448	€ 450	€ 447	€ 3,584	€ 3,314	€ 2,779	€ 2,592	€ 3,037
(users)	1,317,329	1,328,362	1,333,479	1,325,322	5,304,492	11,169	10,968	12,831	13,151	48,119
Second richest	€ 455	€ 458	€ 460	€ 465	€ 459	€ 4,275	€ 3,810	€ 3,431	€ 3,274	€ 3,675
(users)	1,322,702	1,335,195	1,334,901	1,328,916	5,321,714	10,116	10,479	11,470	11,661	43,726
Richest	€ 465	€ 469	€ 473	€ 479	€ 472	€ 5,555	€ 5,123	€ 4,511	€ 4,419	€ 4,888
(users)	1,328,718	1,341,429	1,337,041	1,330,087	5,337,275	9,698	9,546	10,241	10,348	39,833
Total	€ 442	€ 444	€ 447	€ 450	€ 446	€ 3,625	€ 3,168	€ 2,741	€ 2,561	€ 3,001
(users)	6,594,904	6,652,912	6,671,023	6,637,155	26,555,994	77,958	76,795	85,573	89,138	329,464

	WMO (protected living)					WMO (other customised provisions)				
	2016	2017	2018	2019	Total	2016	2017	2018	2019	Total
Poorest	€ 5,144	€ 5,081	€ 5,219	€ 5,315	€ 5,190	€ 295	€ 246	€ 250	€ 188	€ 244
(users)	10,768	11,021	10,923	10,994	43,706	211,545	201,960	208,081	216,422	838,008
Second poorest	€ 6,872	€ 6,879	€ 6,876	€ 6,602	€ 6,809	€ 537	€ 441	€ 441	€ 189	€ 401
(users)	1,047	1,254	1,202	1,147	4,650	158,072	149,597	150,718	158,185	616,572
Middle	€ 5,712	€ 5,560	€ 4,813	€ 4,931	€ 5,253	€ 887	€ 734	€ 732	€ 171	€ 627
(users)	389	460	410	433	1,692	53,420	49,202	50,279	53,543	206,444
Second richest	€ 3,504	€ 3,108	€ 2,869	€ 2,929	€ 3,091	€ 1,052	€ 895	€ 876	€ 159	€ 741
(users)	224	278	245	264	1,011	24,905	22,638	22,790	24,531	94,864
Richest	€ 4,626	€ 3,907	€ 3,644	€ 3,052	€ 3,761	€ 1,065	€ 888	€ 876	€ 156	€ 752
(users)	138	172	154	178	642	12,207	10,958	10,953	11,158	45,276
Total	€ 5,271	€ 5,212	€ 5,297	€ 5,337	€ 5,279	€ 508	€ 419	€ 417	€ 184	€ 381
(users)	12,566	13,185	12,934	13,016	51,701	460,149	434,355	442,821	463,839	1,801,164

Numbers rounded to integers
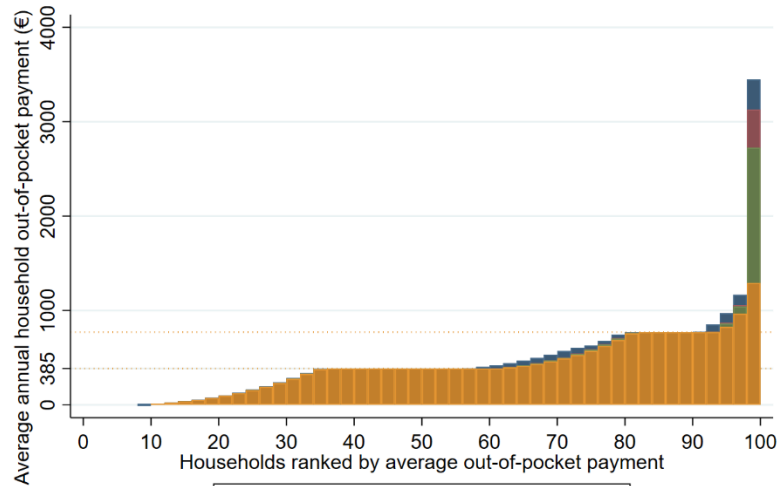
FIGURE 6.1.1: Average annual household out-of-pocket payment, ranked by average payment
Dotted lines indicate the mandatory deductible thresholds of one (€385) and two (€770) adults
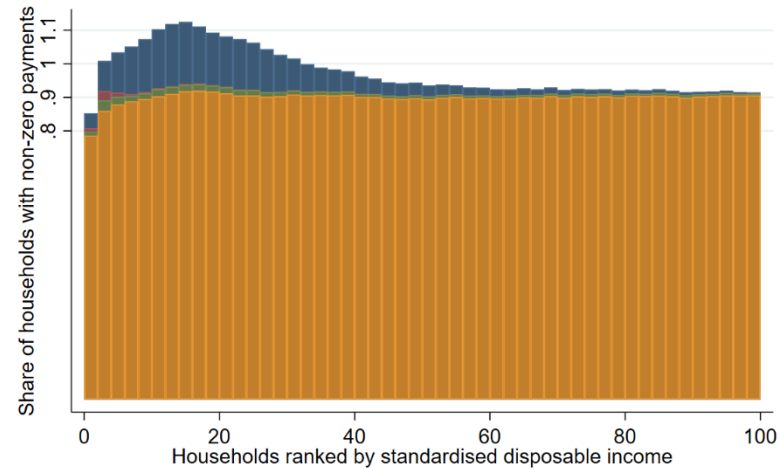
FIGURE 6.1.2: Share of households that use healthcare, ranked by standardised disposable income
One household can have non-zero payments in multiple domains, hence the outcome share is above 1 for some values

Legend:
- Zvw
- Wlz
- Wmo VBL
- Wmo ZTH

Wmo VBL = protected living

Wmo ZTH = other customised provisions
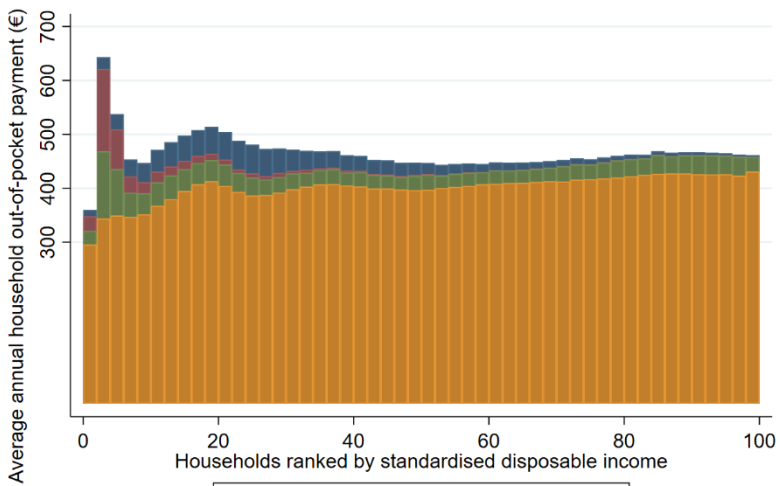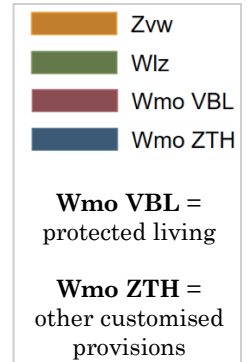
FIGURE 6.1.3: Average annual household out-of-pocket payment, ranked by standardised disposable income
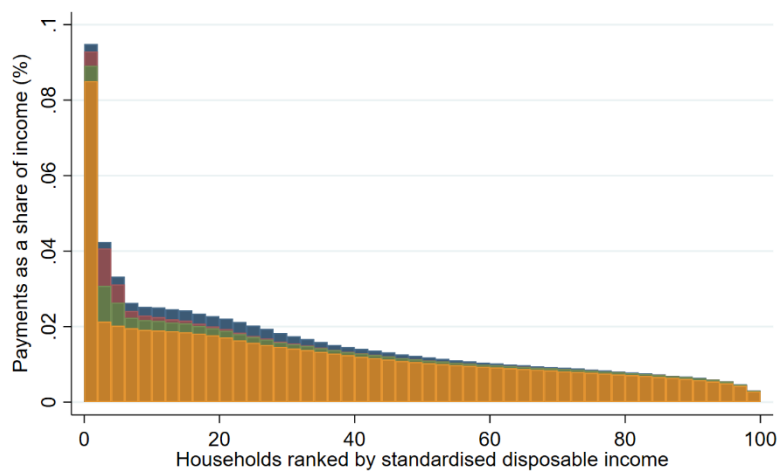
FIGURE 6.1.4: Average household financial burden, ranked by standardised disposable income
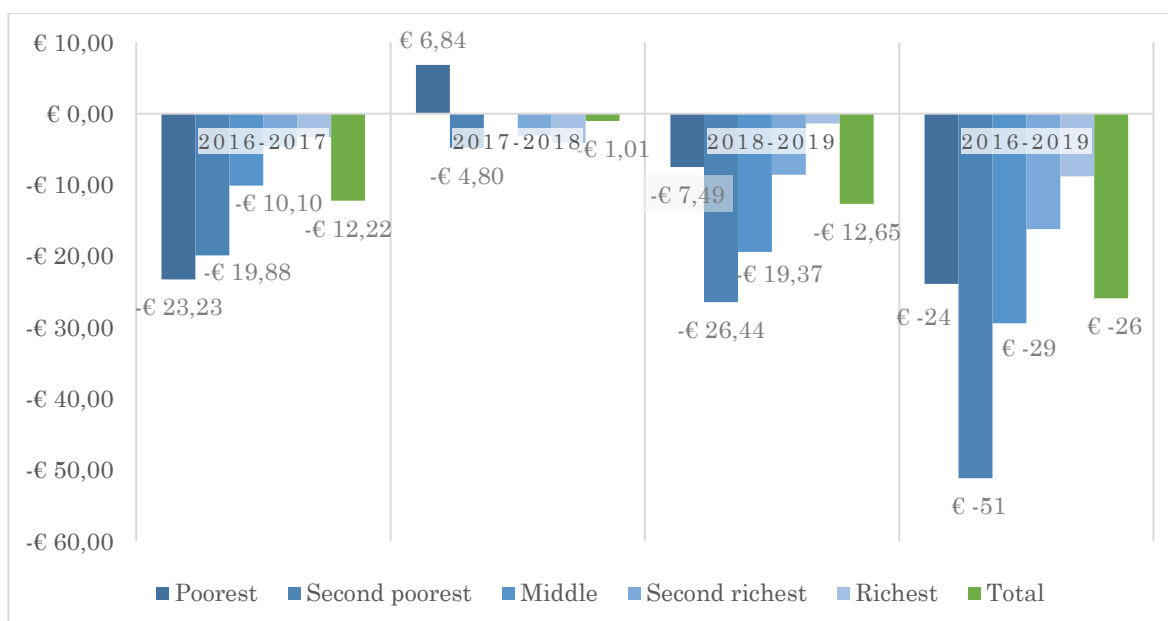
FIGURE 6.2.2: Change in average annual out-of-pocket payment.

