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THE CATASTROPHIC ECONOMIC CONSEQUENCES
OF ILLNESS AND THEIR EFFECT
ON POVERTY ESTIMATES
IN EGYPT, JORDAN, AND PALESTINE

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Abstract

Illness can have catastrophic economics consequences on households in developing countries. In extreme cases, illness can drive households to sell their assets or push them into extreme poverty. Using national representative surveys, the purpose of this work is to examine the effect of out-of-pocket health payments on households' economic situation in three developing countries with a combined total population of 92 million: Egypt, Palestine and Jordan. The paper quantifies catastrophic health payments and impoverishment in the three countries. The analysis confirms that out-of-pocket health payments exacerbate households' living severely in Egypt, pushing more than one fifth of the population into financial catastrophe and four percent into extreme poverty. However, in Jordan and Palestine, the disruptive effect of out-of-pocket health payments is modest. Additionally, based on multi-country regression analyses based on data from the World Health Surveys, the study fills the gap in the literature by providing statistical evidence on the relationship between public health financing and the prevalence of impoverishment by health care payments.

JEL Classification: 114 115

Keywords: Out-of-pocket payments, catastrophic payments; impoverishment; poverty; public health spending; Egypt; Jordan; Palestine

ملخص

المرض يمكن أن يكون له عواقب اقتصاديه كارثية على الأسر في البلدان النامية. في الحالات القصوى، يمكن للمرض ان يدفع بالأسر إلى بيع أصولها أو دفعهم إلى الفقر المدقع. باستخدام مسوحات وطنية، الغرض من هذه الورقه هو دراسة تأثير المدفوعات على الصحة على الوضع الاقتصادي للاسر في ثلاثة بلدان نامية يبلغ مجموع عدد سكانها 92 مليون وهم: مصر وفلسطين والأردن. نقوم بعمل تقدير كمى للمدفوعات الصحية الكارثية والفقر في البلدان الثلاثة. ويؤكد التحليل أن المدفوعات على الصحة تؤدى الى تفاقم اوضاع الأسر بشدة في مصر، مما دفع أكثر من خمس السكان إلى كارثة مالية وأربعة في المئة الى براثن الفقر المدقع. ومع ذلك، في الأردن وفلسطين، هناك أثر تخريبي من مدفوعات الصحة . تملأ هذه الدراسة الفجوة في الأدبيات من خلال توفير البيانات الإحصائية عن العلاقة بين التمويل الصحي العام وانتشار الفقر عن طريق مدفوعات الرعاية الصحية.

1. Introduction

In the absence of universal health coverage in many developing countries, illness exposes households to the risk of encountering financial catastrophe, and in extreme cases to the risk of poverty. Developing countries bear 90 percent of the world's disease burden; and even though they represent around 80 percent of the world's population their share in total health spending does not exceed 12 percent. Consequently, out-of-pocket health payments are the main source of health spending in developing countries. In low-income countries the share of public health spending is about 29 percent of total health spending while it amounts to 42 percent in lower middle income countries, 56 percent in upper middle income countries and 65 percent in high income countries.

Health care costs can cause financial hardship directly via health care payments, and indirectly due to lost income resulting from the inability to work. Some households may use savings, borrowing or selling assets to cope with health shocks. Other households with limited resources may have no option but to cut their spending on necessary goods to cover their health expenses. In critical illnesses, health care cost can be large enough to impoverish households and may force them to cut their subsistence expenditure below the poverty threshold. Those households would not have been poor had they been able to use, for general consumption, the money they were forced to spend on health care.

On another front, the World Bank has developed two international poverty lines ($1.25 (PPP) per head per day and $2 (PPP) per head per day). The lines are widely used to measure and compare poverty across the world. However, these two poverty lines do not adequately incorporate the cost of health needs; using the conventional method of measuring poverty, a household that sells it assets to cover health expenses is classified as non-poor, because its overall spending, including payments made for health care treatment, exceeds the poverty line. Van Doorslaer et al. (2006) has shown that 78 million persons in Asia are impoverished by health payments, meaning that their levels of spending are below $1 per head per day after taking out non-discretionary health payments. Therefore, measuring poverty after taking out non-discretionary health payment could be more revealing than the conventional method of measuring poverty (O'Donnell et al. 2008).

Few papers have studied the effect of health payments on households' economic status in Arab countries. Thus, one objective of this paper is to assess the effect of health care payments on households in these countries. However, due to data limitations only three countries with a total population of 92 million people are studied: Egypt, Jordan and Palestine. Using the most recent national representative surveys, I reassess the poverty estimates (poverty headcount and poverty gap) in Egypt, Jordan, and Palestine using the $1.25 (PPP) per head per day and the $2 (PPP) per head per day poverty lines based on total spending net of health payments.

