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The Incidence of High Medical Expenses by Health Status in Seven Developed Countries

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The Incidence of High Medical Expenses by Health Status in Seven Developed Countries

Abstract

Health care policy seeks to ensure that citizens are protected against excessive out-of-pocket (OOP) expenses. Yet rising health care costs are pressuring private and social insurance schemes to shift toward more cost-sharing measures. This paper uses household surveys from seven countries to measure the burden of health expenditures for individuals with similar health conditions. It compares countries based on the extent to which citizens—those with health problems in particular—devote a large share of their income to medical expenses. The paper finds that in all countries but France, and to a lesser extent Slovenia, unhealthy citizens face considerably higher medical costs than do the healthy. As many as one-quarter of less healthy citizens in the U.S., Poland, Russia and Israel have large OOP expenses. The paper finds increased exposure to high medical expenses within countries is also associated with increased disparities between the unhealthy and healthy in the financial burden of OOP costs. The levels of high OOP spending uncovered, and their disparate weight on those with health problems (who are also disproportionately poor and elderly) underscore the potential for high OOP expenses to undermine core objectives of health care systems, including those of equitable financing, equal access, and improved medical outcomes.

KeyWords: Cost of illness; Health insurance; Health policy; Healthcare financing; Cost-sharing

Introduction

The central purpose of health insurance is to pool the financial risk of medical care so that the high costs that otherwise would fall on select individuals, is instead spread across the population. Without insurance, such high costs are difficult or impossible to plan for; with it, costs that are unaffordable or even catastrophic are transformed into the predictable ones of premiums and taxes.

Yet over the last decade, countries have responded to rising health care costs by introducing greater cost-sharing measures so that the users of health care face higher costs [1-5]. This trend raises the question of how well the design of health insurance in different countries accomplishes the goal of protecting citizens from the risk of large medical expenses.

Certainly, relying on the users of health care to pay some (or occasionally even all) of their medical expenses can be good policy: It helps reduce the risk of moral hazard associated with insurance by reducing the less valuable uses of health care dollars. In many instances, paying out-of-pocket (OOP) can also be fairer than paying though insurance as some health expenses reflect individuals' preferences and income rather than medical necessity. Furthermore, some forms of cost sharing reduce overall health care costs because they eliminate the administrative costs required by having third-party payers.

But high OOP requirements can also undermine fundamental goals of a nation's health care system. They can render the financing of medical care less equitable, as paying for health care out-of-pocket is generally the most regressive way to finance it [6,7]. When high, OOP requirements can cause some to meet their health care needs only by sacrificing other essential purchases, such as on food, shelter and education. They may also require some to assume debt or liquidate assets intended for other purposes [8,9]. Not surprisingly, such ways of coping with

high OOP requirements have been found to be more common among those in poor health and with chronic health problems [9,10].

Most importantly, though, paying for health care out-of-pocket can deter individuals from medical care, pharmaceutical products, and other needed medical goods [9, 11-17]. The poor [12,17], elderly [17], and those with health problems [9, 18] have been shown to be the most sensitive to cost-sharing requirements. Moreover, not only is cost-sharing linked to the reduced use of medical services and weaker adherence to medication therapies, it has also been associated with poorer health outcomes [11,17, 19]. For these reasons, researchers and policy makers are paying increasing attention to how much citizens must pay out-of-pocket to receive medical services and products [1, 3-5, 20-23].

Yet few studies investigate citizens' exposure to high OOP spending in a cross-national context. Making cross-country comparisons based on single country studies is often difficult, or is compromised by differences in the data set, or in how out-of-pocket expenditures or income are defined and measured. Yet cross-national comparisons are of increasing relevance, as countries face the similar public health challenges of reducing health care costs while distributing them fairly, and assuring equitable access to health care while meeting the growing medical needs of an aging population. How OOP expenditures feature into meeting or detracting from these competing goals is of growing concern in nearly all developed countries. Improved cross-national comparisons can aid in understanding the link between the scope and design of health insurance and the distribution of OOP expenditures, as well as contribute to comparative analyses of how well countries' health care systems meet common objectives.

This paper addresses this shortcoming by using nationally-representative household survey data from seven developed countries, where the data have been harmonized for the

purpose of allowing cross-national comparisons. The paper matches household-level health expenditures with income and health status to measure the degree to which those with health problems face high out-of-pocket (OOP) expenses. In this way, the paper provides some of the best evidence to date on variation between countries in the degree to which those in most need of health care face large financial barriers to gaining access to it. It does this by comparing the seven countries based on how common it is in each for individuals to face significant costs when accessing health care, as well as on how high these costs can reach.