6.2 Changes over time

The average payments for Zvw healthcare have very slightly increased each year, while both Wlz and Wmo customised provisions have decreased more substantially (in total, €8 and €21 respectively). Wmo protected living shows a very small overall increase (€0.27). In total, average annual payments have declined from €480 in 2016 to €454 in 2019. Figure 6.2.2 shows the change over time, but now discerned by income quintiles. On average, the poorest groups of the population profited most from the reductions in out-of-pocket payments. The second poorest group has seen the strongest decline, over €50 in average annual payments between 2016-2019.

Changes in regulation on out-of-pocket payments (outlined in section 4) seem to provide explanations for some of the visible trends. The Wlz had multiple changes over the years that seem to have reduced payments over time. However, not only the regulation on out-of-pocket payments is responsible for this decline. Table A-6.2.1 and A-6.2.2 show the number of households using expensive (A-6.2.1) and relatively cheap (A-6.2.2) types of Wlz-care over time, discerned by income group. The downward movement in 2016-2017 is not caused by an institutional change, but instead by a decrease in more intensive and expensive long-term care use. This could be the result of policies aimed at stimulating living at home longer before entering a healthcare residence.[9] The Wmo customised provisions (excluding protected living) exhibit a jump in both 2017 and 2019, simultaneous with reductions in tariffs. In 2019, the payment was no longer income-dependent. Consequently, the decline in payment, among users, was very strong for the highest incomes, but much smaller for lower incomes. An average user of Wmo customised provisions from the lowest income group paid around €250 in 2018 and almost €190 in 2019 (table 6.1.2). An average Wmo patient from the highest income group paid €876 in 2018, which dropped to a mere €156 in 2019.

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[9] For example, *Kamerstukken II, 32 847, nr. 121,* 2014.

To summarise. Out-of-pocket payments are highly concentrated: a relatively small number of households use long-term care (Wlz, 1.1% of households) and social support (Wmo, 6.2% of households), both of which have high payments compared to the more equally shared Zvw-payments. Even though out-of-pocket payments in the Wlz and Wmo are largely income-dependent, payments are concentrated in lower income groups. This seems to be related to utilisation of (more intensive) long-term care. Over time, average out-of-pocket payments have increased in the Zvw and Wmo protected living but decreased for the Wlz and Wmo customised provisions. The lower income groups profit the most from these decreases.

6.3 Financial protection

Figure 6.3.1 shows the average household capacity to pay, cost of meeting needs and the share of households below the poverty line between 2016-2019. Average household income increased more strongly than the cost of meeting basic needs, resulting in an increased average capacity to pay and a decrease in households below the poverty line. Combined with the fact that average out-of-pocket payments have declined (table 6.1.1), this results in a decrease in both catastrophic and impoverishing payments.

Tables 6.3.1 and 6.3.2 show the share of households with catastrophic and impoverishing out-of-pocket payments over time. In the total study period, 1.5% of all households in the sample experienced catastrophic out-of-pocket payments. A downward trend is visible. In 2016, just over 1.7% is reported, while this is reduced to only 1.3% in 2019. Catastrophic payments are highly concentrated in lower incomes. 94% of all households with catastrophic payments are from the lowest income group. All income groups show a downward trend. In the complete study period, almost 0.56% of households were impoverished due to out-of-pocket payments. The number of households peaked in 2016 at almost 0.66%, coinciding with the peak in average out-of-pocket payments (reported in table 6.1.1), after which it steadily declined toward just over 0.5% in 2019. Impoverishing payments are almost exclusively reported in the poorest group, with 95% of all impoverished households.

What kind of households have catastrophic and impoverishing payments? Table 6.3.3 shows a variety of household characteristics, split up into the households with catastrophic or impoverishing payments, and the rest of the population. Both groups differ from the rest of the population in a range of socio-economic characteristics. A larger share of the households is single-person and 80+ years old. Their socio-economic status is lower. Average income and wealth are much lower, while the primary income source often is some type of benefit (social welfare, sickness or incapacity, retirement). Especially social welfare benefits stand out, their share is much greater than the rest of the population (26-30% versus 4%). The out-of-pocket payments are much higher on average. Most impoverished households have a deficit (gap between capacity to pay and out-of-pocket payments) between €101 and €500 (42%), but a sizeable group has a deficit of over €1000 (31%).

6.3.1 Robustness

Long-term care (Wlz) and protected living (Wmo) often include services that replace basic needs, such as food or housing. Excluding these types of payments when examining whether a household has catastrophic or impoverishing payments – thus including

payments for Zvw and Wmo customised provisions only – prevents false positives. The results are presented in table A-6.3.1 and A-6.3.2.

Of all households in the study period, around 1.2% has catastrophic payments, while 0.4% is pushed into poverty. Both catastrophic and impoverishing payments are now almost exclusively concentrated in the poorest income group. This is a logical consequence of excluding the two most expensive types of out-of-pocket payments. For example, it is nearly impossible for higher incomes to become impoverished by only Zvw and Wmo customised provision payments. The trend is still downward for both indicators, meaning the number of households experiencing catastrophic or impoverishing payments decreased over time.

Table A-6.3.3 presents the same descriptive statistics as table 6.3.3, now using the robustness indicators. The number of households is still substantial, with over 365,000 households experiencing catastrophic payments while almost 120,000 households are impoverished. This means that respectively 83% and 72% of the total number of households reported in the original indicators maintain their catastrophic or impoverished status. There are a few differences between the original and the robustness indicators. First, it seems that mostly the elderly (65-79 and 80+) are not marked as catastrophic or impoverished anymore. Their share was 28% but has decreased to 19-22%. Second, the share of households with retirement benefits as their primary income source is much lower. The share of social welfare beneficiaries, on the other hand, has increased to 34-35%. Third, the capacity to pay for healthcare has decreased to only €900 (catastrophic) and €300 (impoverished). Out-of-pocket payments are higher in the Zvw and Wmo customised provisions, but lower in the categories now excluded in determining the indicators (Wlz and Wmo protected living) and are substantially lower overall. Finally, the average deficit (gap between capacity to pay and out-of-pocket payments) is lower. Most households (62%) have a deficit of €101–€500. This was to be expected, as Wlz and Wmo protected living are the most expensive types of out-of-pocket payments.
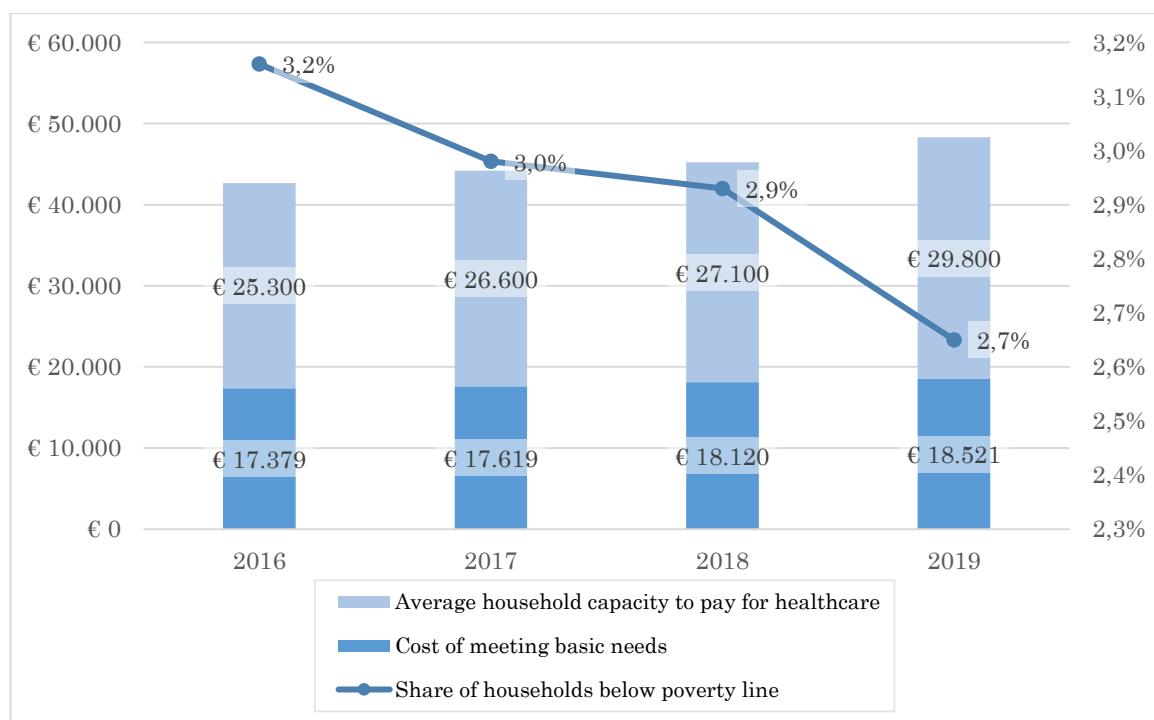
FIGURE 6.3.1: Average household capacity to pay, cost of meeting basic needs, and the share of households below the poverty line, between 2016-2019.

TABLE 6.3.1: Catastrophic payments table

Income quintile	2016	2017	2018	2019	Total
N	7,298,610	7,373,785	7,442,066	7,435,658	29,545,712
Poorest	1.58%	1.38%	1.36%	1.22%	1.39%
Second poorest	0.09%	0.07%	0.06%	0.04%	0.06%
Middle	0.03%	0.02%	0.02%	0.02%	0.02%
Second richest	0.01%	0.01%	0.01%	0.01%	0.01%
Richest	0.01%	0.00%	0.00%	0.00%	0.00%
Total	1.71%	1.48%	1.45%	1.29%	1.48%

TABLE 6.3.2: Impoverishing payments table

Income quintile	2016	2017	2018	2019	Total
N	7,298,610	7,373,785	7,442,066	7,435,658	29,545,712
Poorest	0.61%	0.52%	0.50%	0.48%	0.53%
Second poorest	0.04%	0.03%	0.03%	0.02%	0.03%
Middle	0.01%	0.01%	0.01%	0.00%	0.01%
Second richest	0.00%	0.00%	0.00%	0.00%	0.00%
Richest	0.00%	0.00%	0.00%	0.00%	0.00%
Total	0.66%	0.55%	0.53%	0.51%	0.56%

TABLE 6.3.3: Description of population for catastrophic and impoverished households, compared to the main population

Variable	Not C/I	Catastrophic	Impoverished
N	29,107,298	438,414	166,627
Adults in household	1.74	1.52	1.46
Single-person household*	36%	54%	59%
Age group			
18-34	19%	19%	21%
35-49	32%	26%	27%
50-64	22%	27%	24%
65-79	20%	15%	15%
80+	7%	13%	13%
Disposable HH-income (standardised)**	€ 31,100	€ 14,200	€ 13,900
Wealth (excluding house)**	€ 122,600	€ 43,300	€ 43,000
*Primary type of income**			
Wage	54%	14%	14%
Social welfare	4%	30%	26%
Sickness or incapacity benefits	3%	12%	12%
Retirement benefits	27%	30%	29%
Capacity to pay**	€ 27,600	€2,000	€1,400
Out-of-pocket payments *(% with non-zero payments)*			
Zvw	€ 399	€ 494	€ 466
(%)	(90%)	(98%)	(96%)
Wlz	€ 17	€ 1,123	€ 1,929
(%)	(0.9%)	(15%)	(22%)
Wmo (protected living)	€ 4	€ 378	€ 916
(%)	(0.1%)	(5.4%)	(12%)
Wmo (other provisions)	€ 22	€ 111	€ 75
(%)	(5.9%)	(22%)	(15%)
Total	€ 442	€ 2,106	€ 3,386
If impoverished, what is the deficit?			
€ 0 – € 100	.	.	16%
€ 101 – € 500	.	.	42%
€ 501 – € 1000	.	.	11%
€ 1000 +	.	.	31%

* Rounded to integers
**Rounded to hundreds

6.4 Socio-economic characteristics of out-of-pocket payments

In the main text, the OLS estimates and the two-part model (TPM) marginal effects for household payments in the Zvw and the Wmo are shown (table 6.4.1 and 6.4.2). Estimates from the regressions on payments in the Wlz and total payments can be found in the appendix (table A-6.4.1 and A-6.4.2). The original coefficients of all two-part models can also be found in the appendix (tables A-6.4.3 and table A-6.4.4).

