Exploring the thresholds of health expenditure for protection against financial risk

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World Health Report (2010)
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HEALTH SYSTEMS FINANCING
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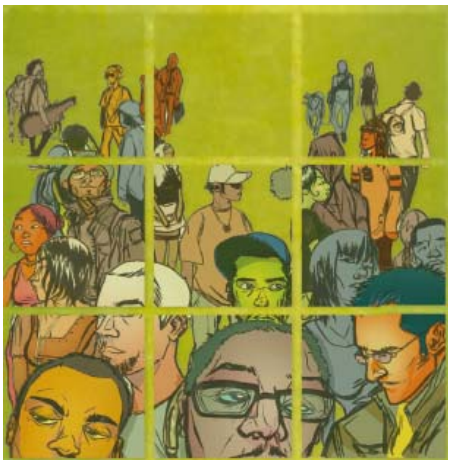

Exploring the thresholds of health expenditure for protection against financial risk

World Health Report (2010) Background Paper, No 19

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Introduction

Globally, 5.3 trillion dollars were devoted to health care in 2007. However, resources available ranged widely, from US$ 7439 in Luxembourg to US$ 7 in Myanmar. Global average health expenditure per capita was US$ 800 (1). Although higher health expenditure does not necessarily lead to better health outcomes, a minimum level of resources are needed for a health system to fulfil its essential functions adequately. In 2001, the Commission on Macroeconomics and Health concluded that US$ 34 per capita on health is the minimum required for providing basic curative services to reach health related MDG goals (2). More recent estimates are available from the Taskforce on Innovative International Financing, which found that on average US $ 44 per capita would be need to strengthen health systems as well as provide essential services in 49 low-income countries in 2009. This amount would need to rise to US$60 per capita by 2015 (3).

Health expenditure reflects the government as well as household capacity and willingness to spend on health. Viewed as a share of GDP, total national health expenditure reflects the importance of health care in the overall economy. Among high income countries, the United States leads with health expenditure representing 15.7% of GDP (1).

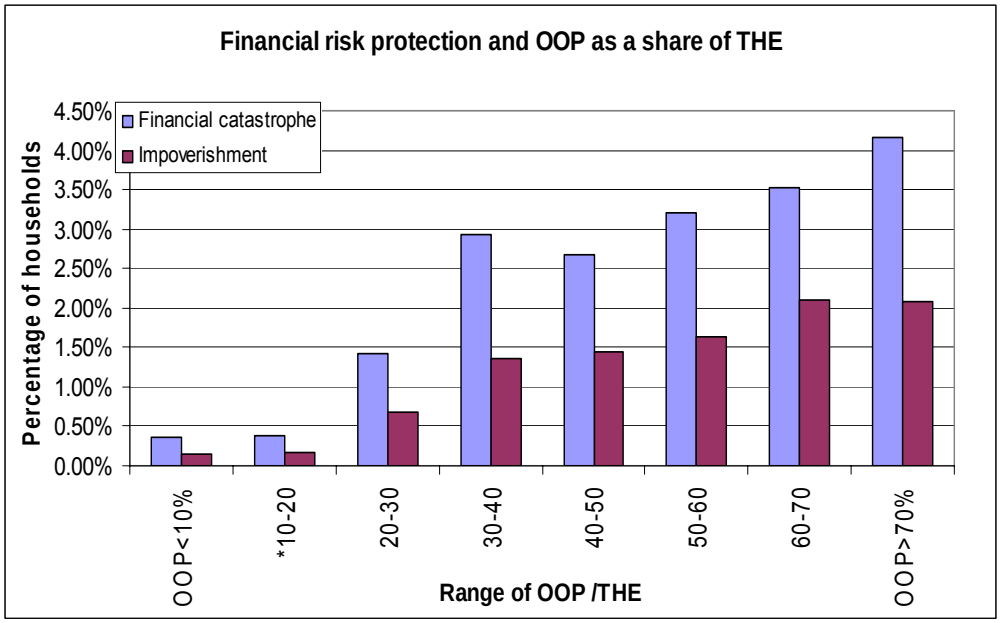
National health expenditure can also be separated by public and private spending. Government expenditure on health includes central and local governments' spending from general taxation, payroll taxes as well as external funds channelled through the government. Private health expenditure in most countries is dominated by out-of-pocket payments. The relative size of public and private spending, particularly the out-of-pocket component, has a huge impact on financial risk protection and access to care. Globally, out-of-pocket payments were 32% of total national health expenditure in 2007, with lower income countries having much larger shares.

The impact of out-of-pocket health expenditure: catastrophic expenditure and impoverishment

Previous literature has well documented that households face financial catastrophe and impoverishment as a result of out-of-pocket payments (OOP) (4-7). A study for 89 countries suggested that the more a country relies on OOP, the more of its households face financial catastrophe (8) Figure 1 presents the percentage of households with catastrophic expenditure and impoverishment against OOP of a share of

total health expenditure. Catastrophic expenditure is defined as out-of-pocket health payment exceeding 40% of a household's non-subsistence spending. Impoverishment measures the percentage of households pushed below the poverty line due to OOP. In general, the higher the share of OOP in total health expenditure, the more the households face catastrophic expenditure and impoverishment. At the same time, OOP discourages the use of needed services, particularly among the poor (9).