Furthermore, although (Cavagnera et al. 2006; Kawabata et al. 2002; Xu et al. 2006/2007) suggest that high out of pocket health payments and inadequate public health financing are the key drivers of catastrophic health expenditures and impoverishment, no paper has provided statistical evidence on the relationship between the size of public health financing and the proportion of households who were pushed into poverty due to health payments across developing countries. This gap in the literature is mainly due to data limitations as the payments and impoverishments due to health payments are mainly calculated from household surveys, which are not easy to conduct in low income countries. However, this study takes advantage of the World Health Survey that was conducted in 47 developing countries in 2003 by the World Health Organization and uses it to provide statistical evidence on the relationship between public health financing and impoverishment by health payments based on a sample of 47 developing countries.

The next section describes the structure of the health financing system in the three countries and the structure of out-of-pocket payments. Then I describe the surveys and the variables used in the analysis. Next, I summarize the methodology of catastrophic payments and impoverishment by out-of-pocket payments followed by econometric analysis then the results section and the conclusion.

2. Concepts

2.1 Catastrophic health expenditure

Catastrophic health expenditure can be defined as health payments that drive households to cut their spending on necessities or sell assets or use credit to the extent that leads to disruption to their living standards to cope with the cost of health care treatment. Xu et al. identified three preconditions for catastrophic health expenditure: expensive health care, poor population and the lack or the failure of health insurance to cover health expenses. There are two approaches that quantify the extent of catastrophic health expenditure within a country. The two approaches share the idea that out-of-pocket payments (OPP) for health care should not exceed a chosen threshold. One approach (O'Donnell et al. 2008) suggests that OPP for health care are considered to be catastrophic if the OPP to the total expenditure ratio exceeds a pre-specified fraction, usually 10 percent of total expenditure (Van Doorslaer et al. 2007). An alternative approach by Xu, suggests that OPP on health services are considered to be catastrophic if they exceed 40 percent of capacity to pay. She defines the household's capacity to pay as remaining income after basic subsistence needs have been met (Xu et al. 2003) (O'Donnell et al. 2008).

In this paper, I use the two approaches to measure the catastrophic payments for health care (O'Donnell et al. 2008). These two approaches have two limitations. First, they do not capture the impact of illness on households who cannot meet the treatment's expenses, though the loss resulting from forgoing health treatment could be quite substantial. Second, they do not measure the full monetary cost of illness, as they do not capture the lost earnings due to inability to work, which could be more important to households than the direct cost of health treatment or transportation cost to the health service unit or other changes in expenditure patterns that arise from illness.

2.2 Impoverishment and poverty estimates

Households impoverished by health payments refer to those households who would not have been poor had they been able to use money paid for non-discretionary health payments for general consumption. Impoverishment rate by health payments is calculated by the proportion of households who cross the poverty threshold after paying for health care.

3. Background

In the health care financing market, government intervention is a common remedy for market failure since market forces alone do not produce the most desirable outcomes from the social welfare perspective as health shocks increase households' vulnerability and disrupt their livelihood. Therefore, government intervention is required to correct market failure and to provide health care and social protection for the poor.

3.1 Principles of public health financing

According to (Gottret & Schieber 2007), there are three basic principles for financing health care: "Raise enough revenues to provide individuals with a basic package of essential services and financial protection against catastrophic medical expenses caused by illness and injury in an equitable, efficient, and sustainable manner. Manage these revenues to pool health risks equitably and efficiently. Ensure the purchase of health services in ways that are allocatively and technically efficient."

3.2 General tax revenue and social health insurance

Generally, there are two principle options of financing health care: general tax revenue and social health insurance. Under the tax-based system, public health spending is mainly funded from tax revenue rather than earmarked payroll taxes. Under the tax financing system, public health facilities are open to the public for free or at a very low price. On the other hand, the social health insurance involves obligatory membership of all citizens. The objective of social health insurance (SHI) is to pool health risk across the population. It collects regular financial contributions for health care so they can be used in case of illness. The value premium is based on the level of risk and income. It separates between access to health care service and the ability to pay for it, as SHI contributions are based on the ability to pay while access to services are based on need. Both the tax based system and the social health insurance aim to spread the financial risk associated with illness across population. However, mixed financing is common in many countries (Evans & Etienne 2010). Proponents of the tax-based system argue that it is more effective in pooling risk as it collects revenue from income taxes, real estate taxes, capital gains taxes, sales taxes and other customs and duties. So it collects contribution from everyone. This is unlike the social health insurance, where informal sector workers can avoid payment and the burden of health financing would rely on the formal sector workers. But the tax-based system is not efficient as well, as it treats unequal population equally. For example, it does not differentiate between the elderly and the youth. However, Evans & Etienne (2010) suggests that there is no one single best prepayment mechanism that fits all countries in terms of raising funds or protecting households from financial catastrophe resulting from health cost. Countries at different stages of development face different kinds of problems and have to make decisions regarding raising funds, pooling risk and how to provide service given their political contexts, social structure, and economic system. Therefore, there is no wide consensus on which financing system is the best to achieve universal health coverage.