Methods

This paper measures the frequency with which citizens with similar indicators of health status in seven countries are exposed to high OOP expenses, where "high" is measured uniformly across the seven countries. It does this by comparing citizens' OOP medical spending relative to income in a single year, and then calculating the percentage of individuals with different health indicators in each country having high medical expenses (as defined below). It then investigates differences within the countries on how high costs can get in each. For this, the paper reports the share of income spent on OOP costs by someone spending at the 90^{th} spending percentile, thus providing a comparison across countries of the extremes of OOP requirements.

For both of these estimations, the paper uses nationally-representative household survey data from seven developed countries, all seven of which are made available through the Luxembourg Income Study (LIS) [24]. LIS produces harmonized versions of nations' household surveys to facilitate cross-national research on social policy.

A number of LIS country data sets include household-level information on both OOP spending as well as the health status of its household members. To choose the nations to

compare, this study selected all countries with datasets no more than ten years old, with OOP spending levels roughly consistent with OECD figures, that use fairly standard definitions of OOP spending, and that have income levels close to those in Europe. This selection process left three countries in Europe (France, Poland, and Slovenia), three in Asia and the Middle East (Russia, Israel and Japan), and one in North America (the United States). All seven countries except Japan (2008) have household data for the calendar year 2010, and contain information on representative households, with weights allowing national-level estimations. Table 1 provides information on each data set used, and the number of observations in each. As shown there, Japan (for both its variables), Slovenia (for one variable), and the United States (for one variable) provide information on the health status of older individuals only, and thus in these instances the comparisons exclude younger individuals. The number of observations in each country range from 3,900 in Slovenia to over 200,000 individuals in the U.S. All calculations presented here are based on weighted individual-level observations.

Table 1 here

Out-of-pocket spending: Out-of-pocket spending is defined by LIS as total household expenditures on medical products, appliances and equipment, outpatient services and hospital services, and excludes health insurance premiums. Countries adhere relatively closely to LIS's definition, which is based on Code 06 of the United Nation's Classification of Individual Consumption According to Purpose. To verify the quality of LIS's OOP spending data, we compared estimates of per-capita OOP spending from each of the seven surveys with those published by the OECD (or in the case of Russia, the World Bank). All seven country estimates

from LIS fall within 74 to 96% of the OECD's estimates. That per-capita OOP estimates from LIS are below the OECD's is at least partially due to the fact that household surveys generally exclude the institutionalized population (e.g., those in long-term care facilities) and individuals who died earlier in the year. For both of these populations, OOP spending can be high. Moreover, recent evidence has raised questions about the reliability of the OECD's estimates of OOP spending [25].

High Medical Expenses. This paper follows the common practice of labeling households as having high OOP spending when the amount they spend exceeds a certain percentage of income [1, 5, 7, 20, 26]. Here all members of a household are designated as having high OOP spending when this amount exceeds 10% of their income, or 5% if the household is in poverty, both of which are defined below. This measurement reflects the most common practice of using a 10% threshold, but often lowering it if the household is poor [1, 26, 27]. This measure of "high spending" is conservative insofar as it entails an arbitrary division between the "poor" and the "non-poor." It also does not capture as high-spenders those with low costs due to their underutilization of medical care or medication.

Income. LIS data provide excellent information on household income which is consistently measured across countries. The paper defines income as disposable income, which is superior to other measures of income since it takes into account the value of government taxes paid and social transfers received. This is especially important for those with health problems, since disposable income includes any benefits received from disability, social insurance, social assistance, and public pension policies. As with OOP spending, income is measured at the household level.

Poverty. Individuals are identified as in poverty when the equivalized form of household disposable income (disposable income divided by the square root of household size) is below a poverty threshold. For this threshold, this paper employs the European Commission's definition of poverty, which is income below 60% of the median. Those individuals with (equivalized) disposable income below 60% of the nation's median value are thus labeled as in poverty. Because all individuals in the same household have the same equivalized income, they also have the same poverty status.