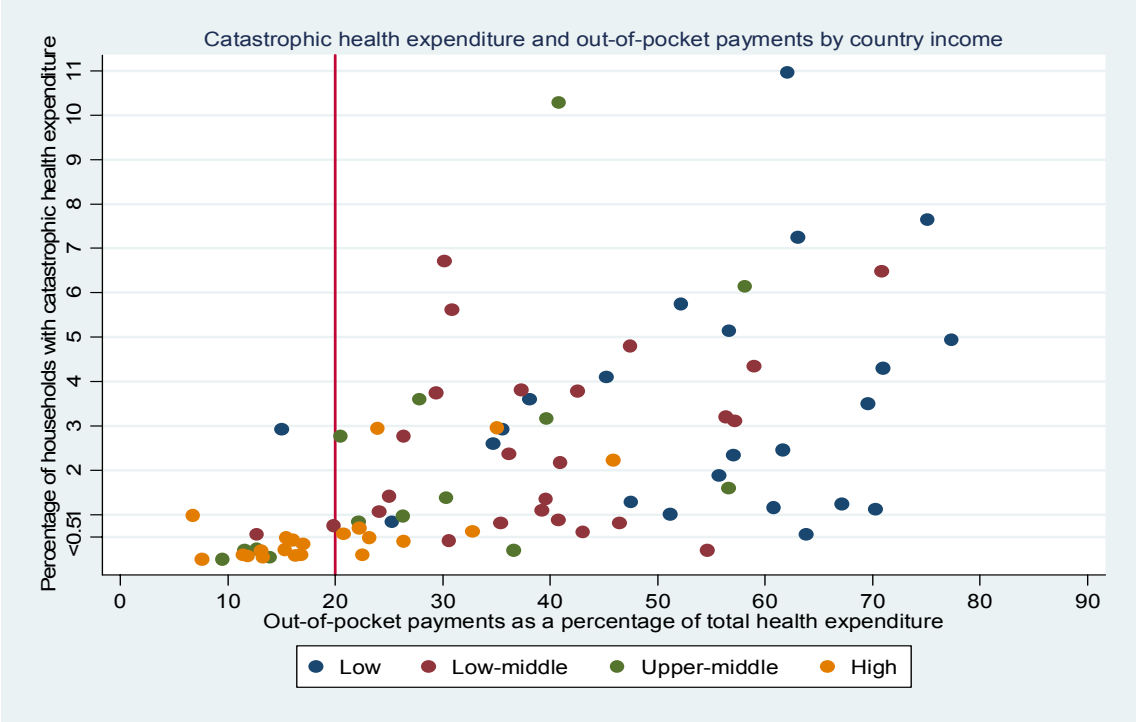
Figure 1 - Percentage of households incurring catastrophic health expenditure and impoverishment against OOP as a share of total health expenditure



Source: Adapted from (8)

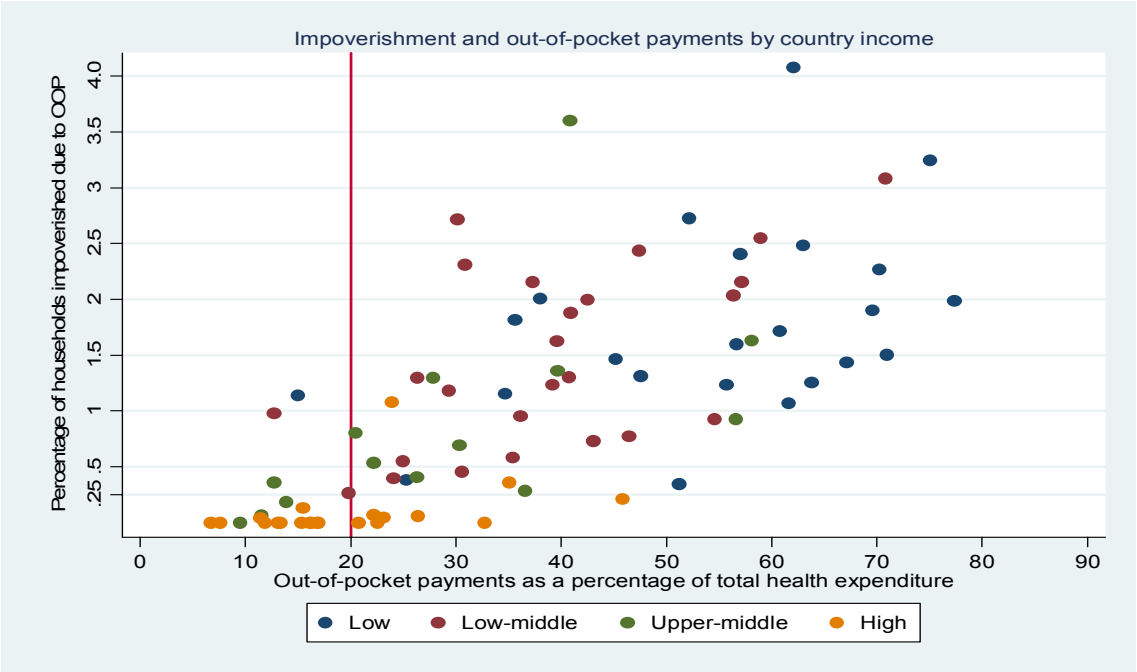
We can note from Figure 2 that catastrophic health expenditure and impoverishment remain low in countries where OOP represent less than 15-20% of total national health expenditure (THE). Similarly, Figure 3 shows when OOP are less than around 20% of the total health expenditure, few households are impoverished.