3.3 Health shocks, coping strategies and economic consequences

Poor households develop strategies to cope with illness. These strategies aim to sustain the economic viability of the household. There are strategies that deal with mobilizing funds to meet direct costs such as borrowing or selling assets. Other strategies deal with indirect cost such as intra-household labor substitution. The ability of households to deal with health shocks depends on their assets portfolio, in addition to the type, severity, duration of illness and the family members affected.

Leive & Xu (2008) explored how households in 15 African countries [1] coped with health shocks. They also questioned whether households' coping strategies vary significantly between financing outpatient service, inpatient service and routine care. These countries are characterized by low government health spending and lack of health insurance. The average public health spending in these countries is nearly 40 percent of total health spending. They developed a logit model to identify the variables that are associated with selling assets, borrowing or both to finance health care. The dependent variable is a binary variable such that it equals one when a household used a coping strategy (borrowing or selling assets or both) and zero if a household relied on their income or savings to finance health care. In order to allow for comparison across countries, the logit model was run separately for each country. The results suggested that in 12 countries high inpatient spending increased the likelihood of borrowing or selling assets. Moreover, it pointed out that rich quintiles were less likely to use coping strategies compared to poor quintiles. There was no significant difference in the coping behaviors among the bottom three income quintiles. Urban households were less

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[1] The 15 African countries are Burkina Faso, Chad, the Congo, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Malawi, Mali, Mauritania, Namibia, Senegal, Swaziland, Zambia and Zimbabwe.

likely to use coping strategies than rural households. The study reported that in 11 countries male headed households were less likely to borrow or sell assets. It suggested that households headed by a senior member (above 60 years) were more likely to borrow or sell assets.

Wagstaff (2007) explored the response of household income, consumption and medical care spending to health shocks. Additionally, he explored the extent to which household consumption is protected from health shocks. He measured household health shocks by a recent death of working-age household member, a long inpatient spell, and a recent sizable drop in the Body Mass Index (BMI) of household head. The study concluded that the death of a working-age household member negatively affects earned income particularly in urban areas. However, other health shocks (drop in BMI or inpatient) do not significantly reduce earned income. This suggests that households used coping strategies such as intra-household labor substitution to deal with health shocks other than a death. Moreover, hospitalization significantly increased medical spending particularly for the uninsured than the insured. Results suggested that deaths and drop in BMI of household head did not significantly affect medical spending. The study suggested that health shocks reduced the per capita food consumption within households. Furthermore, it pointed out that some health shocks increased expenditure on electricity and housing for the rural sample while cutting expenditure on durable goods. Wagstaff interpreted this change in consumption pattern as an attempt to provide the sick household member with comfortable housing during recovery.

Van Doorslaer et al. (2006) examined whether OOP on health exacerbate poverty in 11 countries in Asia. They obtained data on OOP from nationally representative surveys, and subtracted them from total household income. Thereby they calculated the poverty estimates (poverty headcount and poverty gap) after making OOP. They compared poverty estimates after making OOP to the conventional poverty estimates. They found that poverty estimates after paying for health care were much higher than the conventional estimates, ranging from an additional 1.2 percent in Vietnam to 3.8 percent in Bangladesh. They concluded that OOP are likely to inflate the extent of poverty. Therefore, poverty alleviation policies should take OOP into account.