Health Status. LIS data capture individuals' health status through three different variables, and each household survey includes information on the health of individuals via one or two of these three variables. Two of them are indicator variables that take a value of 1 if the individual has a health problem, and 0 otherwise. One of these is a disability variable, where a "yes" response indicates the individual has a permanent health condition (either physical or mental) that limits basic activity; all household surveys except for Japan's and France's contain this "Disability" variable. The percent of yes (disabled) responses to this variable differs across countries, ranging from 1% in Slovenia to 10% in the US (see online Appendix). Much of this variation likely reflects the specific way the question was worded in the different countries (see Table 1 for detail).

The second health variable indicates if a household member has a chronic illness or disease. France and Japan were the only countries to provide information on this variable, with Japan providing it for the household head and spouse only (Table 1). Japan's "Illness" rate (25%) is slightly higher than France's (21%). Japan, Russia, Slovenia and the United States all provided information on a third health variable, which provides a ranking of each individual household member's health status, from 1 (excellent) to 5 (bad). For the purposes of this study,

we used this variable to create a third health indicator variable, where individuals are deemed in "Poor Health" if they report being either in poor or bad health (a ranking of 4 or 5), or they are deemed not in poor health (i.e., they report a health ranking of 1,2 or 3). In Slovenia, this variable is available only for household heads, and in Japan it is provided for household heads and spouses only. The percentage of the population reporting to be in poor health ranges from 12% to 14%, suggesting some similarity across countries in how respondents categorize their health.

Results

How do countries compare in the degree of financial protection provided against the risk of large medical expenses? How much additional risk of high expenditures do those with health problems face compared with the rest of the population? And how high does "high" go in each of the countries?

Table 2 column 1 presents country-level estimates of the frequency of high medical expenses in each of the seven countries during the study year, where "high" is as defined earlier. As shown, in the US, Poland, Israel and Russia more than 10% of individuals lived in households with high medical spending, and only in France were less than 5% of individuals required to spent large amounts to meet their medical needs.

To compare how the incidence of high medical spending within countries differs by citizens' health status, Table 2 presents estimates of the percentage of individuals with large medical expenses, broken down by their health status for each of the three different indicators of health status. It also shows the amount spent on health care as a share of income by health status for those with expenses placing them at the 90^{th} spending percentile. Together these two provide

comparative indicators of the extent to which health care costs within a county fall disproportionately on those who need it more: the first measures the prevalence of high medical costs, and the second measures how high these costs can reach.

Table 2 here

As Table 2 shows, differences in the incidence of high medical spending between the disabled and non-disabled population exceeds ten percentage points in the United States, Poland, Israel and Russia, while differences in Slovenia (four percentage points) are the smallest. Comparing rates between those with and without a chronic illness reveals smaller difference between these two groups in France and Japan.

The last two columns in Table 2 present rates of high OOP spending among those in poor health versus those not in poor health. By this indicator, we see that those in poor health in Japan, Russia and the U.S. are at significantly higher risks of large medical expenses compared with those not in poor health. The gap between the two is largest in Russia, where an estimated one-third of those in poor health had high medical expenses in 2010, whereas among those not in poor health, 14% had high medical expenses. Slovenia, on the other hand, offers the best financial protection, as only 15% of those reporting poor health had high medical expenses, which compares with 9% among the rest of the population.

With the exception of the Illness variable—which is probably the weakest indicator of health status (see Table 1)--the results indicate that those with health problems are exposed to a significantly higher risk of large OOP spending that those without—in all countries, the risk roughly doubles for this population compared with those without health problems. But in France

especially, and to a lesser extent Slovenia, "greater risk" is relative to a population provided significant protection from high financial costs. In absolute terms, the estimates show that a quarter or more of citizens with health problems in Poland, Russia, the U.S. and Israel incurred high medical expenses in 2010, with only slightly better outcomes in Japan.

Similarly, across all observations, the amount spent on medical care for those at the 90th percentile of spending is about 75 percent more for those with health problems than for those without. For instance, a disabled person at the 90 percentile of spending in Poland devoted 16% of her income to meeting her health needs, whereas a non-disabled at this point of the spending distribution spent 9%.

Figure 1 presents a graphical representation of the degree to which those with health problems face a higher risk of large medical expenses in the seven countries, compared with those without. It does this by plotting the overall level of financial protection in each county (the X axis) along with the average *difference* in risk between those with and without indicators of a health problem (Y axis). For instance, as shown in Table 2, in Israel an estimated 15 percent of the population is exposed to high health costs (X axis), whereas there is an estimated 11 percentage point difference is this exposure (Y axis) between those who are disabled and those who are not (26% versus 15%, see Table 2).