Figure 2 - Percentage of households incurring catastrophic health expenditure against OOP as a share of total health expenditure



Source: Household surveys listed in Appendix

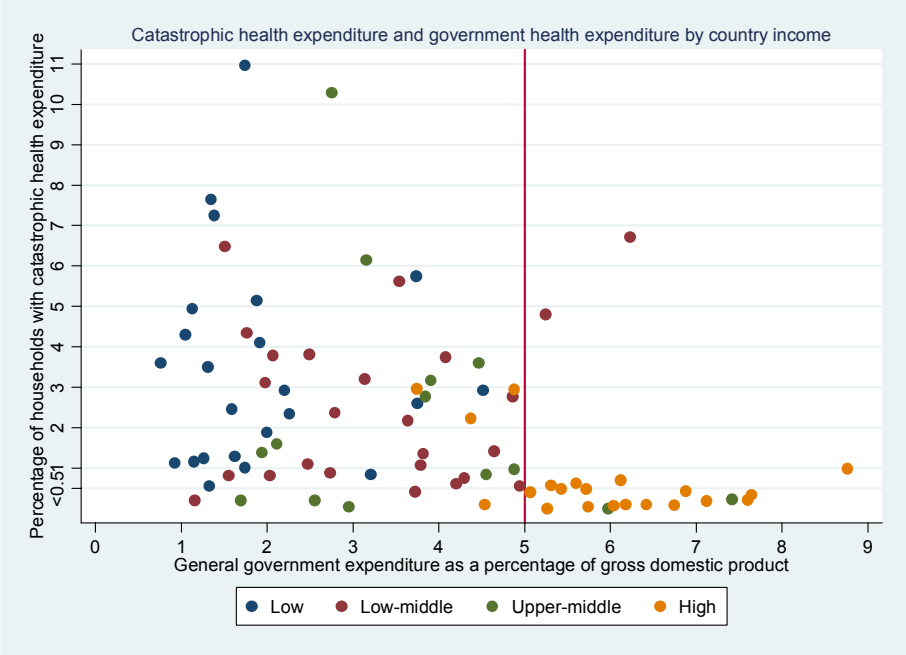
Figure 3 - Percentage of households impoverished against OOP as a share of total health expenditure



Source: Household surveys listed in Appendix

The complement of OOP is prepayment for health, which is funded mainly through general government expenditure on health. General government expenditure on health is spending by all levels of government and includes both general taxation and social health insurance contributions. But finding ways to increase government expenditure on health is a concern shared by all countries and in practice, it can be a daunting task. Empirical data show that when government expenditure on health is greater than 5-6% of GDP, fewer households face financial difficulties in paying for health services (Figure 4 (8).

Figure 4 - Percentage of households incurring catastrophic health expenditure against government expenditure on health as a share of GDP



The messages form previous studies are fairly consistent that reliance on OOP and less government health spending increases households' financial risk, levels of impoverishment and deepens the extent of poverty. However, a closer examination shows that of the data shows that most countries that can devote more than 5-6% of their GDP to health are high income countries. Similar pattern emerge for OOP as a share of total health expenditure. Is this a coincidence among countries reported in previous studies? Or are there limits on how large of a budget share can be allocated to health by governments and households given a country's level of economic development?

With this question in mind, this paper explores the patterns of total health expenditure and its components as well their relationship with GDP. We build on previous literature, most of which is significantly older,

and further examine health expenditure data (10-13). We take advantage of the availability of time series National Health Accounts (NHA) data to do this. The next section describes the data and methods used. This is followed by the presentation of the results and finally, a discussion section.

Data and methods

The NHA (1) database (from March 2010 update) are used for this analysis. 185 countries are included and grouped by income according to the World Development Indicators database income group classification(14). Variables examined include total health expenditure, government expenditure on health, out of-pocket payments, total government expenditure and GDP.

The analysis starts with intuitive approach of describing the trends and distribution of health expenditure over time by different country income groups. The distribution of health expenditure is plotted using box plots. The horizontal line within the boxes represents the median, whereas the boxes themselves represent the 25^{th} and 75^{th} percentiles, also known as the inter-quartile range. Finally, the "whiskers" on top and below box represent range within one and half times the inter-quartile range.

A simple univariate panel regression is used to study the relationship between health expenditure and economic growth. Total health expenditure per capita (THE), OOP per capita (OOP) and per capita general government expenditure on health (GGHE), were regressed against GDP per capita. Considering the possibility that health expenditures may follow different patterns for different country income groups, the regressions were run for four country income groups in addition to pooled regressions. Regressions were performed in international dollars. All values were log-transformed and as such the coefficients of these regressions can conveniently be explained as elasticities. Finally, government expenditure on health as a share of general government expenditure (GGHE%GGE) was regressed against GDP per capita. GGHE%GGE reflects the importance of health in the government agenda and the purpose is to test whether government give more priority to health as a nations gets wealthier. Appendix 1 summaries the variables used in this study.

We recognize that the incidence and prevalence of disease would have an impact on government as well as household health spending. However, these types of data are not available for all countries. Health outcome indicators, such as infant mortality, life expectancy although available, are highly correlated with the GDP per capita. As a result, univariate regressions were chosen.

Results

1. Descriptive statistics

Total health expenditure

There is a clear pattern of health expenditure per capita increasing with country income group. Figure 5 illustrates health expenditure per capita in international dollar terms (Int $), which reflects purchasing power parity, among country groups and over time. Among the high income countries, median health expenditure per capita is Int $ 2105 in 2001 compared to around Int $ 56 for low-income countries. Health expenditure does not seem to be increasing substantially over time, except in high income countries. Indeed, the median for high income countries was Int $ 2874 in 2007 while it was Int $ 64 for low income countries.