The magnitude of the original two-part model coefficients – i.e., the Logit and GLM estimates – cannot be directly interpreted, therefore I use the marginal effects for two types of households. For brevity of this section, the Wlz and total payment results are discussed, but their regression coefficients are placed in the appendix. It is important to note that the marginal effects were estimated on a random sample of 5%, because the estimation proved to be too computationally intensive when using the complete dataset. The sample seems to be representative, as descriptive statistics are very similar compared to the complete sample (provided in table A-6.4.5).

To make interpretation more intuitive, I have chosen to inspect the marginal effects for both a young (aged 18-34) and old (aged 80+) single-person household. This means we estimate the TPM by using these household types as reference category. Generally, older persons are in a worse health condition and should display higher healthcare costs compared to the younger household. The socio-economic characteristics associated with higher out-of-pocket payments may vary between both age groups, which can be uncovered by the marginal effects. I have used the most common type of income source for both age groups, wage from employment (18-34) and retirement benefits (80+). The baseline for both households is the lowest (poorest) income and wealth quintile.

Tables 6.4.1 and 6.4.2 can be read as follows. Because all independent variables are categorical, a coefficient should always be read as the effect compared to the baseline category (indicated with '0' in the table). For example, the OLS model (1) estimates a single-person household in the richest income quintile to have €7.58 additional out-of-pocket payments in the Zvw on an annual basis compared to a household in the poorest income quintile, keeping all else equal. In the OLS model, this effect (going from poorest to richest in income quintile) is the same regardless of the other characteristics. Whether a household is young (18-34) or older (e.g., 80+), the effect remains €7.58. This is different for the other models in columns (2)-(7), because these are marginal effects. This means that the presented coefficients are only applicable for a household with the same exact baseline characteristics.[10] Column (4) and (7), the TPM estimates, show that there is a heterogenous effect of income. For a young, wage-earning household, the richest income quintile is estimated to have €11 more annual Zvw payments compared to a household in the poorest income quintile. For the old and retired household, this is only €8.65. Finally, one should be attentive to the separation of extensive and intensive margin. The extensive margin is represented by the Logit coefficients in columns (2) and (5). E.g., a young household in the richest income quintile has 3.3 percentage point more chance of having any Zvw payments, compared to the poorest quintile (column 2). If any Zvw payments are incurred, an additional €4.2 in payments are estimated (the intensive margin, column 3). Because both the estimated chance *and* the amount are higher for the richest household, the final estimation is an additional €11 (column 4).

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[10] This is also the reason for presenting results for a household of two different age groups.

The TPM estimates a young, poor household to have around €160 in annual Zvw out-of-pocket payments, which is indicated by the constant in the TPM model (aged 18-34, column 4) in table 6.4.1. Higher income groups are associated with a slightly larger increase in payments, while payments decrease for higher wealth groups. Primary source of income and age have a much bigger impact on out-of-pocket payments. Compared to wage, all other primary sources of income are associated with an increase in annual payments, except for profits from self-employment. Sickness or incapacity benefits are most prominent, with an annual increase of over €120. Social welfare benefits also stand out, with €65 additional payments. Older age groups are estimated to have increasingly more annual Zvw-payments, compared to the young household.

The old (aged 80+), retired household is estimated to have almost €385 in out-of-pocket payments (corresponding to the mandatory deductible threshold). This is in line with the expectation that older households are generally in worse health, therefore having higher healthcare payments. The marginal effects of the different socio-economic characteristics are similar to the young household. Other primary income sources seem to be associated with similar differences, but now relative to retirement benefits (as opposed to wage).[11]

All coefficients are significant at the 0.1% level, except for the second poorest wealth quintile (18-34). The OLS model sometimes estimates larger coefficients (higher if positive, lower if negative), but is otherwise aligned with the TPMs.

6.4.2 Wmo and Wlz

The estimates of the OLS and TPM models start to diverge when looking at the results for the Wmo (and the Wlz). A probable cause is the fact that payments are largely income-dependent and concentrated in a smaller group.[12] The TPM neatly shows the difference between the extensive margin (chance of having non-zero payments, column 2 and 5) and the intensive margin (if yes, then how much, column 3 and 6) in the predicted Wmo-payments (table 6.4.2). If a poor household were to attain a higher income quintile, this is associated with a significant reduction in the probability of having any payments (as shown by the negative coefficient in step one, the logit models), keeping all else equal.[13] However, if the household has any Wmo payments, attaining the middle- or richer-income quintiles is associated with a significantly higher out-of-pocket payment amount (as seen in the positive coefficients in step two, the GLM).[14] The total marginal effect (TPM) combines both effects and predicts a lower out-of-pocket payment for the higher income groups. In the young household, the difference is only a few euros. In the older household, the marginal differences are stronger in most variables. The difference between the highest and the lowest income groups is as much as €85. Notable is the estimated 33 percentage point lower probability in the Logit model, of having any Wmo payments when attaining the highest income group. The highest wealth group also sees a large reduction (17 percentage points), but a more sizable increase in payments. Primary income sources wage and unemployment benefits strongly reduce, while social welfare and sickness

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[11] E.g., retirement benefits are estimated to increase payments by €65 for 18-34 with wage, sickness benefits are estimated to increase payments by €120 (18-34) and €65 (80+).

[12] In the Wmo, payments were income-dependent between 2016-2018.

[13] For example, -0.0309 for the richest income category indicates that they have a 3.09 percentage point lower chance of having any Wmo payments, compared to the poorest income category.

[14] Now, 138.3 in column (3) signifies that a household in the richest income category is estimated to have €138.30 more Wmo payments compared to the poorest, if Wmo payments are incurred.

benefits increase the probability. However, it is unlikely these sources of income happen often in households aged over 80 years.

The TPM marginal results for the Wlz are shown in table A-6.4.1. The estimated probability of having any Wlz payments is much lower than the Wmo.[15] Higher income reduces the probability of having payments but increases the height of payments when non-zero. However, because the marginal change in probability is smaller in magnitude, and the increase in absolute terms is larger, the final effect on estimated payments is different. Low income is still estimated to have the largest payment. Then, the second poorest group has the lowest payment, after which is steadily rises. The effect of wealth is much stronger in the Wlz than in the Wmo. The highest wealth group is associated with a higher probability of any payments (+1.6 percentage point), as well as an increase in the amount, leading to a marginal increase of over €180. This is potentially explained by differences in the regulation of both domains. In the Wlz, wealth plays a substantial role in the determination of the out-of-pocket payment. Wealth above a threshold (of €25,000-€70,000, depending on household type) had a marginal tariff of 8% (4% in 2019). An average household in the richest wealth quintile has €550,000 in wealth, which would immediately result in reaching the maximum annual Wlz-payment. Payments in the Wmo, however, are only dependent on wealth for protected living (which follows the Wlz payment scheme). The vast majority of payments in the Wmo consists of other customised provisions, which are never dependent on wealth.

6.4.5 Total out-of-pocket payments

The TPM estimates of total out-of-pocket payments (table A-6.4.2) seem to be the roughly the sum of all domains. This makes sense, considering that total household out-of-pocket payments are the sum of these three parts. The most important determinants are age and whether the primary source of income is (potentially) related to sickness or incapacity to work. For a young household, the influence of income and wealth are relatively limited. The largest gap is moving from poorest to richest for both income and wealth, associated with a €20 decrease in total. For an old, retired household, most effects are similar but larger in magnitude. Contrary to the young household, wealth is associated with an increase in expected payments. Again, this could be explained by the fact that only long-term care (mostly used by the elderly) is dependent on wealth.

In short, higher socio-economic status is associated with higher Zvw-payments, but lower Wlz, Wmo and total out-of-pocket payments. The differences between income and wealth groups are rather limited at a young age but become more pronounced at old age. The two-part model offers a useful insight in the difference between the extensive and intensive margin. Higher socio-economic status reduces the probability of having Wlz and Wmo payments but increases the height when one is confronted with these payments.

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[15] The baseline, poor and 80+ household is estimated to have a 48% chance of non-zero payments in the Wmo, while this is only 3% in the Wlz.

TABLE 6.4.1: OLS and TPM (margins) estimates for Zvw out-of-pocket payments							
	OLS	TPM (margins)					
			18-34			80+	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variable	OLS	Logit	GLM	TPM	Logit	GLM	TPM
Income quintiles							
Poorest	0	0	0	0	0	0	0
2nd poorest	9.662***	0.0418***	2.221***	11.86***	0.00646***	3.591***	6.056***
Middle	7.546***	0.0292***	1.490***	8.207***	0.00458***	2.409***	4.156***
2nd richest	5.941***	0.0290***	1.696***	8.300***	0.00455***	2.742***	4.467***
Richest	7.577***	0.0330***	4.220***	11.01***	0.00516***	6.823***	8.652***
Age group							
18-34	0	0	0	0	-0.133***	-126.8***	-158.2***
35-49	23.40***	0.0340***	12.60***	16.93***	-0.113***	-112.9***	-140.8***
50-64	106.5***	0.149***	64.02***	87.55***	-0.0506***	-56.12***	-71.32***
65-79	172.1***	0.207***	105.3***	140.8***	-0.0229***	-10.55***	-19.06***
80+	193.7***	0.259***	114.9***	167.8***	0	0	0
Wealth quintiles							
Poorest	0	0	0	0	0	0	0
2nd poorest	-6.259***	0.0126***	-4.424***	0.213	0.00202***	-7.152***	-6.079***
Middle	-15.13***	-0.0018	-7.926***	-5.523***	-0.0003	-12.81***	-12.43***
2nd richest	-22.67***	-0.027***	-9.920***	-12.77***	-0.0046***	-16.04***	-17.17***
Richest	-31.09***	-0.0577***	-13.25***	-22.01***	-0.0103***	-21.42***	-24.46***
Primary income source							
Wage	0	0	0	0	-0.0588***	-37.51***	-57.32***
Retirement benefits	59.54***	0.185***	25.60***	66.86***	0	0	0
Profits from self-employment	-7.215***	-0.016***	-3.473***	-6.235***	-0.0652***	-42.60***	-64.21***
Social welfare benefits	75.09***	0.146***	37.20***	65.40***	-0.0106***	16.98***	11.90***
Sickness or incapacity benefits	132.9***	0.251***	65.77***	120.9***	0.0165***	58.84***	64.10***
Unemployment benefits	28.96***	0.0513***	16.98***	24.46***	-0.0401***	-12.64***	-27.67***
Constant (OLS) or predicted value	144.86***	0.643***	247.05***	158.77***	0.961***	399.42***	383.84***
N	29,545,712	1,478,588	1,329,653	1,478,588	1,478,588	1,329,653	1,478,588
(Pseudo) R-squared	0.339	0.157		0.157	0.157		0.157
AIC			14.09	14.09		14.09	14.09

Columns (1), (3), (4), (6) and (7) should be read as euros.