Figure 1 here

As Figure 1 clearly shows, these pairs of data in the seven countries reveal a distinct pattern whereby higher levels of exposure to large medical bills within countries (X axis) is associated with a larger gap between the risk faced by those with versus without health problems.

In other words, where a country's health policies expose citizens to a higher overall risk of large medical expenses, this risk increasingly shifts to those with health problems. This association makes intuitive sense: if health policy within a country exposes a larger percentage of citizens to substantial medical expenses, then we would expect that additional exposure to fall disproportionately on those who most need health care and medical products.

How overall exposure to risk translates into a disparate burden on those with health problems is one feature of high medical spending within countries that bears examining. But so too does the magnitude of the risk. Are "high" medical expenses more catastrophic in some countries than others, and if so does it correspond with the overall level of financial risk in a country? Evidence on spending levels at the 90th percentile by health status, presented in Table 2, shows that level to which OOP expenses can reach clearly differ by country. For instance, among those citizens considered disabled, those spending at 90th percentile in Slovenia spent 9% of their income on medical expenses, whereas in Israel they spent 18%.

More generally, as Figure 2 shows, the results indicate that nations that expose their citizens to a higher risk of large medical expenses (X axis), also expose their citizens with health problems to more catastrophic spending levels: the Y axis in Figure 2 measures the share of income devoted to OOP spending for those with health problems spending at the 90th spending percentile. Thus, for Russia (the northeast corner of Figure 2) 17% of its population faced high medical bills in 2010, and among Russia's disabled population, those with medical spending levels placing them in the top ten percent, devoted at least 20 percent of their income to medical expenses. The strong correlation depicted in Figure 2 thus provides a separate indication of the problem associated with high exposure to OOP expenses: it tends to also expose citizens in poor health to large and even catastrophic levels of medical bills.

Figure 2 here

In our sample of countries, high exposure to large medical bills in a country translates into those with health problems facing an especially high risk of this occurring, and a higher chance of these costs reaching catastrophic levels. This finding becomes even more concerning when one examines the other characteristics of citizens with health problems. Table 3 shows that in nearly every country, those with indicators of poor health are disproportionately poor and elderly. In fact on average, those in poorer health in the seven countries were about twice as likely to have income below the poverty line, and were several times more likely to be 65 years or older. Thus, when countries' health policy exposes large number of its citizens to high OOP expenses, it disproportionately shifts the burden of health care financing to those with health problems, which also means shifting it to the poor and elderly. And these are the citizens who are both least able to bear these costs, and most likely to respond by reducing their health care consumption [9, 12, 17, 18].

Table 3 here

Discussion

This study presents comparable cross-national indicators of the incidence of high medical expenses among those with different indicators of health. Within each of the seven countries, the design and scope of insurance leaves the unhealthy more exposed to high medical costs than it does the healthy. Looking across countries, the absolute magnitude of this risk varies

considerably. Health policy in France provides the best financial protection against the costs associated with adverse health outcomes, with Slovenia a distant second. By contrast, the U.S., Poland, Russia and Israel stand out for the significant exposure their citizens have to high medical expenses, an outcome that the paper shows disproportionately shifts the financing of health care costs to low-income households, to citizens in poor health, and to the elderly. Moreover, it also leaves these individuals more exposed to the potential of having extremely high medical expenses.

In measuring the frequency and magnitude of large OOP spending, the paper does not address what the right amount or the appropriate conditions are for individuals to pay out-of-pocket, as opposed to pre-paying collectively via taxes or premiums. Paying out-of-pocket may advance the objective of constraining the burden medical care places on public budgets and private premiums, and moderating citizens' incentive to overconsume health care. Yet the levels of high OOP spending uncovered in most of the countries here, and their disparate effect on individuals with health problems, the poor and the elderly, underscores its widespread potential to undermine core objectives of health care systems, including those of equitable financing, equal access, and improved medical outcomes.

Conclusions

Despite universal insurance in six of the seven countries in this study, and the widespread existence of policies that supposedly limit citizens' financial exposure to high OOP expenses [4, 28, 29], the paper finds that large levels of OOP spending are common in all but France. It is also noteworthy that France, Poland, Japan and Israel all have common institutional arrangements for regulating, financing, and providing health care within their nation [30]. Yet

according to this paper's findings, these similarities do not translate into similar levels of financial protection. Exactly how countries do and do not accomplish the level of financial protection each provides deserves further detailed analyses.