Figure 5 - Per capita total health expenditure in international dollars

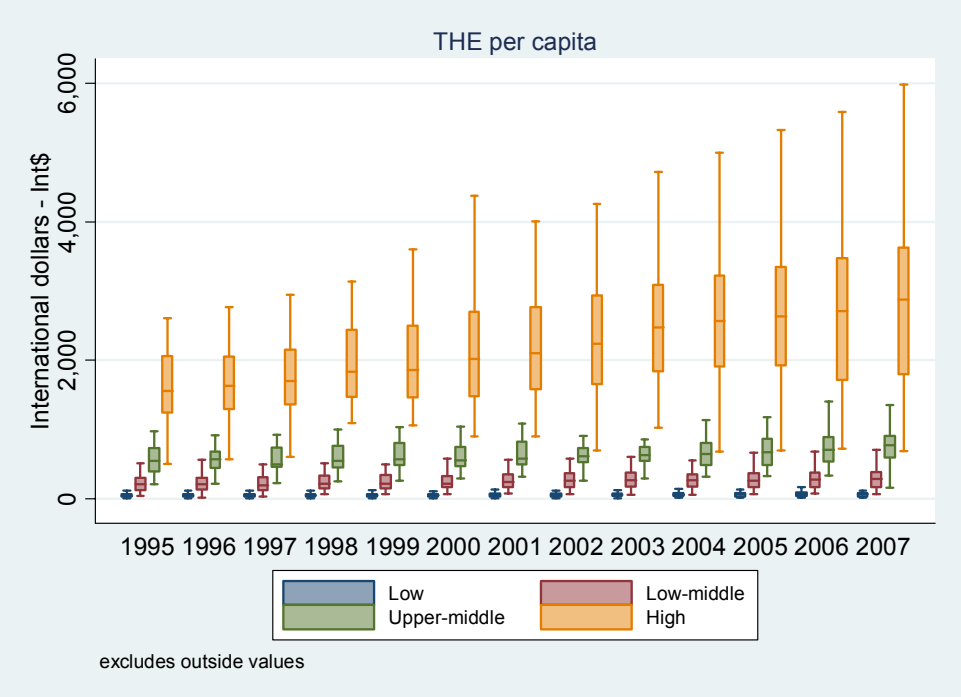
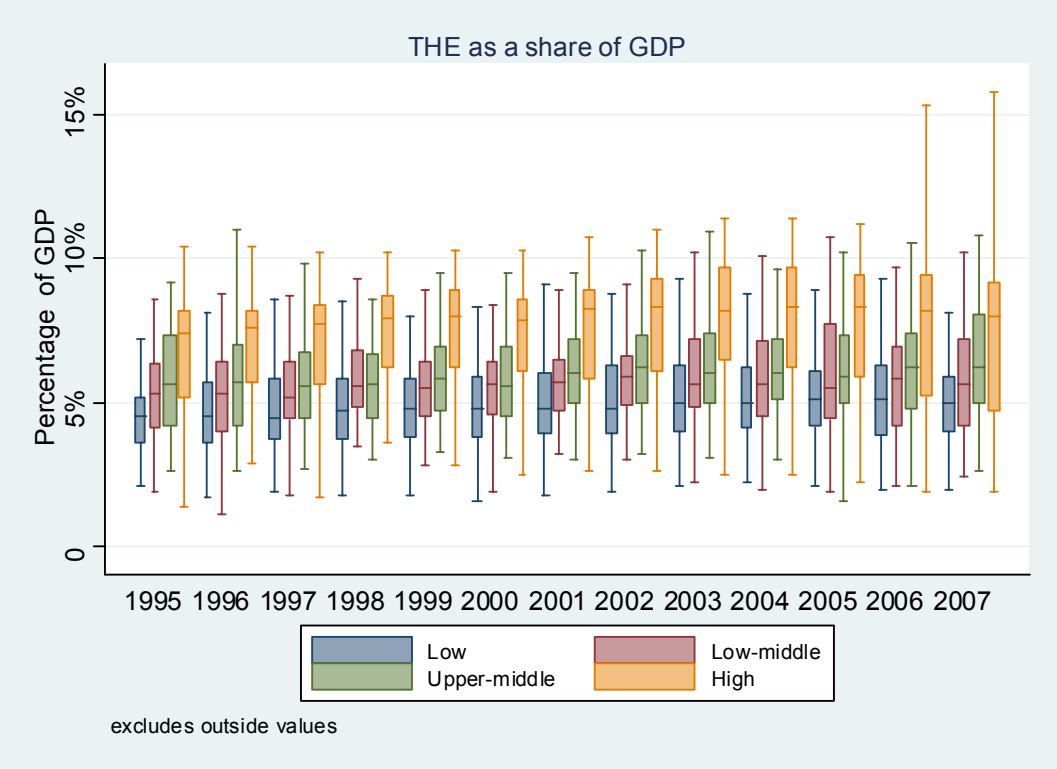


Figure 6 presents total health expenditure as a share of GDP. Once again, health spending is a larger share of GDP in richer countries(10). However, the differences within country income groups are much less pronounced than for health expenditure per capita. The median share of GDP in low and low-middle income countries is around 5%, compared to 7.5% for high income countries. The trends over time are not apparent.