Columns (2) and (5) should be read as percentage points.

Columns (3) and (6) are an estimation of payments, once a household has non-zero payments (as estimates are based only on households with non-zero payments)

All regressions were controlled for household size and year-fixed effects.

Robust standard errors were used.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

	OLS	TPM (margins)					
			18-34			80+	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variable	OLS	Logit	GLM	TPM	Logit	GLM	TPM
Income quintiles							
Poorest	0	0	0	0	0	0	0
2nd poorest	-15.27***	-0.00815***	2.549	-2.759***	-0.0607***	2.343	-18.49***
Middle	-23.42***	-0.0226***	105.0***	-6.216***	-0.207***	96.54***	-41.11***
2nd richest	-28.70***	-0.0284***	151.1***	-8.392***	-0.287***	138.8***	-66.58***
Richest	-31.80***	-0.0309***	138.3***	-9.701***	-0.325***	127.1***	-85.80***
Age group							
18-34	0	0	0	0	-0.358***	74.28***	-106.4***
35-49	7.802***	0.0136***	14.32	5.482***	-0.323***	90.50***	-90.24***
50-64	2.813***	0.00780***	15.07	3.411***	-0.338***	91.35***	-96.18***
65-79	12.23***	0.0289***	-14.2	9.111***	-0.285***	58.20***	-80.77***
80+	109.4***	0.183***	-65.59***	49.22***	0	0	0
Wealth quintiles							
Poorest	0	0	0	0	0	0	0
2nd poorest	9.348***	0.00861***	2.603	3.120***	0.0528***	2.392	18.16***
Middle	12.69***	-0.00180***	83.23***	2.415***	-0.0124***	76.49***	30.86***
2nd richest	12.59***	-0.0119***	217.5***	1.642***	-0.0927***	199.9***	45.28***
Richest	14.52***	-0.0195***	520.0***	3.033***	-0.170***	477.9***	87.84***
Primary income source							
Wage	0	0	0	0	-0.246***	-37.41*	-87.08***
Retirement benefits	19.59***	0.0713***	46.09*	29.88***	0	0	0
Profits from self-employment	-3.792***	-0.0110***	-111.3***	-6.875***	-0.300***	-127.7***	-117.5***
Social welfare benefits	2.956***	0.0937***	-106.8***	18.52***	0.0528***	-124.1***	-47.70***
Sickness or incapacity benefits	103.2***	0.156***	311.3***	114.9***	0.165***	215.2***	189.0***
Unemployment benefits	-14.68***	-0.00439*	-36.67	-2.773	-0.267***	-67.16	-98.97***
Constant (OLS) or predicted value	34.06***	0.038***	348.04***	13.35***	0.468***	319.85***	149.66***
N	29,545,712	1,478,588	92,658	1,478,588	1,478,588	92,658	1,478,588
(Pseudo) R-squared	0.024	0.248		0.248	0.248		0.248
AIC			14.21	14.21		14.21	14.21

Columns (1), (3), (4), (6) and (7) should be read as euros.

Columns (2) and (5) should be read as percentage points.

Columns (3) and (6) are an estimation of payments, once a household has non-zero payments (as estimates are based only on households with non-zero payments)

All regressions were controlled for household size and year-fixed effects.

Robust standard errors were used.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

6.5 Socio-economic characteristics of financial protection

The regression results of the linear probability model (LPM) and logit (margins) are presented in table 6.5.1. Again, margins have been estimated for two types of households. The original coefficients of the logit models can be found in table A-6.5.1.

The logit model attributes a young, poor, wage-earning single-person household a 2.6% chance of having catastrophic payments. The estimated impact of income on the probability of catastrophic payments is very strong. The attainment of any income quintile above the poorest is associated with a significant decline of 2.4-2.5 percentage point, keeping all else equal. This indicates a virtual eradication of having catastrophic payments. Higher wealth, on the other hand, is associated with increased probability. This could indicate a group with low income, but high wealth is marked as having had catastrophic payments. This group was also identified in the Wlz regressions, and probably has to do with the wealth-dependency of the Wlz. These households should be able to cover these medical expenses with their financial wealth reserves. Having some type of benefit as primary source of income also seems to be an important determinant. Social welfare (6.8), sickness (4.3), retirement (1.5) and unemployment benefits (1.4) are estimated to increase probabilities, relative to wage-earners. Effects are similar but stronger for the older household. Such a household has a much higher baseline predicted probability for both (7.8% and 2.7% respectively), and marginal effects seem to adjust roughly proportionally. Thus, old age is also a strong determinant of catastrophic payments.

The results for impoverishing payments are very similar to those of catastrophic payments. The coefficients are different in size, the probability of having impoverishing payments is lower, but are similar in relative terms. One discernible difference is the effect of age, which seems to be more important in predicting catastrophic payments. A poor, old and retired household is estimated to be over three times more likely to have catastrophic payments than a young, wage working household. This difference is only over twofold for impoverishing payments.

For both indicators, the LPM coefficients seem to be in between the estimates of the two marginal estimations. Similarly, any income group above the lowest is associated with an almost zero percent chance of having catastrophic or impoverishing payments (given that wage is the primary income source).

	Catastrophic payments			Impoverishing payments		
	(1)	(2)	(3)	(4)	(5)	(6)
Variable	LPM	Margins (18-34)	Margins (80+)	LPM	Margins (18-34)	Margins (80+)
Income quintiles						
Poorest	0	0	0	0	0	0
2nd poorest	-0.0517***	-0.0241***	-0.0733***	-0.0199***	-0.0106***	-0.0253***
Middle	-0.0523***	-0.0250***	-0.0761***	-0.0205***	-0.0111***	-0.0267***
2nd richest	-0.0531***	-0.0252***	-0.0770***	-0.0207***	-0.0113***	-0.0271***
Richest	-0.0541***	-0.0254***	-0.0776***	-0.0210***	-0.0113***	-0.0271***
Age group						
18-34	0	0	-0.0370***	0	0	-0.00774***
35-49	0.000231***	0.00065	-0.0359***	-0.000176***	-0.0001	-0.00799***
50-64	0.00203***	0.00444***	-0.0300***	-0.000803***	-0.00141***	-0.0101***
65-79	-0.00107***	0.00025	-0.0366***	-0.00185***	-0.00234***	-0.0117***
80+	0.0125***	0.0238***	0	0.00286***	0.00456***	0
Wealth quintiles						
Poorest	0	0	0	0	0	0
2nd poorest	0.00074	0.00	0.00	0.00	0.00	0.00013
Middle	0.00038	-0.00266***	-0.00774***	0.00121***	0.00208***	0.00489***
2nd richest	0.00206***	0.00353***	0.0101***	0.00155***	0.00401***	0.00943***
Richest	0.00489***	0.0201***	0.0556***	0.00263***	0.0115***	0.0267***
Primary income source						
Wage	0	0	-0.0285***	0	0	-0.0113***
Retirement benefits	0.00384***	0.0153***	0	0.00189***	0.00811***	0
Profits from self-employment	-0.00173***	-0.0014	-0.0311***	-0.000709***	-0.0003	-0.0117***
Social welfare benefits	0.0568***	0.0677***	0.0914***	0.0157***	0.0233***	0.0210***
Sickness or incapacity benefits	0.0216***	0.0429***	0.0492***	0.0102***	0.0223***	0.0195***
Unemployment benefits	0.00219***	0.0143***	-0.002	-0.000115	0.00466**	-0.00479*
Constant (OLS) or predicted value	0.0492***	0.0255***	0.0778***	0.020***	0.0113***	0.0272***
N	29,545,712	1,478,588	1,478,588	29,545,712	1,478,588	1,478,588
(Pseudo) R-squared	0.0612	0.288	0.288	0.0236	0.241	0.241

TABLE 6.5.1: LPM and Logit (margins) estimates for catastrophic and impoverishing out-of-pocket payments

All regressions were controlled for household size and year-fixed effects.

Robust standard errors were used.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

7. Discussion

7.1 Key findings

The main research question of this thesis is: 'How are out-of-pocket, catastrophic and impoverishing payments distributed across the Dutch population between 2016-2019?'. I answer this question by responding to the three subquestions.

First, in response to question (1), I conclude that out-of-pocket payments in the Zvw are fairly evenly distributed, but payments in the Wlz and Wmo are concentrated in a small number of households. This also holds for the distribution across income. This mainly originates from a concentration in utilisation of (more intensive) long-term care and social support services among lower incomes. Overall, the average payment has decreased by €26 between 2016-2019. The poorer income groups profited the most. The decrease over time likely is the result of both policy changes in out-of-pocket payments for Wlz and Wmo care, and the process of substituting care from healthcare facilities to care at home.

Second, question (2) regards the distribution of catastrophic and impoverishing payments. In the study period, 1.5% of all households experienced catastrophic healthcare payments. Out-of-pocket payments have pushed an additional 0.6% of the population into poverty, which amounts to over 40,000 households each year. They are strongly concentrated in lower incomes and beneficiaries of social welfare benefits. Between 2016 and 2019, average disposable income increased more than the costs to cover basic needs, while out-of-pocket payments were simultaneously reduced. This led to an improvement in the financial protection from problematic healthcare payments. The share of households experiencing catastrophic payments has decreased by almost a quarter, from 1.71% to 1.29%. The number of impoverished households – due to healthcare payments – decreased by over one-fifth, from 0.66% to 0.51%.

Third, in response to research question (3), the results show that low socio-economic status (low income and social benefit-dependent income sources) is associated with higher out-of-pocket payments and strongly increased probability of catastrophic or impoverishing payments. Especially social welfare beneficiaries are overrepresented in both catastrophic and impoverishing payment groups. The Wlz and Wmo show a distinct difference between the extensive and the intensive margin, contrary to the Zvw. Higher income is associated with a (much) lower probability of having any Wlz or Wmo payments, but once incurred the height of the payment is higher.