In addition to more closely investigating how and why OOP expenses in countries can mount (or not), another implication of this study is the increasingly important need to monitor the incidence of high OOP spending within countries. The extent of high OOP revealed here, and the subpopulations within countries most exposed to it, reveals an aspect of nations' health care system that is currently not very visible. Collecting and publicizing this data is especially important given that health care costs are rising, as in most countries have out-of-pocket costs.

A challenge for public health is reducing the potential contribution that OOP requirements can make to inequities in health care financing, access, and outcomes. A final implication of this study is that attaining financial protection on par with that achieved in France will require more comprehensive income-based limits on OOP spending than currently exist in most countries. However, the magnitude of financial risk revealed here may indicate a more general need to shift from cost-sharing measures as a way to reduce health care costs, and toward alternative policy mechanisms such as are being attempted in many other countries [31].

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Table 1: Description of National Household Budget Surveys and Study Observations

Country Year	Data Source	Observations Study/Total	Notes on data source:
France 2010	Institut National de la Stratistique et des Etudes Economiques *Enquête "Budget de Famille"*	40,837/41,285	"Illness" variable indicates if person was hospitalized in the last 12 months for any reason (including maternity).
Israel 2010	Central Bureau of Statistics *Household Expenditure Survey*	20,203/20,225	"Disabled" variable refers to persons strongly limited in their daily activities because of a health problem for at least the last six months.
Japan 2008	Keio University Joint Research Center for Panel Studies *Japan Household Panel Survey*	5,318/14,575 (disability) 5,322/14,575 (health status)	Health variables only provided for head of household and spouse. "Illness" variable refers to a chronic physical illness.
Poland 2010	Central Ststistical Office *Household Budget Survey*	107,147/ 107,967	"Disabled" refers to those who have doctor certified light, medium, and substantial disability.
Russia 2010	National Research University Higher School of Economics *Russia Longitudinal Monitoring Survey-Higher School of Economics*	15,027/16,867 (disability) and 15,037/16,867 (health status)	"Disability" refers to certified degrees of disability (first, second or third degree). Some households missing income data.
Slovenia 2010	Statistical Office of the Republic of Slovenia *Household Budget Survey*	11,514/11,515 (disability) and 3,924/11,515 (health status)	"Disability" refers to persons who receive disability allowances. "Health status" data provided for household head only.
United States 2010	United States Census Bureau *Current Population Survey Annual Social and Economic Supplement*	155,807/ 204,983 (disability) and 203,799/ 204,983(health status)	"Disabled" refers to persons who have a disability which prevents work or which limits the kind or amount of work. Not provided for children.

Note: OOP means out-of-pocket.All calculations are based on weighted values using "ppopwgt" variable. Out of pocket spending is variable "hmcmed" or "hcmed." Disposable income is "dhi." All negative values for dhi, hcmed and hmcmed are bottom coded to zero.

Source: LIS (www.lisdatacenter.org)

Table 2: Out of Pocket (OOP) Expenses for Total Population and By Health Status: Percent With Large OOP Expenses, and OOP as a Share of Income At 90th Spending Percentile

	Total	Disabled		Illness		Poor Health	
	Population	Yes	No	Yes	No	Yes	No
France							
% High OOP	3%			4%	3%		
90th % OOP/Inc	4%			5%	3%		
Israel							
% High OOP	15%	26%	15%				
90th % OOP/Inc	11%	18%	10%				
Japan							
% High OOP	9%			13%	9%	21%	8%
90th % OOP/Inc	7%			9%	7%	15%	7%
Poland							
% High OOP	13%	25%	11%				
90th % OOP/Inc	10%	16%	9%				
Russia							
% High OOP	17%	29%	15%			33%	14%
90th % OOP/Inc	12%	20%	12%			21%	11%
Slovenia							
% High OOP	7%	11%	7%			15%	9%
90th % OOP/Inc	7%	9%	7%			11%	7%
United States							
% High OOP	13%	25%	11%			25%	10%
90th % OOP/Inc	9%	17%	9%			17%	8%