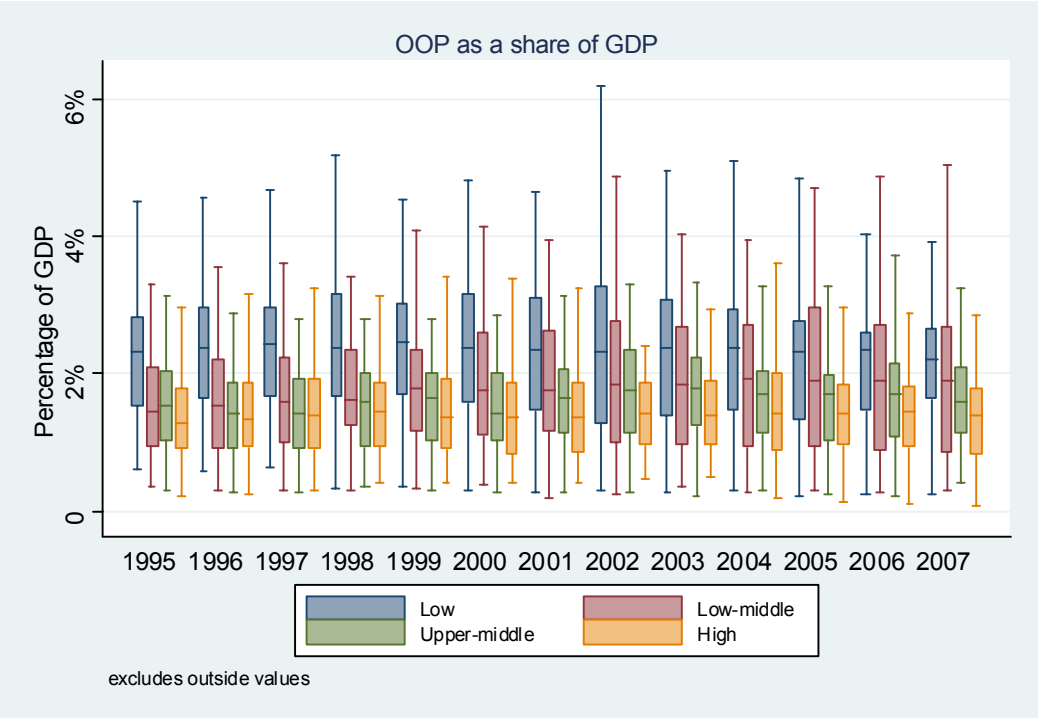
Figure 6-Total health expenditure as a share of GDP



Out-of-pocket payments

In contrast to health expenditure as a share of GDP, OOP as a share of GDP is smaller in higher income countries as shown in Figure 7. Indeed, OOP as a share of GDP is the highest in low income countries. From 2005, we observe more overlap between low and low-middle income countries' shares. Low and low-middle income countries also have the widest range of OOP as a share of GDP compared to upper middle and high income countries.

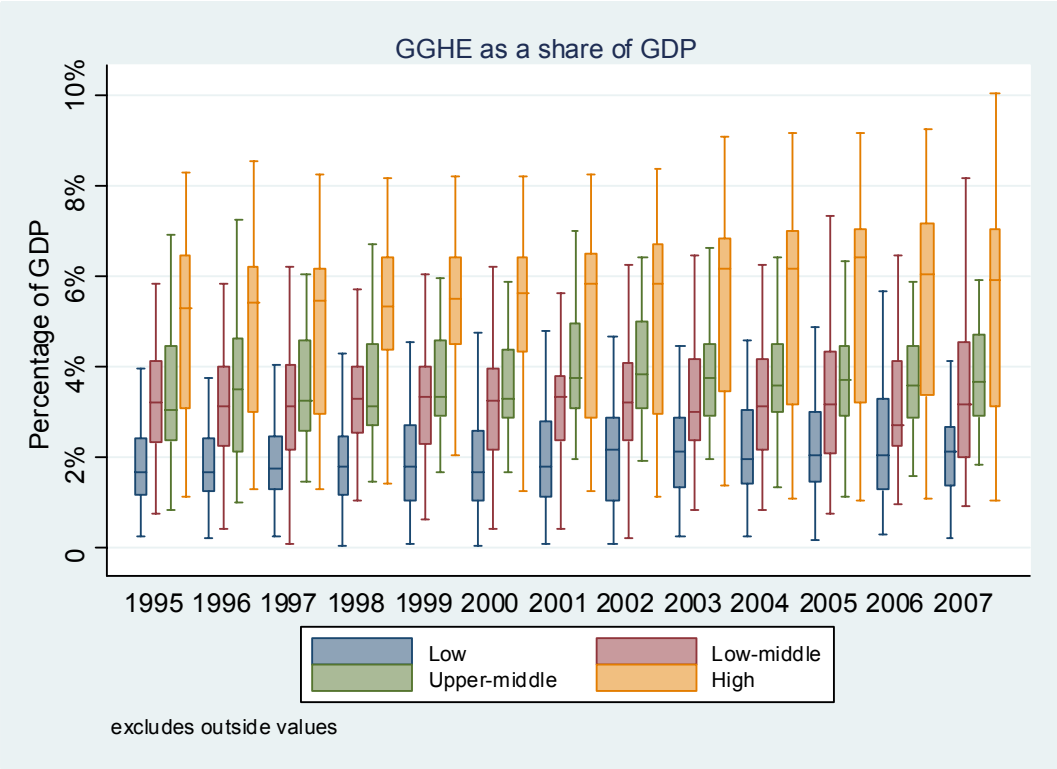
Figure 7 - Out-of-pocket payments as a share of GDP