3.4 Egypt, Jordan and Palestine: An overview

Egypt, Jordan and Palestine are three Arab countries with a total of population 92.9 million. Egypt is the largest Arab country with a population of 82 million. It is a lower middle income country with large number of poor people. In 2011, Egypt experienced a dramatic political change putting an end to Hosni Mubarak's rule that lasted more than 30 years. However, the political instability caused negative economic consequences. In fiscal year 2011/2012, the country incurred a large budget deficit equal to 11 percent of the GDP, and economic growth rate has dropped from 5.1 percent in 2010 to 1.8 percent in 2011. According to the World Health Organization (WHO) database, the share of the government in total health spending declined from 41.7 percent in 2010 to 37 percent in 2011 putting more burden on households. OPP accounts for 60 percent of total health spending. Unlike Egypt, Jordan is a much smaller country with a population of 6.2 million. It is an upper middle income country with GNI per head equals to $4,340. The Jordanian government's share in total health spending has been rapidly increasing in the last ten years. It amounted to 45 percent in 2000 and reached 68 percent in 2011. Palestine is a country with 4.2 million and is a lower middle income country. Similar to Egypt, 37 percent of total health financing comes from the Palestinian Ministry of Health.

3.5 The structure of health systems in Egypt, Jordan and Palestine

In Egypt, the health care system provides health care services through three channels. These channels are: the public sector, the private sector and the civil society. The public sector refers to different ministries that provide health service such as the Ministry of Health,

Ministry of Higher Education, Ministry of Defense and Ministry of Interior. Along with ministries, the public sector includes Health Insurance Organization and the Curative Care Organization. They are financially independent organizations under the authority of the Ministry of Health. The private sector refers to for-profit hospitals, clinics, and pharmacies, while the civil society consists of non-profit, non-governmental organizations (NGOs). The Ministry of Finance is the major funding source for health care activities in different ministries. For instance, it funds 93 percent of the Ministry of Health's activities. The Ministry of Health provides a wide range of health services to all citizens at highly subsidized rates. In addition, public health insurance exists under the Health Insurance Organization. In 2013, the Health Insurance Organization covered 57 percent of the population. The coverage includes coverage for school students, infants, pensioners and widows, in addition to employees through employment-based schemes. It raises funds from beneficiaries' payments, the Ministry of Finance and users' fees.

In Palestine, the Palestinian-Israeli conflict has influenced the development of its health system. Shortly after the birth of the Palestinian National Authority (PA) under the Oslo accord in 1994, the Palestinian Ministry of Health was established. According to Mataria et al. (2010), the health care providers in Palestine can be classified into four groups; the Palestinian Ministry of Health, private sector, NGOs and United Nations Relief and Works Agency. Additionally, Palestine has governmental health insurance that is compulsory for public employees and their dependents, pensioners and their dependents, however, for private sector employees it is voluntary. After Gaza war in 2007, the government introduced a free health insurance system covering all Gaza residents. However, only half the residents of the West Bank are covered by the health insurance system.

In Jordan, there are two major public health providers: the Ministry of Health and the Royal Medical Services. They provide their services at heavily subsidized rates to all citizens irrespective of their income level. The Ministry of Health provides its services to all citizens and it operates 30 hospitals while the Royal Medical Services provides its services to armed forces and their dependents through eleven hospitals. The Jordanian National Health Accounts have suggested that 75 percent of population is covered by some form of health insurance in year 2008. The largest insurer in Jordan is the Civil Health Insurance followed by the Military Medical Insurance.

3.6 Out of pocket payments

There is a wide consensus in the literature arguing that reducing reliance on OPP in financing health care is key to protecting households from financial catastrophe resulting from illness (Xu et al. 2003). Xu et al. explored the determinants of catastrophic health expenditure in 59 countries. They concluded that the proportion of OPP opposed to the share of government health spending within total health spending is the main driver of explaining the difference in the extent of prevalence of catastrophic health expenditures across countries (Xu et al. 2007). According to Egypt's National Health Accounts for 2008, OPP accounted for 60 percent of total health spending. In Palestine, the OPP share in total health spending was 43.1 percent in 2011 while in Jordan OPP accounted for 42.3 percent of total health expenditure in 2008. Table 2 breaks down the OPP for Egypt and Jordan based on the National Health Accounts of the two countries.

In this paper, I use three Household Income and Expenditure Surveys. They are nationally representative datasets. For Egypt, I use the Household Income, Expenditure and Consumption Survey (HIECS) for 2010/2011. The survey is conducted by the Central Agency for Public Mobilization and Statistics (CAPMAS). The sample covers 26,500 households across Egypt. HIECS is the only source for measuring poverty in Egypt and it is conducted every two years. The sample of HIECS, 2010-2011 is a self-weighted two-stage

stratified cluster sample. HIECS collects data for all categories of household expenditure. Additionally, it collects information on employment status, educational status, marital status and other socio-economic variables. The recall period varies according to the nature of the variable collected. For instance, for food expenditure, the recall period is 15 days while the recall period for expenditure on clothes is one year. For health spending, the recall period is one month, three months, and one year.