7.2 Contextualising the results

In the Netherlands, healthcare costs have increased by about 13% (over 10 billion euros) between 2016 and 2019 (CBS statline, n.d.). During this period, the government introduced several measures to decrease out-of-pocket payments. This is reflected in my results, which show a substantial decrease in average out-of-pocket payments. The upward trend for out-of-pocket payments between 2002 and 2015 seems to have been halted (CBS, 2017). However, the average annual health insurance premium in the Zvw, paid by each individual regardless of healthcare use, has increased by almost €200 between 2016-2019 (Vektis, 2021).[16] Additionally, a small group profits from decreases in Wlz and Wmo payments, costs of which are eventually borne by the collective. In all three

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[16] Note that the basic health insurance premium is deducted from household income. Thus, conclusions in this thesis about decreasing financial burden still hold.

domains, a portion of the burden has shifted from the user of care to the collective. Thus, one could argue that solidarity between the many (relatively healthy) and the few (relatively sick) has increased.

Concerns about the increasing financial burden of out-of-pocket payments (e.g., Corrieri et al., 2010) are not justified for the Netherlands in the study period. Average payments decreased, and the poorest people benefited the most. The level of financial protection from problematic healthcare payments, measured using the WHO-indicators catastrophic and impoverishing payments, improved. The share of households with catastrophic payments declined by almost a quarter, to only 1.3%. The number of households impoverished by healthcare payments declined by around one-fifth, to 0.5%. Internationally, both percentages are very low. In the EU, these numbers are second best behind only Slovenia (WHO, n.d.). My results indicate slightly higher levels of catastrophic and impoverishing payments than those reported for the Netherlands by the WHO in 2015 (WHO, n.d.). It is probable that this is caused by the different construction of these indicators. Usually, household surveys are used, as opposed to administrative microdata. I would argue that the use of microdata has both advantages and disadvantages. Income and out-of-pocket payments are defined exactly the same for all households and are accurate. However, a different composition makes international comparisons harder. More on this in the limitations (section 7.3).

One concerning find, is the large share of households with catastrophic or impoverishing healthcare payments that are dependent on social welfare benefits. Using the regular indicators, almost 30% of households with catastrophic or impoverishing payments is primarily dependent on these benefits. This share is even larger, 34-35%, when we consider the robust indicators.[17] These shares are remarkably high, as only 4% of the total population is dependent on social welfare benefits. This also corresponds to the association found in the regression analyses, where social welfare benefits as primary income source is one of the most important determinants of catastrophic or impoverishing payments. When a household is unable to make ends meet, social welfare benefits are the safety net of social security in the Netherlands. Apparently, these benefits are insufficient for a considerable number of households to be able to cover out-of-pocket healthcare costs.

Characteristics associated with high out-of-pocket payments are generally in line with previous studies in different countries. For curative care (the Zvw in the Netherlands), higher age and higher income are associated with higher out-of-pocket payments (as in, for example, Bock et al., 2014). In other high-cost health care services (e.g., long-term care), high costs were associated with lower income (Wammes et al., 2018). The reason being that use of care is higher for low incomes compared to high incomes.

The separation between the intensive and extensive margin is not made often. To my knowledge, this is the first time it has been applied in the Netherlands. The findings derived from the two-part model validate expectations. It affirms, at the extensive margin, that an improved socio-economic status significantly diminishes the likelihood of incurring payments for long-term care or social support. Once incurred, however, at the intensive margin, the payments are greater. This aligns with the objectives of the

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[17] These indicators exclude long-term care (either the Wlz or Wmo protected living), to prevent false positives due to replacement of basic needs.

underlying regulations of out-of-pocket payments, burdening the user of care in accordance with their capacity to pay.

7.3 Limitations

This study has limitations that impact the interpretation of the results. First and foremost, even though the comprehensive dataset is one of the strengths and unique features of this study, it is not complete. In principle, only health services under the basic health insurance are covered in this study. Supplementary health insurances, often covering dentistry and physical therapy, are not included. Also, not every type of potential out-of-pocket payment (related to the basic health insurance) is included. Most important omissions are co-payments for specific types of Zvw care (reported in table A-4.1-4.2). These include, among others, up to €250 annual payments for medicine and the majority of costs for dentures. Dentures were found to be the most used medical aid in research by Brabers et al. (2021). The median users of medical aids reported €250 in annual out-of-pocket payments. Median payments were higher for low incomes (€275). Consequently, payments might be substantially higher for subgroups with these omitted payments. Results from this thesis are a lower bound and might diverge from the true out-of-pocket payment amount more for people with lower income, compared to higher income.

Second, two specific subgroups – institutional and student households – have been excluded. This study is not representative of these households. Especially the omission of institutional households is important for the interpretation of this study. These households are a small but important group in out-of-pocket healthcare payments. They are expected to have (very) high out-of-pocket payments, as care facilities such as nursing homes are included in this household type. Again, the results presented in this thesis are a lower bound for actual out-of-pocket payments, in particular for users of long-term care.

Third, it is important to note that catastrophic and impoverishing payments are constructed differently from the standard WHO-methods. To ensure availability of data worldwide, they are usually based on household survey data. Both indicators use a basic needs line, based on household consumption of households between the 25th and 35th income percentiles. The indicators are very sensitive to the choice of basic needs line (WHO, 2019). I used administrative microdata with accurate income but no information on consumption. Therefore, the basic needs budget was based on literature by the Netherlands Institute for Social Research (Goderis et al., 2018). I would argue the objective information collected by the CBS on income and healthcare costs are a strength of this study, compared to survey results which might suffer from biases and mistakes from the respondents. Still, one should be aware of the differences when making external comparisons with WHO-reports.

Additionally, the basic needs budget is a general measure of needs for the average household. Some types of long-term care or protected living from the Wlz and Wmo offer various degrees of services. Even though out-of-pocket payments might be high, these services can include basic needs such as food or even housing. These services would simply substitute other costs. Using the basic needs line without adjusting for this substitution of needs could cause some households to be inappropriately marked as impoverished. This leads to an upward bias of the indicators. To test the robustness of the results, I constructed both indicators without these types of care to avoid false positives. Other than an even stronger concentration in people with low income, conclusions are similar.

7.4 Recommendations for further research

This study aimed to give insight in the distribution of out-of-pocket payments across socio-economic characteristics in the Dutch population. Some exclusions were made in connection to problematic household types, such as institutional households. Analysis done on an individual level could potentially avoid these problems, and thus construct an even more comprehensive overview of the distribution of out-of-pocket payments. Alternatively, a study could focus specifically on institutional households, taking into account the deviating dynamic and assumptions that come along with these households.

Some specific types of payments were omitted in this study, due to unavailability of the data. Other than a few survey studies (e.g., Brabers et al., 2021), it is unknown how widespread and sizeable payments for these types of healthcare are. Consequently, it is hard to make informed policy choices regarding these types of care and out-of-pocket payments. Further research could specifically look at these payments or try to include them in another population wide study.

My results show the annual distribution of healthcare payments. Some types of care are incidental (e.g., a broken knee), while others are more persistent (such as chronic illness or long-term care). When a longer perspective is taken, the burden of healthcare expenditure can be more appropriately estimated. Likewise, taking a lifetime perspective could shed an interesting light on the distribution and fairness of out-of-pocket payments. It is known, for example, that costs are much higher in the last year of life (Madsen et al., 2002).

One should be cautious when drawing conclusions on avoidance of care from this thesis. Out-of-pocket payments are the product of health status, healthcare use and a complex set of regulations on different kinds of healthcare payments. To adequately inform on avoidance, more information is needed on health status, perhaps also complemented by qualitative research. The CBS-microdata can be paired with data from the monitor on Health (*Gezondheidsmonitor*), which collects panel survey data on (experienced) health, healthcare use, lifestyle, and other personal information. The combination of this survey and the microdata provides an opportunity to examine socio-economic differences in healthcare use, and perhaps make inferences on avoidance, underutilisation of and unmet need for care in different socio-economic groups.[18]

The Netherlands is one of the few countries in Europe that participates infrequently in the reports on financial protection. These indicators can, however, provide valuable insights for comparisons between countries but also over time within the Netherlands. Future research could adhere to the WHO-method strictly, using household survey data and similar methods to examine catastrophic and impoverishing payments. This would provide the opportunity to monitor the performance of the Dutch healthcare system in terms of financial protection more consistently and comparatively.

Finally, out-of-pocket payments are only one of multiple financing mechanisms in healthcare systems. The Netherlands has a largely collectively financed system. To reach a complete and balanced assessment about the equity of healthcare payments and the fairness of out-of-pocket payments, I recommend studying all financing mechanisms

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[18] Comparable to Bouckaert et al. (2020)

combined. A Kakwani progressivity analysis could be done using the CBS-microdata, like Wagstaff et al. (1992) did years ago.

7.5 Policy implications

The results presented in this thesis have implications for policymakers. The Dutch healthcare system has a high level of collective financing and solidarity. Out-of-pocket payments are among the lowest in Europe (OECD, 2022). Developments, such as an aging population and increasingly expensive medico-technological innovation, threaten to harm the solidarity that underpins the system (WRR, 2021). Thus, when considering the sustainability of healthcare, one could argue that out-of-pocket payments should play a larger role in healthcare financing. However, after a decade of economic growth and increasing welfare, times have changed from 2020 onward. Since then, the Covid-19 pandemic, housing and energy crisis, and general economic downturn have damaged the resilience of the average household and greatly increased the costs of basic needs, threatening the accessibility of healthcare. These facts could support arguments for lowering out-of-pocket payments, at least for vulnerable groups. Striking a balance between the sustainability of healthcare while maintaining the accessibility is crucial. Two policy measures taken in the study period are illustrative for this balance.

In 2017, several changes were made regarding the out-of-pocket payment in the Wmo. Households with lower income profited greatly from these measures, while higher incomes were mostly unaffected. In contrast, reducing the tariff and removing the income-dependent aspect of Wmo payments in 2019 reduced out-of-pocket payments across the board. However, richer Wmo users profited much more than poorer households. It is likely that high income households could afford these health services, also without this measure. Reducing the tariff most likely increased healthcare accessibility for affected households. Removing the income dependent payments, however, increased accessibility for some while also unburdening households that had no need for this. These funds could be allocated more effectively. Future policy that wishes to consider both sustainability while maintaining accessibility of healthcare, should be aimed at unburdening households with low-income like the targeted policy change in 2017. Alternatively, the burden of households with higher income could be increased, as they have a greater capacity to pay for healthcare. This could entail (re-)introducing some form of income-dependency in the Zvw and Wmo and increasing it in the Wlz.