Government expenditure on health

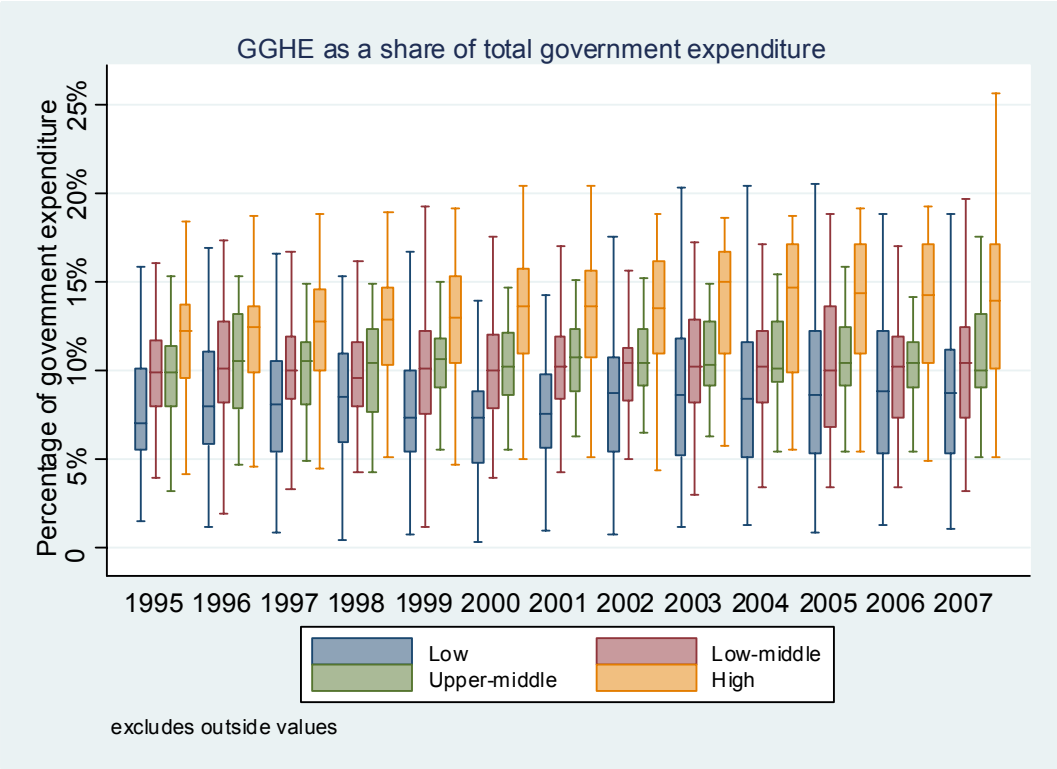
Among high income countries, the dominant component of health expenditure is from public sources. Figure 8 shows that government expenditure on health as a share of GDP is the highest among high income countries. Overtime, government expenditure on health has increased (both at the median and mean levels). Although, not it is always continuous, the trend is more pronounced in high and low income countries. This is indeed a very promising among low income countries, although it may not necessarily be a good thing in high income countries.

Figure 8 - Government expenditure on health as a share of GDP



Government expenditure on health as a share of total government expenditure reflects the priority of health in the national agenda (15). Indeed in 2001, the Abuja Declaration endorsed that at least 15% of total government expenditure should be allocated to health (16). However, almost a decade later, only a handful of countries have achieved this. Figure 9 suggests that for most wealthy countries, well above 10% of the government budget is spent on health, whereas the share is smaller in low income countries. Median government health expenditure as a share of general government expenditure seems to increase as country income increases. However, this pattern is less evident for low-middle and upper-middle income countries. Additionally, there is huge variation within the same income group.

Figure 9 - Government expenditure on health as a share of total government expenditure



2. Regression results

The regression results from the pooled data showed that health expenditure, in total as well as its components, OOP and GGHE, increased as GDP increased. The elasticity: for total health expenditure is greater than one; for OOP it is less than one; and for GGHE, it is greater than one. Regression results also show that the increases in GDP were associated with increases in GGHE%GGE (Table 1).

In the country income group regressions, results were consistent among income groups except in low income countries. In middle and high income countries, the elasticity for total health expenditure is and GGHE is greater than one, while elasticity for OOP is around one. In low income countries, total health expenditure does not seem to increase as fast as GDP increases. The elasticity for OOP was between 0.871 and 0.932 and between 0.909 and 1.061 for GGHE. The GGHE as a share of general government expenditure increased as GDP increased in all countries groups except in low income countries where the coefficient is negative and statistically insignificant.

Table 1 - Coefficients of panel regression with GDP per capita (1995-2007)

Country income group	THE	95 % confidence interval		OOP	95 % confidence interval		GGHE	95 % confidence interval		GGHE%GGE	95 % confidence interval	
Low	0.980***	0.935	1.025	0.888***	0.835	0.941	0.985***	0.909	1.061	-0.024	-0.101	0.053
Lower middle	1.084***	1.038	1.130	0.954***	0.881	1.027	1.152***	1.085	1.219	0.080**	0.025	0.134
Upper middle	1.099***	1.030	1.168	1.090***	0.998	1.182	1.128***	1.036	1.219	0.093**	0.000	0.186
High	1.145***	1.081	1.209	1.022***	0.949	1.095	1.202***	1.128	1.277	0.366***	0.316	0.417
All countries	1.045***	1.024	1.066	0.902***	0.871	0.932	1.125***	1.094	1.156	0.098***	0.070	0.126

*** p≤ 0.001
** p≤ 0.05

Discussion and conclusion

When interpreting the results, certain limitations in this study need to be taken into consideration. We recognize that cross-country time-series analysis has a variety of constraints in its interpretation. Nonetheless, we chose to limit any further assumptions that may be needed to support more complex modelling. This is particularly relevant with the univariate regressions of income against health expenditure indicators, where introducing more covariates would lead to substantial problems with multi-collinearity, which would, in turn, have to be addressed with a myriad of further assumptions. Indeed, we believe that our models have sufficient robustness to support the findings.

A practical question for policymakers is often to how much a country could spend on health. Or even more relevantly, how much can a government spend on health? The data presented here suggests that 15-20% of OOP as a share of total health expenditure and 5-6% of government expenditure on health as a share of GDP could considerably reduce the incidence financial catastrophe in a country. However, as we find in this study, the reality is almost all countries that have reached these levels are high and upper-middle income countries.