For Jordan, I use the Household Expenditure and Income Survey (HIES) 2010. The sample size is 13,866 households and it's a stratified cluster sample. The survey is conducted by the Department of Statistics of the Hashemite Kingdom of Jordan. The survey collects information on dwelling characteristics, demographic characteristics, assets ownership, sources of earning (income from employment, rent, transfer payments, etc.), and all different categories of expenditure. The survey collects data on health payments and the recall period is three months.

For Palestine, the Expenditure and Consumption Survey 2010 is used. The sample size is 3,757 households (2,574 households in the West Bank and 1,183 households in the Gaza Strip). The survey collects information on spending, the socioeconomic and demographic statuses of households. The recall period is one month. The survey is conducted by The Palestinian Central Bureau of Statistics (PCBS). It collects information on geographic, social, and economic characteristics of household. The three datasets are harmonized and cleaned by the Economic Research Forum. To measure catastrophic payments for health care and impoverishment, three variables are needed: the total level of spending on health, level of total expenditure of household and the total non-food expenditure level. The three variables of interest are standardized and harmonized across the three surveys by the Economic Research Forum. The health spending variable includes spending on medical products, appliances and equipment, outpatient service and hospital services, however, payments for health insurance are excluded. The total expenditure variable is the summation of all expenditure. The non-food expenditure variable is the total expenditure minus spending on food, however, alcoholic and tobacco expenditures are included here.

4. Method

4.1 How to measure catastrophic health payments and impoverishment by health care cost?

The methodology is adopted from O'Donnell et al. (2008). The measurement of catastrophic payments for health care is similar to the poverty measurement methodology. A household encountering a catastrophic health expenditure is a household that has OPP as a share of total expenditure or (non-food expenditure) equal to or exceeding a chosen threshold, usually 10 percent of total expenditure or 40 percent of non-food expenditure. The basic idea is that, beyond the chosen threshold, the health payments would be disruptive and households would have to cut their spending on necessities to pay for health care services. Similar to the poverty headcount, the incidence of catastrophic payment can be measured by the following equation:

$$H = \frac{1}{N} \sum_{i=1}^{N} E_i$$

Where N is the sample size and $E_i = 1$ if the ratio of health payment to total household expenditure given by T/x exceeds the threshold z and equals to zero otherwise.

However, this measure captures the prevalence but not the severity of catastrophic payment, by how far the ratio of total health payments to total household spending exceeds the chosen

threshold. Therefore, similar to the poverty gap, the catastrophic payment overshoot captures the severity of catastrophic payments as given in the following equation:

$$O = \frac{1}{N}\sum_{i=1}^{N}O_i$$

Where $O_i = E_i((T_i/x_i) - z)$

Moreover, the mean positive overshoot is used to reflect the overshoot relative to households encountering catastrophic payments:

$$MPO = \frac{O}{H}$$

It is also significant to uncover the distribution of catastrophic payments. The above measures of incidence and overshoot do not distinguish whether it is the poor households or the rich households that are encountering the catastrophic health payments. If the law of diminishing marginal utility holds for income, then the loss in utility resulting from illness expenses would be much greater for poor households than for rich ones. Therefore, I use the concentration index to reveal whether the better-off households or the poor households are more likely to exceed the payment threshold. The concentration index is analogous to the Gini coefficient, its value depends on the area between the 45 degree line (line of equality) and the concentration curve, which provides the distribution of catastrophic payment in relation to a measure of living standard. Like the Gini coefficient, the absolute value of concentration index varies between zero and one, where zero is perfect equality and one is perfect inequality. Positive (negative) concentration index suggests that the better-off (the poor) are more likely to exceed the threshold. The concentration index (C) is calculated as following:

$$C = \frac{2}{\mu}Cov(H,W)$$

Where H is the catastrophic payments headcount and μ its mean, while W is the measure of living standard. Therefore, the concentration index depends on the covariance between catastrophic payments headcount and its association with the measure of living standard. To capture the effect of health care payments on poverty estimates (poverty headcount and poverty gap) for the three countries, I use the following methodology (O'Donnell et al. 2008):

$$P^{gross} = \frac{\sum_{i=1}^{N}s_i p_i^{gross}}{\sum_{i=1}^{N}s_i}$$

Where P^{gross} is the conventional measure of poverty headcount, s_i is the size of household, and N is the number of households in the sample. $p_i^{gross} = 1$ if $x_i < PL$ and is 0 otherwise, where x_i per capita spending in household i and PL is the poverty line. The conventional poverty gap is calculated as following:

$$G^{gross} = \frac{\sum_{i=1}^{N}s_i g_i^{gross}}{\sum_{i=1}^{N}s_i}$$

Where $g_i^{gross} = p_i^{gross}(PL - x_i)$

The effect of health payments on poverty headcount and poverty gap are captured by replacing p_i^{gross} with p_i^{net}. Where $p_i^{net} = 1$ if $(x_i - T_i) < PL$ and zero otherwise and by replacing g_i^{gross} with $g_i^{net} = p_i^{net}(PL - (x_i - T_i))$, where T_i is the per capita health spending at household i. Then I compare between P^{gross} and P^{net}, and between G^{gross} and G^{net} to demonstrate the effect of health payments.