Specific vulnerable groups that can be identified from this study are recipients of social welfare, sickness or incapacity, retirement, and unemployment benefits. Social welfare and unemployment benefits are particularly remarkable, as these do not have a direct relationship to health status. These households are at a (greatly) increased risk of either inaccessible healthcare, or the crowding out of other basic needs. Either outcome leads to undesirable consequences for both the household and society. Inaccessible or avoided healthcare could in time lead to increased healthcare costs in the future. Crowding out other basic needs could lead to prolonged socio-economic problems and dependency on some type of social benefit. All these benefits are meant to help households provide in their basic needs but are apparently insufficient for a significant number of households. Additional policy measures, aimed at protecting these households and guaranteeing accessible healthcare could be required. Possibilities are (partial) exemptions from out-of-pocket payments, or an increased healthcare allowance for recipients of these types of benefits.

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Appendix

Section 1

TABLE A-1.1: An overview of the translations of Dutch healthcare terms	
English term	**Dutch term**
Anti-accumulation regulation	Anticumulatieregeling
Basic needs budget	Basisbehoeftenbudget
Complete nursing package at home	Volledig pakket thuis (VPT)
Contributory income	Bijdrageplichtig inkomen
Curative care	Curatieve zorg
Customised provision	Maatwerkvoorziening
Deductible	Eigen risico
District nursing	Wijkverpleging
Explanatory memorandum	Memorie van Toelichting
Fixed monthly co-payment	Abonnementsbijdrage/tarief
General provision	Algemene voorziening
Healthcare allowance	Zorgtoeslag
Health insurance policy - In-kind insurance policy - Reimbursement system	Verzekeringspolis - Naturapolis - Restitutiepolis
Housekeeping (Wmo)	Hulp bij huishouden (Wmo)
Insurance obligation	Verzekeringsplicht
Insured care (including Wmo in this study)	Verzekerde zorg (in dit onderzoek ook inclusief Wmo)
Integrated care	Ketenzorg
Long-term care	Langdurige zorg
Medical aid	Hulpmiddelen
Medical aids and other services (Wmo)	Hulpmiddelen en diensten (Wmo)
Ministry of Health, Welfare, and Sports (VWS)	Ministerie van Volksgezondheid, Welzijn en Sport
Modular nursing package at home	Modulair pakket thuis (MPT)
Non-hospital pharmacy	Extramurale farmacie
Nursing home	Verzorgingstehuis
Nursing home	Verpleeghuis
Part-time residence in a nursing home	Deeltijdverblijf
Personal care budget	Persoonsgebonden budget (PGB)
Policy minimum	Beleidsmatig minimum
Protected living (Wmo)	Beschermd wonen en maatschappelijke opvang (Wmo)
Provision	Voorziening
Religious objections	Gemoedsbezwaren
Retirement benefits	Pensioenuitkering
Resident	Ingezetene
Sickness or incapacity benefits	Ziekte- of arbeidsongeschiktheidsuitkering
Social assistance (Wmo)	Ondersteuning thuis (Wmo)
Social support	Maatschappelijke ondersteuning
Social welfare benefits	Bijstandsuitkering

Section 4

TABLE A-4.1: Types of care exempted from the mandatory (and voluntary) deductible between 2016-2019. Source: rijksoverheid.nl.

Type of care
GP-care
Obstetric and maternal care
Multidisciplinary or integrated care:
When there is cooperation between different competent institutions for a number of chronic diseases (type 2 diabetes, COPD and CVR). Different healthcare providers are involved in the treatment of these diseases. In the case of diabetes, for example, these include GP, dietician, podiatrist, pharmacist, ophthalmologist, and physiotherapist.
District nursing
Follow-up control after organ donation
Travel expenses in case of organ donation
Combined lifestyle intervention (since 2019)

TABLE A-4.2: Out-of-pocket payments for Zvw-types of care between 2015-2019, omitted in this study. Source: Chapter 2 paragraph 1.5 Regeling Zvw, rijksoverheid.nl and cbs.nl.

Type of care	Co-payment 2019	Co-payment 2015
Hearing aids	18 years and older: 25%	25%
Dentures: removable and complete	25%	Under 18 y/o: €125 18 years and older: 25%
Dentures: removable and complete on implants	Bottom jaw 10%, upper jaw 8%	€125
Dentures: repairing or rebasing	10%	No payment
Orthopaedic or allergen-free shoes	Under 16 y/o: €65.50 a year 16 years and older: €131 a year	Under 16 y/o: €70 a year 16 years and older: €140.50 a year
Wigs	All costs above €436	All costs above €414.50
Contact lenses	€58.50 per lens, for lenses that last longer than a year. €58.50 per lens, for lenses that last shorter than a year, with a maximum of €117 per calendar year.	€55.50 per lens, for lenses that last longer than a year. €55.50 per lens, for lenses that last shorter than a year, with a maximum of €111 per calendar year.
Eyeglass lenses	Under 18 y/o: €58.50 per lens, maximum of €117 per year.	Under 18 y/o: €55.50 per lens, maximum of €111 a year.
Maternity care at home	€4.40 per hour	€4.15 per hour
Maternity care at a facility, not medically necessary	Per day: €17.50 for the mother and €17.50 for the baby. Depending on the facility, additional costs may apply. Any costs exceeding €125 are also OOP.	Per day: €16.50 for the mother and €16.50 for the baby. Depending on the facility, additional costs may apply. Any costs exceeding €117.50 are also OOP.
Patient travel by car or public transport (not by ambulance)	€103 per calendar year	€97 per calendar year
Pharmaceuticals	Maximum of €250 per year	Different maximum depending on type of pharmaceutical.

Section 5

TABLE A- 5.3.1: Composition of the basic needs budget in 2017

Basic need	Monthly expense
Rent	€ 443
Food	€ 201
Inventory	€ 74
Gas	€ 60
Clothing and shoes	€ 56
Telephone, television and internet	€ 54
Insurances	€ 45
Maintenance of house and garden	€ 24
Personal care	€ 21
Electricity	€ 20
Transport	€ 14
Miscellaneous	€ 10
Water	€ 9
Laundry and cleaning products	€ 6
Subscriptions and contributions	€ 2
Total basic needs budget	€ 1,039

Source: Goderis et al. (2018).

TABLE A-5.3.2: Equivalence factors for most common household types. Source: cbs.nl.

	Number of children			
Number of Adults	0	1	2	3
1	1,00	1,34	1,61	1,84
2	1,41	1,67	1,90	2,10
3	1,73	1,95	2,14	2,32
4	2,00	2,19	2,37	2,53

Equation A-5.3.1

$$B_{h_{ij}} = E_j * \sqrt[2]{A_{h_{ij}} + (0.8 * C_{h_{ij}})}$$

Where $B_{h_{ij}}$ is the basic needs minimum, $A_{h_{ij}}$ is the number of adults, $C_{h_{ij}}$ is the number of children in household i in year j. The baseline amount for a single household is €1039 in 2017, based on Goderis et al. (2018). It has been corrected for the corresponding level of inflation in the Netherlands (CBS, n.d.). These numbers are reported below in table A-5.3.3.

TABLE A-5.3.3: Monthly basic needs budget in each of the study years

|	2016	2017	2018	2019
Index	98.62	100	101.7	104.34
Basic needs budget	€ 1,024.65	€ 1,039.00	€ 1,056.66	€ 1,084.14

TABLE A-5.3.4: Composition of financial protection indicators.

Used metrics	WHO-metrics (Source: WHO, 2019)
Catastrophic health spending	
'Out-of-pocket payments that are greater than 40% of household **capacity-to-pay** for healthcare'	
Capacity-to-pay = disposable household income – basic needs budget	**Capacity-to-pay** = household consumption – standard amount to cover basic needs
Disposable household income =	**Household consumption** =
Gross income minus income transfers (such as partner alimony), premiums on income and health insurances, and taxes on income and wealth. Health insurance benefit is included. *	The sum of the monetary value of all items consumed by a household in a year. It includes the imputed value of items not purchased but procured in other ways (e.g., home-grown produce).
Basic needs budget =	**Amount to cover basic needs** =
The minimum amount needed for unavoidable and basic needs such as food, clothing and housing, as established by the SCP (Goderis et al., 2018).	Average amount spent on food, housing and utilities by households between the 25th and 35th percentiles of the household consumption distribution.
Impoverishing health spending	
'**Income** falls below the **basic needs line** due to out-of-pocket payments'	
Income = Standardised disposable household income (see above)	**Income** = household consumption (see above)
Basic needs line = basic needs budget (see above)	**Basic needs line =** amount to cover basic needs (see above)

*Definition CBS (2021).

TABLE A-5.3.5: Catastrophic payment incidence for all out-of-pocket payments (left) and Zvw/Wmo ZTH only (right)

Threshold	All out-of-pocket payments					Zvw and Wmo ZTH only (robustness)				
	5%	10%	20%	30%	40%	5%	10%	20%	30%	40%
2016 N=7,298,610	21.9%	10.95%	4.40%	2.48%	1.71%	21.49%	10.49%	3.99%	2.15%	1.43%
2017 N=7,373,785	21.0%	10.10%	3.84%	2.17%	1.48%	20.67%	9.65%	3.46%	1.88%	1.24%
2018 N=7,442,066	20.6%	9.94%	3.79%	2.13%	1.45%	20.23%	9.49%	3.43%	1.86%	1.22%
2019 N=7,435,658	19.0%	8.48%	3.32%	1.91%	1.29%	18.60%	8.01%	2.97%	1.64%	1.07%
Total N=29,545,712	20.6%	9.86%	3.83%	2.17%	1.48%	20.24%	9.41%	3.46%	1.88%	1.24%
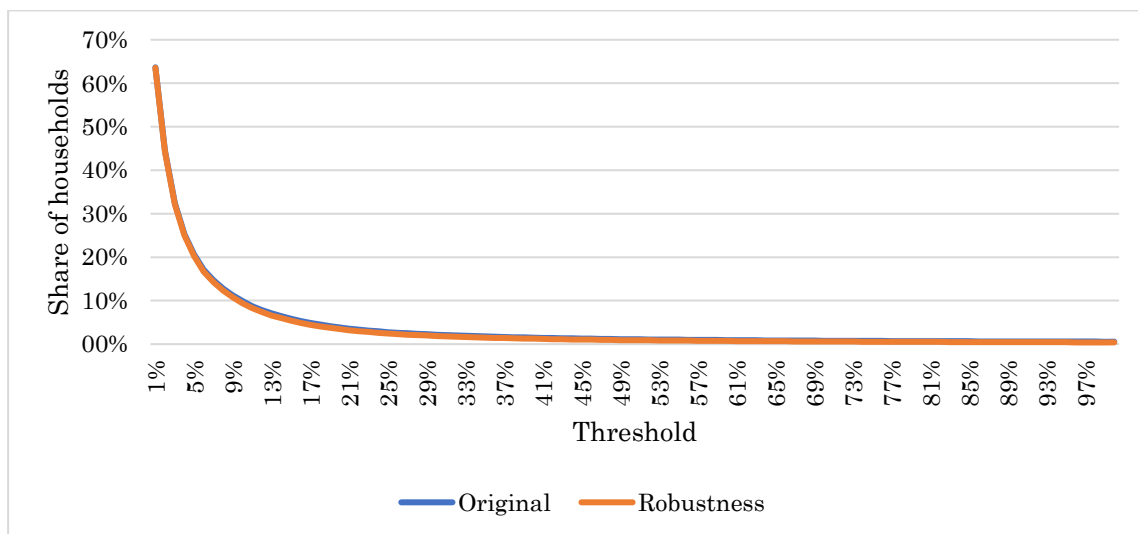
FIGURE A-5.3.6: Catastrophic payments curve. Share of household with catastrophic payments at different thresholds