The results from the regression analysis support this further. Health expenditure increases as a country becomes wealthier. This is in line with findings from previous literature on the topic (10). Growth of health expenditure is faster than the growth of GDP, except in low income countries where government health expenditure seems to be increasing at around the same rate as GDP, while out-of-pocket payments seem to be growing slower than GDP. On the other hand, in middle and high income countries, government health expenditure seems to be growing faster than GDP while OOP grows at around the same rate as GDP.

In general, growth in government health expenditure seems faster than that of the out-of-pocket payments. However, the situation in low income countries may be different from middle and high income countries. Whereas the growth of social sectors, including health can be desirable, this may also be reflective of cost containment issues, ageing populations and new and expensive health technologies in middle and high income countries. While in low income countries, it is possible that increased health care consumption may be overshadowed by meeting other basic needs such as better food and shelter when GDP grows in these settings.

There is no evidence that governments allocate larger budget shares on health as GDP grows in low income countries. These patterns may be explained partly by the external funds on health channelled through government. While the health specific aid increases the total government spending on health, it may result in the reduction of government budget allocation on health from domestic resource(17). At the same time, government health expenditure is related to fiscal constraint as well as government priorities among public sectors.

This study also suggests that the increases in government spending on health are however, accompanied by the increases in OOP. Whereas a one percent increase in GDP leads to a higher percentage increase in government expenditure than OOP, their coefficients are nonetheless both positive and a dollar to dollar substitution of OOP with GGHE does not occur. The reasons for this are rather evident. For example, when increased government spending is used to provide free or low price consultations, some people who could not afford the service, or more service earlier may now be able to use services, but still end up paying out-of-pocket for partial consultation fee or for medicines and tests. Indeed, increasing government spending on health is important, but equally important is how to use the available public resource to improve access and protect households from financial risk.

Overall, these results by no means suggest that income growth will automatically solve the problems of health care financing. Increased priority needs to be given to health, especially low income countries which are in most need for additional spending on health. Our study found wide variations in health expenditure and its structure within the same country income groups, which indicates that income is not the sole factor deciding health expenditure, even if it is an important one. Indeed, there may be significant room for manoeuvring to achieve national health objectives. In doing so, countries should consider the whole breadth of health expenditure information and find ways to tackle different aspects at the same time in moving towards universal coverage. Any targets countries may aspire to should be reflective of the goals of the health system as a whole.

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Acknowledgement

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Appendix

Table 1 - Summary data

		Mean	Std. Dev.	Min	Max	Observations
Per capita total health expenditure in international dollars						
capthe_i	overall	703.838	994.687	7.000	7287.000	N = 2363
	between		947.085	10.923	5129.077	n = 188
	within		279.218	-901.777	2861.761	T-bar = 12.5691
Total health expenditure as a share of gross domestic product						
the_gdp	overall	0.060	0.024	0.007	0.203	N = 2447
	between		0.023	0.020	0.158	n = 190
	within		0.008	0.017	0.129	T-bar = 12.8789
Out-of-pocket payments as a share of gross domestic product						
OOP_GDP	overall	0.019	0.011	0.001	0.070	N = 2447
	between		0.010	0.001	0.060	n = 190
	within		0.004	-0.003	0.039	T-bar = 12.8789
General government health expenditure as a share of gross domestic product						
gghe_gdp	overall	0.036	0.023	0.000	0.199	N = 2447
	between		0.022	0.003	0.154	n = 190
	within		0.007	0.000	0.102	T-bar = 12.8789
General government health expenditure as a share of general government expenditure						
gghe_gge	overall	0.105	0.044	0.004	0.381	N = 2447
	between		0.040	0.011	0.243	n = 190
	within		0.019	-0.024	0.257	T-bar = 12.8789
Per capita gross domestic product in exchange rate US dollars						
capgdp_x	overall	8109.288	16202.740	76.923	238357.200	N = 2447
	between		15503.610	115.482	155657.100	n = 190
	within		4639.900	-34065.100	90809.310	T-bar = 12.8789
Per capita gross domestic product in international US dollars						
capgdp_i	overall	10630.910	15502.640	216.216	183000.000	N = 2363
	between		15243.310	254.018	143512.800	n = 188
	within		3302.642	-17034.100	50118.070	T-bar = 12.5691

Appendix

Table 2 - Household survey data presented in the Introduction section

Country	Survey year	Survey name	Percetange of households	
			with catastrophic health expenditure	*impoverished*
Albania	1996	Employment & Welfare Survey	3.79%	1.99%
Argentina	2002	Encuesta de Impacto Social de la Crisis Argentina	3.60%	1.30%
Armenia	2001	Household Living Standards Survey	2.45%	1.07%
Austria	1999/00	Household Budget Survey	0.21%	0.00%
Azerbaijan	1995	The Azerbaijan Survey of Living Conditions	7.25%	2.48%
Belgium	1997/98	Household Budget Survey	0.09%	0.00%
Burkina Faso	1998	Enquête Prioritaire sur les Conditions de Vie des Ménages	5.14%	1.60%
Bangladesh	1995/96	Household expenditure Survey	1.16%	1.72%
Bulgaria	2000	Bulgarian Integrated Household Survey	2.18%	1.88%
Belarus	1999	Income and Expenditure Survey	0.56%	0.97%
Bolivia (Plurinational State of)	2002	Encuesta Continua de Hogares, Condiciones de Vida	3.75%	1.18%
Brazil	1996	Living Standards Measurement Survey	10.29%	3.60%
Canada	1997	Survey of Household Spending	0.09%	0.00%
Switzerland	1998	Swiss Survey on Income and Expenditure	0.61%	0.00%
China	2000	National Income and Expenditure Survey	4.34%	2.55%
Côte d'Ivoire	1998	Enquête Niveau de Vie des Ménages	7.64%	3.24%
Colombia	1997	National Quality of Life Survey	6.72%	2.72%
Cape Verde	2001/02	Inquérito às despesas e receitas familiares	1.06%	0.39%
Czech Republic	1999	Household Budget Survey	0.00%	0.00%
Djibouti	1996	Enquête Djiboutienne auprès des Ménages	0.41%	0.45%
Denmark	1997	Danish Household Budget Survey	0.07%	0.00%
Egypt	1997	Egypt Integrated Household Survey	3.11%	2.16%
Spain	1996	Encuesta Continua de Horgares	0.48%	0.04%
Estonia	2005	Household Budget Survey	2.77%	0.80%
Finland	1998	Consumption Expenditure Survey	0.56%	0.00%