I also measure the normalized poverty gap (NG) gross of health payments and net of health payments which can be calculated by:

$$NG = \frac{G}{PL}$$

4.2 Poverty line

In order to measure the effect of health payments on poverty, I use poverty lines for the three countries. A poverty line could be either absolute or relative. In this paper, I use the World Bank's absolute poverty lines, the $1.25 per head per day (PPP) and the $2 per head per day (PPP). These two poverty lines are considered extreme poverty lines and they do not have special allowances for health care needs. Thus, measuring poverty after taking out health payments from total spending using these lines does not require reducing those poverty lines. The World Bank's poverty lines are based on 2005 prices, using 2005 purchasing power parity (PPP). Therefore, to use these poverty lines for 2010, the poverty lines need to be adjusted to reflect the changes in prices between 2005 and 2010. To adjust the $1.25 poverty line to use it in 2010, I use the following equation:

$1.25 \times PPP\ rate\ (2005) \times Consumer\ Price\ Index - 2010\ (2005 = 100)$

The data for PPP rates and consumer price indexes are obtained from the World Bank database.

5. Econometric Analysis

The purpose of this model is to obtain empirical statistical evidence on the relationship between the size of public health spending and the extent of prevalence of impoverishment by health payments in the developing countries. The quantitative analysis is implemented using multiple regression models.

5.1 The dependent variable

The dependent variable is the proportion of households impoverished by health care payments. It is simply calculated as the percentage difference between the poverty headcount pre health care payments and the poverty headcount post health care payments (section 4.1).

The dependent variables are:

1. The Impoverishment Rate (IMPOVRATE) in logarithmic format at $1.25 per day, which is the proportion of households who crossed the $1.25 poverty line after paying for health care.
2. The Impoverishment Rate (IMPOVRATE) in logarithmic format at $2 per day, which is the proportion of households who crossed the $2 poverty line after paying for health care.

The data on the dependent variables are collected from 47 surveys covering 47 developing countries (Tables 6 and 7).

5.2 The main regressor

The main regressor is the proportion of public health spending in total health spending (GOVHS). According to the World Bank, public health expenditure consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds. Total health expenditure is the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation.

5.3 Control variables

1. Gross Domestic Product per capita (current US$) in logarithmic format (LOGGDP). The variable is included to control for difference in income level between countries. The data is obtained from the World Bank's database.

2. Life expectancy at birth (LIFEXP), total (years)which indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. The life expectancy is included in the models as a proxy of the health status of the country. The data is collected from the World Bank's database.

3. Health expenditure (TOTHE), total (% of GDP) which is included to control for the level of health care utilization. The data is collected from the World Bank's database.

4. Democracy dummy (DEMOC) is a dummy of free and fair elections. If the dummy has the value of one it indicates the country has electoral democratic system and if the dummy is valued as zero it indicates the country is not a democratic country. The data is obtained from the Polity IV project. The Polity score varies from -10 to +10. If the country scores between 6 and 10, the country is consider democratic and the dummy takes the value of one and zero otherwise. The democracy dummy is included as democracy has positive effect on health (Besley & Kudamatsu 2006; Franco et al. 2004; Gerring et al. 2012; Rugar 2005).

5. Legal origins dummies (LEGORG) are three dummies reflecting whether the country has French or British or Socialism legal origin, These dummies are included, as legal origins matter for economic and social outcome (Lopez de Silanes 2008). The data is collected from (Lopez de Silanes 2008).

6. Region dummies (REGDUM) are dummies indicating six geographic regions. The regions are Middle East, Europe and Central Asia, East Asia, South Asia, Sub Saharan Africa and Latin America.

Summary statistics of the dependent variables, main regressor and control variables is provided at Table 8.