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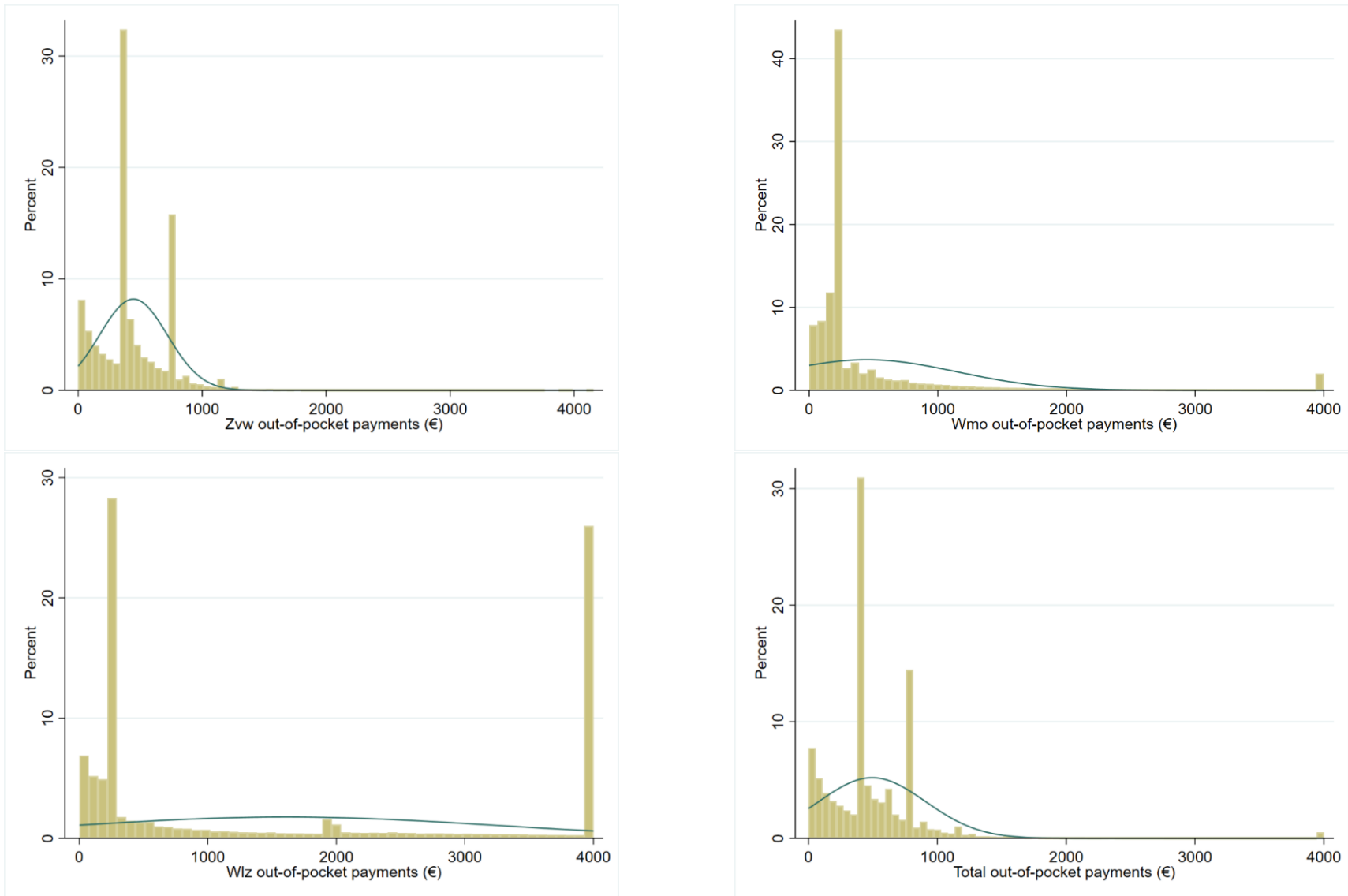
FIGURE A-5.4.1: Distribution of out-of-pocket payments for all households with non-zero payments
Share of households with zero payments: Zvw (10.1%), Wmo (93.8%), Wlz (98.9%), Total (9.9%). €4000 represents €4000 or more

Section 6

TABLE A-6.2.1: Number of households using ZIN/VBL long-term healthcare, between 2016-2019

Income quintile	2016	2017	2018	2019
Poorest	42,350	37,399	39,079	39,684
2nd poorest	25,543	24,372	26,520	27,120
Middle	14,188	13,336	14,910	15,020
2nd richest	10,994	10,702	11,392	11,332
Richest	9,498	8,648	8,821	8,786
Total	**102,573**	**94,457**	**100,722**	**101,942**

TABLE A-6.2.2: Number of households using MPT/PGB long-term healthcare, between 2016-2019

Income quintile	2016	2017	2018	2019
Poorest	14,470	15,915	19,529	21,493
2nd poorest	11,053	11,949	14,358	15,843
Middle	6,950	7,042	9,376	9,526
2nd richest	6,489	6,998	9,061	8,703
Richest	6,293	6,488	8,389	7,830
Total	**45,255**	**48,392**	**60,713**	**63,395**

TABLE A-6.3.1: Share of households with catastrophic payments (robustness)

Income quintile	2016	2017	2018	2019	Total
N	7,298,610	7,373,785	7,442,066	7,435,658	29,545,712
Poorest	1.41%	1.23%	1.21%	1.07%	1.23%
Second poorest	0.02%	0.01%	0.01%	0%	0.01%
Middle	0%	0%	0%	0%	0%
Second richest	0%	0%	0%	0%	0%
Richest	0%	0%	0%	0%	0%
Total	1.43%	1.24%	1.22%	1.07%	1.24%

TABLE A-6.3.2: Share of households with impoverishing payments (robustness)

Income quintile	2016	2017	2018	2019	Total
N	7,298,610	7,373,785	7,442,066	7,435,658	29,545,712
Poorest	0.46%	0.40%	0.39%	0.37%	0.41%
Second poorest	0%	0%	0%	0%	0%
Middle	0%	0%	0%	0%	0%
Second richest	0%	0%	0%	0%	0%
Richest	0%	0%	0%	0%	0%
Total	0.46%	0.40%	0.39%	0.37%	0.41%

TABLE A-6.3.3: Description of population for catastrophic and impoverished households (robustness), compared to the main population.

Variable	Not C/I	Catastrophic	Impoverished
N	29,179,740	365,972	119,788
Adults in household	1.74	1.54	1.58
Single-person household*	36%	50%	47%
*Age group**			
18-34	19%	20%	24%
35-49	32%	28%	32%
50-64	22%	29%	26%
65-79	20%	13%	12%
80+	7%	9%	7%
Disposable HH-income (standardised)**	€ 31,100	€ 13,300	€ 12,800
Wealth (excluding house)**	€ 122,500	€ 37,900	€ 40,300
*Primary type of income**			
Wage	54%	13%	14%
Social welfare	4%	35%	34%
Sickness or incapacity benefits	3%	11%	11%
Retirement benefits	27%	24%	20%
Capacity to pay**	€ 27,600	€900	€300
Out-of-pocket payments (% with non-zero payments)*			
Zvw	€ 399	€ 514	€ 514
(%)	(90%)	(99.7%)	(99.7%)
Wlz	€ 33	€ 106	€ 171
(%)	(1.1%)	(3.1%)	(4.3%)
Wmo (protected living)	€ 8	€ 104	€ 182
(%)	(0.2%)	(1.9%)	(3.2%)
Wmo (other provisions)	€ 22	€ 129	€ 101
(%)	(5.9%)	(25%)	(20%)
Total	€ 462	€ 853	€ 968
If impoverished, what is the deficit?			
€ 0 – € 100	.	.	23%
€ 101 – € 500	.	.	62%
€ 501 – € 1000	.	.	13%
€ 1000 +	.	.	2%

Robustness: Only Zvw and Wmo ZTH payments have been taken into account
* Rounded to integers
**Rounded to hundreds

	OLS	TPM (margins)					
			18-34			80+	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variable	OLS	Logit	GLM	TPM	Logit	GLM	TPM
Income quintiles							
Poorest	0	0	0	0	0	0	0
2nd poorest	-24.10***	-0.00084***	-368.4***	-2.008***	-0.0111***	-448.0***	-32.63***
Middle	-22.25***	-0.00108***	-41.34	-1.800***	-0.0143***	-50.27	-29.04***
2nd richest	-21.13***	-0.00110***	205.3*	-1.470***	-0.0146***	249.7*	-23.52***
Richest	-19.89***	-0.00116***	459.7***	-1.201***	-0.0154***	559.0***	-19.01***
Age group							
18-34	0	0	0	0	-0.0320***	-748.6***	-65.36***
35-49	-6.636***	-0.00028***	112.9	-0.18	-0.0324***	-663.7***	-65.54***
50-64	16.70***	0.000271**	1623.8***	5.132***	-0.0317***	472.4***	-60.38***
65-79	73.47***	0.00325***	1943.0***	16.67***	-0.0278***	712.4***	-49.18***
80+	176.9***	0.0250***	995.6***	67.77***	0	0	0
Wealth quintiles							
Poorest	0	0	0	0	0	0	0
2nd poorest	4.501***	0.00145***	134.4	2.882***	0.0186***	163.4	45.30***
Middle	12.00***	0.00142***	709.9***	5.166***	0.0183***	863.4***	82.23***
2nd richest	17.02***	0.00108***	960.1***	5.288***	0.0139***	1167.6***	84.85***
Richest	35.09***	0.00130***	2377.2***	11.42***	0.0167***	2891.1***	183.6***
Primary income source							
Wage	0	0	0	0	-0.0078***	647.0***	2.531
Retirement benefits	-39.24***	0.000766***	-400.0***	-0.119	0	0	0
Profits from self-employment	-15.98***	-0.00074***	-486.7***	-2.107***	-0.0154***	-140.3	-33.11***
Social welfare benefits	-9.438***	0.00187***	-1164.7***	-2.215***	0.0111***	-1236.8***	-35.81***
Sickness or incapacity benefits	23.98***	0.00526***	40.95	8.801***	0.0436***	713.2***	141.9***
Unemployment benefits	-12.95***	-0.000638*	-399.1	-1.820**	-0.0144***	1.5	-28.23**
Constant (OLS) or predicted value	7.12***	0.0026***	1612.34***	4.23***	0.035***	1960.90***	69.47***
N	29,545,712	1478588	16,340	1478588	1478588	16,340	1478588
(Pseudo) R-squared	0.007	0.137		0.137	0.137		0.137
AIC			17.76	17.76		17.76	17.76

TABLE A-6.4.1 OLS and TPM (margins) estimates for Wlz out-of-pocket payments

Columns (1), (3), (4), (6) and (7) should be read as euros.