France	2006	Household Budget Survey	0.99%	0.00%
United Kingdom	1999/00	Family Expenditure Survey	0.04%	0.00%
Georgia	2007	Household budget survey	6.48%	3.08%
Ghana	1998/99	Ghana Living Standards Survey	1.01%	0.34%
Greece	1998	Household Expenditure Survey	2.23%	0.21%
Croatia	1999	Household Budget Survey	0.22%	0.36%
Hungary	2000	Household Budget Survey	0.97%	0.41%
Indonesia	2001	National Socioeconomic Survey	3.60%	2.00%
India	1995	National Sample Survey Round 52	1.12%	2.27%
Ireland	1999/00	Household Budget Survey	0.09%	0.04%
Iceland	1995	Household Budget Survey	0.42%	0.00%
Israel	1999	Household expenditure survey	0.40%	0.06%
Italy	2001	Household Expenditure Survey	0.69%	0.07%
Jamaica	2001	Jamaica Survey of Living Conditions	1.09%	1.23%
Jordan	2006	Household Expenditure and Income Survey	0.60%	0.73%
Kazakhstan	1996	Living Standards Measurement Survey	2.36%	0.95%
Kenya	2003	Health Expenditure and Utilisation Survey	4.10%	1.46%
Kyrgyzstan	2004	Household survey on health care utilization	2.33%	2.40%
Cambodia	1999	Cambodia Socioeconomic Survey 1999	4.94%	1.99%
Republic of Korea	2007	Household Income and Expenditure Survey	2.96%	0.36%
Lao People's Democratic Republic	1997/98	Lao Expenditure and Consumption Survey II	1.24%	1.43%
Lebanon	1999	National Household Health Expenditure and Use of Services	6.13%	1.63%
Sri Lanka	1995/96	Household Income and Expenditure Survey	1.28%	1.31%
Lithuania	1999	National Household Budget Survey	1.41%	0.55%
Luxembourg	1998	Enquête budget des ménages	0.00%	0.00%
Latvia	2006	Household Budget Survey	3.17%	1.36%
Morocco	1998/99	Enquête nationale sur les niveaux de vie des ménages	0.19%	0.93%
Republic of Moldova	2007	Household Budget Survey	4.80%	2.44%
Mexico	1996	National Income Expenditure Survey	1.59%	0.93%
Mauritius	1996/97	Household Budget Survey	1.38%	0.69%
Malawi	1997/98	Integrated Household Survey	0.83%	0.38%
Malaysia	1998/99	Household Expenditure Survey	0.19%	0.28%
Nicaragua	2001	Living Standards Measurement Survey	5.75%	2.73%

Norway	1998	Consumer Expenditure survey	0.33%	0.00%
Nepal	1995/96	Living Standards Measurement Survey	3.50%	1.90%
Oman	1999/00	Household Income and Expenditure survey	0.19%	0.06%
Panama	1997	Encuesta National de Niveles de Vida	2.77%	1.30%
Peru	2000	Encuesta Nacional sobre Medición de Niveles de Vida	3.81%	2.15%
Philippines	1997	Family Income and Expenditures Survey	0.81%	0.77%
Portugal	1994/95	Income and Expenditure Survey	2.95%	1.08%
Paraguay	2000/01	Encuesta Integrada de Hogares	3.20%	2.04%
Russian Federation	2002	Russian Longitudinal Monitoring Survey	5.61%	2.31%
Rwanda	2005/06	Integrated Living Conditions Survey	2.92%	1.13%
Senegal	1994/95	Enquête Sénégalaise auprès des Ménages	0.55%	1.25%
Slovenia	1997/98	Annual Household Budget Survey	0.06%	0.00%
Sweden	1996	Household Expenditure Survey	0.18%	0.00%
Thailand	1998	Thailand Socio-Economic Survey	0.81%	0.58%
Tajikistan	1999	Living Standards Measurement Survey	4.30%	1.50%
Tunisia	1995	L'enquête Nationale sur le Budget et la Consommation des Ménages	0.88%	1.30%
Turkey	2003	Household Budget Survey	0.75%	0.26%
Uganda	2002/03	National Household Survey	2.92%	1.81%
Ukraine	2006	Ukrainian Household Survey	1.34%	1.62%
Uruguay	1997	Consumer Expenditure Survey	0.83%	0.53%
United States of America	1995	Encuesta de Gastos e Ingresos de los Hogares	0.48%	0.13%
Viet Nam	1997	Vietnam Living Standard Survey	10.95%	4.08%
Yemen	1998	Household Budget Survey	1.88%	1.23%
South Africa	1995	South Africa Income Expenditure Survey	0.03%	0.18%
Zambia	1996	Living Conditions Monitoring Survey	2.59%	1.15%