5.4 The regression model

The following regression model is used to explore the effect of public health spending on the size of impoverishment rate across developing countries.

$$IMPOVRATE_t = \beta_0 + \beta_1 GOVHS_t + \beta_2 LOGGDP_t + \beta_3 LIFEXP_t + \beta_4 TOTHE_t$$

$$+ \beta_5 DEMOC_t + \beta_6 LEGORG + \beta_7 REGDUM + \varepsilon_i \qquad (1)$$

Due to data limitations, as the dependent variables are mainly collected from surveys, cross sectional data has been used in the econometric analysis.

6 Results

6.1 Catastrophic payments and impoverishment in Egypt, Jordan and Palestine

The results suggest that the size of catastrophic payments varies considerably across the three countries. Table 3 presents the prevalence, the intensity and the distribution of catastrophic health payments across the three countries at several thresholds. The two commonly used thresholds are 10 percent of total expenditure and 40 percent of non-food-expenditure. At the 10 percent threshold, Egypt has more than one fifth of the population encountering catastrophic health payments, which is relatively very high compared to catastrophic payments in middle and low income countries including low income countries like Bangladesh, and India (Van Doorslaer et al. 2007). Moreover, at the 25 percent of non-food-expenditure threshold, more than one fifth of population are exceeding the threshold. At 40 percent of non-food-expenditure threshold, the proportion of catastrophic health payments goes down to 7.1 percent of households encountering financial catastrophe. Ultimately, comparing Egypt to other developing countries shows that Egypt has one of the highest proportions of catastrophic payments (Figure 1).While in Jordan, out of pocket payments for health care do not cause disruption to many households, as only 2.7 percent of households encounter catastrophic payments at the 10 percent threshold and 0.7 percent at the 40 percent threshold. In Palestine, 6.7 percent of the population encounter catastrophic payments at the 10 percent threshold and approximately 2 percent at the 40 percent threshold.

Table 3 provides the concentration index for the three countries. A positive concentration index indicates a greater tendency for the better-off households to cross the threshold. For the three countries, the value of concentration indexes are always positive at different thresholds suggesting that the problem of catastrophic health payments is less common among poor households, as the better-off are more likely to cross threshold based on the concentration index values.

Table 4 shows the impoverishment effect of OPP at $1.25 per day. Table 4 describes the impoverishment effect at $1.25 per day for Egypt only, because no households in Jordan or Palestine spend less than $1.25 per head per day (PPP) so there is no impoverishment effect at this level. Table 5 suggests that 3.8 percent of the population in Egypt are pushed below $2 because of health payments and OPP has deepened the normalized poverty gap by 0.8 percent. In Palestine and Jordan, a very small percent of the population are pushed below $2 per day because of health payments and OPP have no effect on the normalized poverty gap.

6.2 Econometric results

Figures 2 and 3 show how change in IMPOVRATE relates to change in GOVHS. They offer good idea on the direction of the relationship between the IMPOVRATE at the two poverty lines and the GOVHS. The line fitting suggests that there is an inverse relationship between IMPOVRATE and GOVHS. To test the significance of this relationship, I run equation 1 on my sample data. The regression models (Tables 10 and 11) provide statistical evidence that there is really a relationship between IMPOVRATE and GOVHS at the five percent significance level. Therefore, the regression's results support what has been argued in the literature. The relationship between IMPOVRATE and GOVHS is robust to the changes in poverty thresholds and to the inclusion of regional and legal origin dummies.

The two models have good fitting with R square of 68 percent for the first model and 32 percent for the second model. To test for the models misspecification due to omitted variables and incorrect functional form, the RESET test is used. The test is conducted by including the square of form of the predicted dependent variable and cubic form of the predicted dependent variable in the regression model as follow:

$$IMPOVRATE_t = \beta_0 + \beta_1 GOVHS_t + \beta_2 LOGGDP_t + \beta_3 LIFEXP_t + \beta_4 TOTHE_t$$

$$+ \beta_5 DEMOC_t + \beta_6 LEGORG + \beta_7 REGDUM + \beta_8 \widehat{IMPOVRATE_t}^2 + \varepsilon_i \qquad (2)$$

And the polynomial function:

$$IMPOVRATE_t = \beta_0 + \beta_1 GOVHS_t + \beta_2 LOGGDP_t + \beta_3 LIFEXP_t + \beta_4 TOTHE_t$$

$$+ \beta_5 DEMOC_t + \beta_6 LEGORG + \beta_7 REGDUM + \beta_8 \widehat{IMPOVRATE_t}^2 + \beta_9 \widehat{IMPOVRATE_t}^3 + \varepsilon_i \qquad (3)$$

If the model is improved by including the square and cubic of the predicted dependent variable then the original model must have been inadequate (Carter et al.2001). The null hypothesis of the RESET test claims that the model has no omitted variables or misspecification. With P-values of F-tests equaling 0.31 for the first model and 0.084 for the second model, I do not reject the null hypothesis and the models have no misspecification error. Table 9 provides the cross correlation table. The table suggests no strong linear association or harmful collinearity exists. To test for heteroskedasticity, the White test for homoskedasticity is used. The test fails to detect heteroskedasticity in the models.