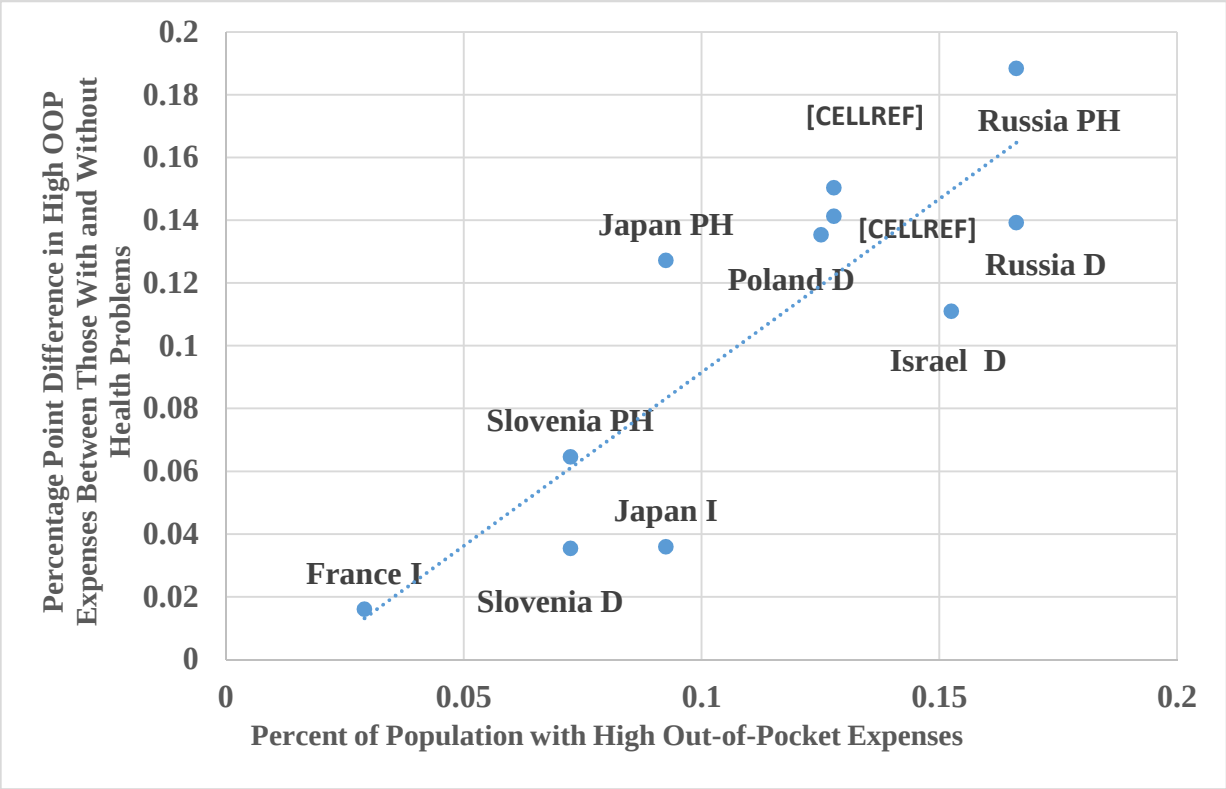
Note: Total population based on entire dataset. All estimations based on weighted observations for calendar year 2010, except Japan (2008). See text for definitions.
Source: Authors calculations based on LIS data (www.lisdatacenter.org).

Table 3: Composition of Subpopulations Based on Health Status: Percent that are Poor and Elderly

	----------Percent in Poverty by Health Status-------						--------Percent Elderly by Health Status--------					
	Disabled		Illness		Poor Health		Disabled		Illness		Poor Health	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
France			13%	16%					18%	16%		
Israel	28%	28%					10%	10%				
Japan			19%	16%	25%	16%			20%	23%	41%	20%
Poland	22%	15%					29%	11%				
Russia	16%	21%			22%	21%	51%	8%			50%	7%
Slovenia	24%	16%			45%	19%	49%	16%			53%	21%
U.S.	43%	20%			40%	22%	35%	14%			34%	10%
Unwgt. Avg	27%	20%	16%	16%	33%	19%	35%	12%	19%	20%	44%	14%

Source: Authors calculations based on LIS data (www.lisdatacenter.org). Elderly defined as 65 years and older. Poor defined as individuals with equivalized household disposable income below 60% of national median of same. All data for calendar year 2010, except Japan (2008).