Columns (2) and (5) should be read as percentage points.

Columns (3) and (6) are an estimation of payments, once a household has non-zero payments (as estimates are based only on households with non-zero payments)

All regressions were controlled for household size and year-fixed effects.

Robust standard errors were used.

* p < 0.05, ** p < 0.01, *** p < 0.001

TABLE A-6.4.2: OLS and TPM (margins) estimates for Total out-of-pocket payments						
	OLS	TPM (margins)				
		18-34			80+	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variable	OLS	Logit	GLM	TPM	Logit	GLM	TPM
Income quintiles							
Poorest	0	0	0	0	0	0	0
2nd poorest	-29.70***	0.0387***	-22.87***	-4.756***	0.00544***	-56.28***	-50.82***
Middle	-38.13***	0.0232***	-29.85***	-13.49***	0.00333***	-73.44***	-68.79***
2nd richest	-43.90***	0.0225***	-31.98***	-15.11***	0.00323***	-78.67***	-73.92***
Richest	-44.11***	0.0262***	-31.40***	-13.79***	0.00374***	-77.26***	-72.24***
Age group							
18-34	0	0	0	0	-0.130***	-393.7***	-419.7***
35-49	24.57***	0.0327***	19.04***	22.29***	-0.111***	-373.2***	-396.4***
50-64	126.0***	0.145***	81.73***	106.1***	-0.0517***	-305.9***	-315.5***
65-79	257.8***	0.203***	174.2***	206.2***	-0.0248***	-206.5***	-211.5***
80+	480.0***	0.261***	366.4***	407.6***	0	0	0
Wealth quintiles							
Poorest	0	0	0	0	0	0	0
2nd poorest	7.590***	0.0143***	2.890***	5.985***	0.0021***	7.111***	8.328***
Middle	9.569***	0.00118	4.762***	3.436***	0.00018	11.72***	11.43***
2nd richest	6.949***	-0.0241***	4.799***	-3.848***	-0.0037***	11.81***	8.769***
Richest	18.52***	-0.0543***	12.56***	-7.938***	-0.0087***	30.90***	23.48***
Primary income source							
Wage	0	0	0	0	-0.0547***	-48.46***	-82.36***
Retirement benefits	39.89***	0.185***	21.16***	70.21***	0	0	0
Profits from self-employment	-26.98***	-0.0180***	-15.35***	-14.80***	-0.0613***	-83.60***	-118.4***
Social welfare benefits	68.60***	0.153***	29.12***	66.94***	-0.00796***	18.23***	11.88*
Sickness or incapacity benefits	260.0***	0.254***	175.2***	230.5***	0.0158***	352.7***	357.0***
Unemployment benefits	1.328	0.0489***	-3.059	11.76***	-0.0381***	-55.46***	-78.04***
Constant (OLS) or predicted value	185.99***	0.65***	284.12***	184.64***	0.97***	698.97***	674.57***
N	29,545,712	1478588	1332512	1478588	1478588	1332512	1478588
(Pseudo) R-squared	0.085	0.1573		0.1573	0.1573		0.1573
AIC			14.37	14.37		14.37	14.37

Columns (1), (3), (4), (6) and (7) should be read as euros.

Columns (2) and (5) should be read as percentage points.

Columns (3) and (6) are an estimation of payments, once a household has non-zero payments (as estimates are based only on households with non-zero payments)

All regressions were controlled for household size and year-fixed effects.

Robust standard errors were used.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE A-6.4.3: Logit and GLM coefficients for Zvw and Wmo payments				
	Zvw		Wmo	
Variable	Logit	GLM	Logit	GLM
Income quintiles				
Poorest	0	0	0	0
2nd poorest	0.188***	0.00895***	-0.247***	0.0073
Middle	0.130***	0.00601***	-0.913***	0.264***
2nd richest	0.129***	0.00684***	-1.380***	0.361***
Richest	0.147***	0.0169***	-1.663***	0.335***
Age group				
18-34	0	0	0	0
35-49	0.152***	0.0498***	0.318***	0.0403
50-64	0.749***	0.230***	0.193***	0.0424
65-79	1.149***	0.355***	0.592***	-0.0416
80+	1.636***	0.382***	1.965***	-0.209***
Wealth quintiles				
Poorest	0	0	0	0
2nd poorest	0.0553***	-0.0181***	0.212***	0.00745
Middle	-0.0078	-0.0326***	-0.0500***	0.214***
2nd richest	-0.116***	-0.0410***	-0.382***	0.485***
Richest	-0.244***	-0.0551***	-0.729***	0.914***
Primary income source				
Wage	0	0	0	0
Retirement benefits	0.982***	0.0986***	1.128***	0.124*
Profits from self-employment	-0.0709***	-0.0142***	-0.349***	-0.385***
Social welfare benefits	0.730***	0.140***	1.339***	-0.366***
Sickness or incapacity benefits	1.548***	0.236***	1.800***	0.639***
Unemployment benefits	0.232***	0.0665***	-0.126*	-0.111
Constant	-0.903***	5.064***	-2.975***	6.209***
N	1,478,588	1,329,653	1,478,588	92,658
(Pseudo) R-squared	0.157		0.248	
AIC		14.09		14.21

All regressions are controlled for household size and year fixed effects.

Robust standard errors were used.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE A-6.4.4: Logit and GLM coefficients for Wlz and Total payments				
	Wlz		Total	
Variable	Logit	GLM	Logit	GLM
Income quintiles				
Poorest	0	0	0	0
2nd poorest	-0.386***	-0.259***	0.175***	-0.0839***
Middle	-0.530***	-0.026	0.104***	-0.111***
2nd richest	-0.548***	0.120**	0.101***	-0.119***
Richest	-0.586***	0.251***	0.117***	-0.117***
Age group				
18-34	0	0	0	0
35-49	-0.112***	0.0677	0.147***	0.0649***
50-64	0.0986**	0.697***	0.736***	0.253***
65-79	0.811***	0.791***	1.138***	0.478***
80+	2.380***	0.481***	1.701***	0.828***
Wealth quintiles				
Poorest	0	0	0	0
2nd poorest	0.441***	0.0801	0.0635***	0.0101***
Middle	0.435***	0.365***	0.0052	0.0166***
2nd richest	0.345***	0.467***	-0.104***	0.0167***
Richest	0.404***	0.906***	-0.231***	0.0433***
Primary income source				
Wage	0	0	0	0
Retirement benefits	0.257***	-0.285***	1.002***	0.0718***
Profits from self-employment	-0.332***	-0.359***	-0.0781***	-0.0555***
Social welfare benefits	0.541***	-1.281***	0.788***	0.0976***
Sickness or incapacity benefits	1.106***	0.0251	1.622***	0.480***
Unemployment benefits	-0.28	-0.284	0.223***	-0.0108
Constant	-6.784***	7.695***	-0.873***	5.253***
N	1,478,588	16,340	1,332,512	1,478,588
Pseudo r-squared	0.137		0.1573	
AIC		17.76		14.37

All regressions are controlled for household size and year fixed effects.
Robust standard errors were used.
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Variable	Share of households	Number of households
Number of adults in the household		
1	40.9%	605,038
2	47.9%	708,096
3	7.8%	115,182
4+	3.4%	50,272
	100.0%	1,478,588
Number of children in the household		
0	75.6%	1,117,369
1	10.4%	153,625
2	10.4%	153,182
3	3.0%	43,766
4+	0.7%	10,646
Age category		
18-34	19.6%	289,064
35-49	32.1%	473,887
50-64	21.7%	321,149
65-79	19.9%	293,795
80+	6.8%	100,692
Primary type of household income source		
Wage	53.0%	782,912
Retirement benefits	26.9%	397,592
Profits from self-employment	6.8%	99,953
Social welfare benefits	4.2%	62,396
Sickness or incapacity benefits	3.5%	52,194
Wages director and major shareholder	2.3%	33,564
Other welfare benefits	1.5%	22,622
Unemployment benefits	0.9%	13,307
Income from wealth	0.7%	10,498
Other income from self-employment	0.3%	3,696
Income quintiles		*Average disposable household income**
Poorest	20.0%	€ 14,700
Second poorest	20.0%	€ 21,200
Middle	20.0%	€ 27,100
Second richest	20.0%	€ 34,100
Richest	20.0%	€ 57,400
Total	100.0%	€ 30,900
Wealth quintiles		*Average wealth (excluding house)**
Poorest	20.0%	€ -17,600
Second poorest	20.0%	€ 3,200
Middle	20.0%	€ 16,100
Second richest	20.0%	€ 47,700
Richest	20.0%	€ 560,500
Total	100.0%	€ 122,200

*Rounded to hundreds

TABLE A-6.5.1: Logit estimates for catastrophic and impoverishing out-of-pocket payments				
	Catastrophic payments		Impoverishing payments	
Variable	Logit (18-34)	Logit (80+)	Logit (18-34)	Logit (80+)
Income quintiles				
Poorest	0	0	0	0
2nd poorest	-2.933***	-2.933***	-2.727***	-2.727***
Middle	-3.929***	-3.929***	-4.178***	-4.178***
2nd richest	-4.710***	-4.710***	-5.615***	-5.615***
Richest	-6.042***	-6.042***	-8.089***	-8.089***
Age group				
18-34	0	-0.684***	0	-0.344***
35-49	0.026	-0.658***	-0.0131	-0.357***
50-64	0.165***	-0.519***	-0.135***	-0.478***
65-79	0.0101	-0.674***	-0.234***	-0.578***
80+	0.684***	0	0.344***	0
Wealth quintiles				
Poorest	0	0	0	0
2nd poorest	-0.0001	-0.0001	0.00477	0.00477
Middle	-0.113***	-0.113***	0.171***	0.171***
2nd richest	0.133***	0.133***	0.308***	0.308***
Richest	0.602***	0.602***	0.714***	0.714***
Primary income source				
Wage	0	-0.487***	0	-0.549***
Retirement benefits	0.487***	0	0.549***	0
Profits from self-employment	-0.0558	-0.543***	-0.0271	-0.576***
Social welfare benefits	1.370***	0.882***	1.144***	0.594***
Sickness or incapacity benefits	1.033***	0.546***	1.112***	0.562***
Unemployment benefits	0.460***	-0.0275	0.350***	-0.199
Predicted value baseline	-3.854***	-2.683***	-4.473***	-3.580***
N	1,478,586	1,478,586	1,478,586	1,478,586
(Pseudo) R-squared	0.288	0.288	0.241	0.241

All regressions are controlled for household size and year fixed effects.

Robust standard errors were used.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$