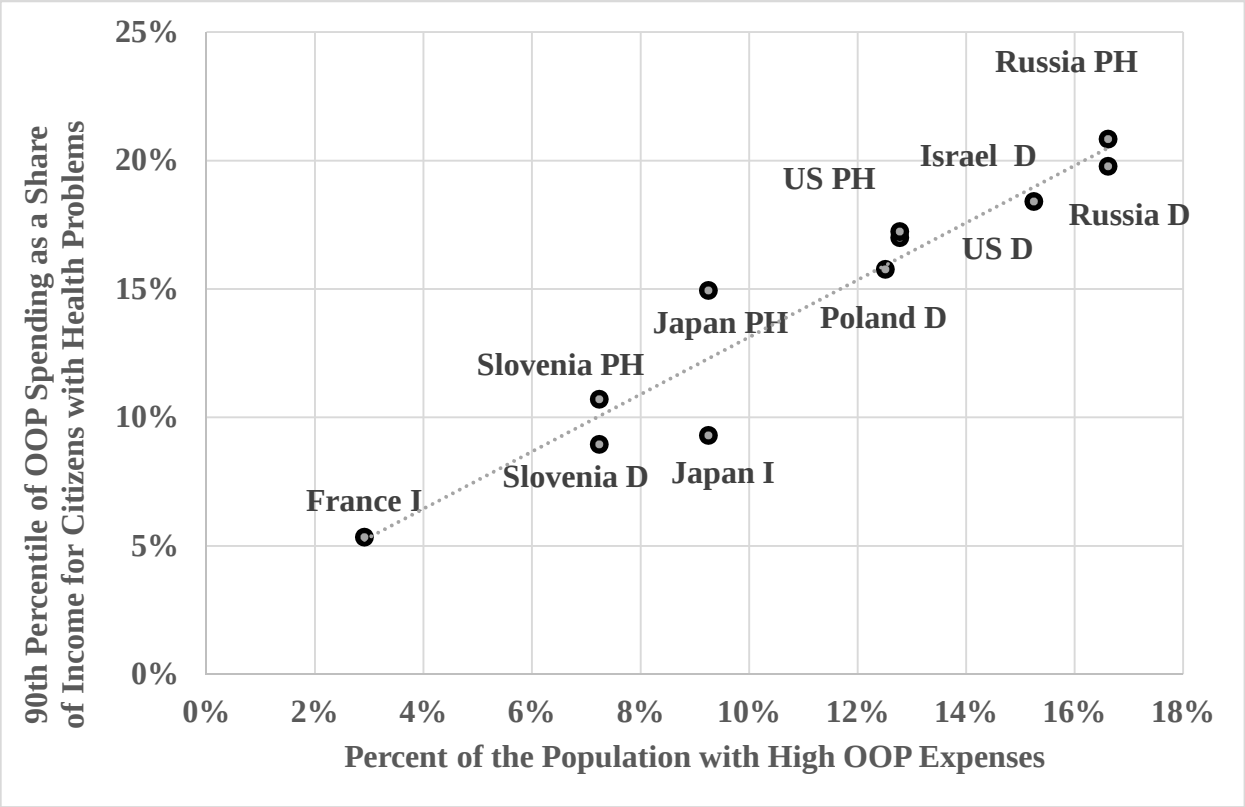
Figure 1: Incidence of High Out of Pocket (OOP) Expenses and Disparities in Risk Between Those With and Without Health Problems, By Country



Source: Authors calculations based on LIS data. All estimates except Japan (2008) based on data for calendar year 2010.

Definitions: D: Disability. I: Illness. PH: Poor Health. High OOP defined as OOP exceeding 10% of income, or 5% if poor (income below 60% of median).

Figure 2: Risk of High Out of Pocket (OOP) Expenses and Extreme OOP Expenditures Among Those With Health Problems, By Country



Source: Authors calculations based on LIS data. All estimates except Japan (2008) based on data for calendar year 2010.

Definitions: D: Disability. I: Illness. PH: Poor Health. For definition of high OOP, see text.

Appendix: Distribution of Population by Health Status Based on Three Alternative Health Indicators

	Disability		Illness		Poor Health	
Co/Year	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
France 2010			21%	79%		
Israel 2010	3%	97%				
Japan 2008			25%	75%	12%	88%
Poland 2010	9%	91%				
Russia 2010	7%	93%			11%	89%
Slovenia 2010	1%	99%			14%	86%
United States 2010	10%	90%			12%	88%

Note: For definitions of variables, and variation in each by country, see Table 1 and text.
Source: Author calculation based on LIS data (www. lisdatacenter.org)