7. Conclusion

The paper has examined the economic consequences of OPP for health care in three Arab middle income countries; Egypt, Jordan and Occupied Palestine. I have measured the prevalence of catastrophic health payments in the three countries by utilizing commonly used methodology. Furthermore, I have argued that the conventional method of measuring poverty, which does not take into account the non-discretionary health spending, underestimates the size of poverty and its severity in Egypt. I have reassessed the measures of poverty in the three countries at two international poverty lines ($1.25 (PPP) and $2 (PPP) per head per day) developed by the World Bank and found that 7.4 percent of households in Egypt are pushed into extreme poverty because of OPP while they have minor effect on poverty measures in Jordan and Palestine.

The literature suggests that the share of government spending on total health spending as opposed to the share of OOP on total health spending is a key determinant of the prevalence of catastrophic health payments across countries and this relation is evident in this paper. In Jordan, where the government spends more than 25 percent of GDP on human capital and funds 68 percent of total health spending, less than 1 percent of the population encounter catastrophic payments for health care and there is only 0.1 percent impoverishment impact. While in Egypt, where the government is one of the lowest spenders on health care compared to middle income countries and OPP is the major funding source of health spending, 22 percent of households encounter catastrophic health payments. Therefore, with evidence from empirical study, I stress on the fact that reducing reliance on OPP on financing health care and moving toward universal health coverage is the key to protect households from the catastrophic economic consequences of illness.

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Figure 1: Catastrophic Health Payments across Countries
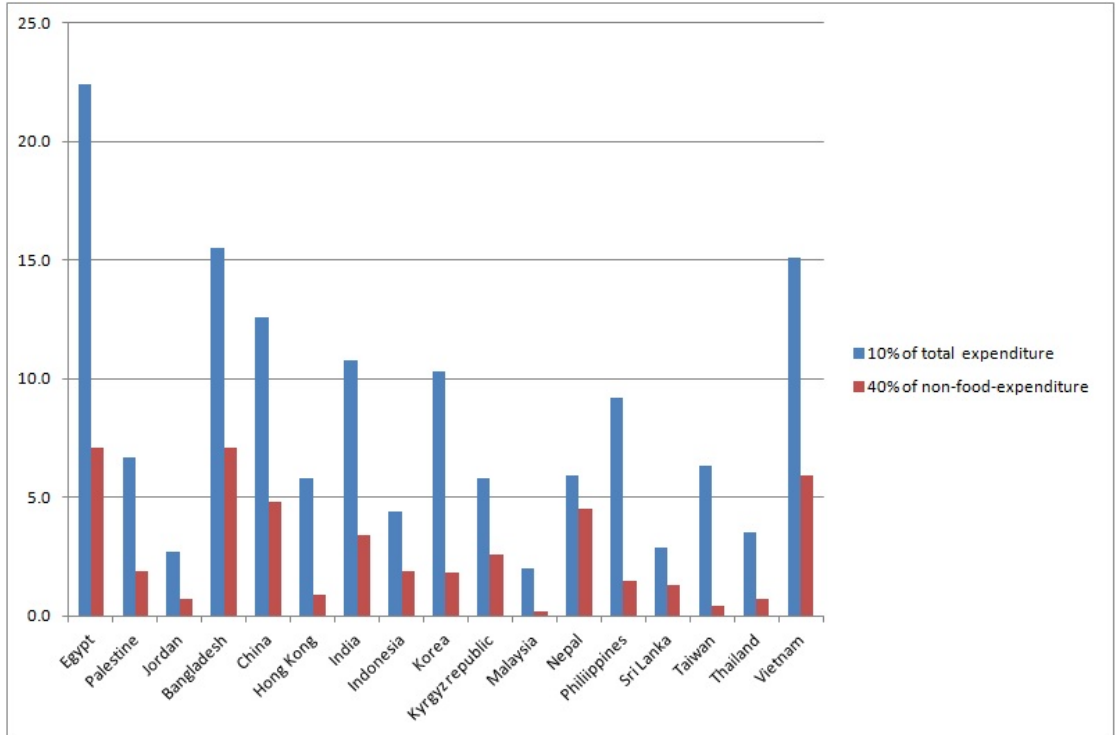
Figure 2: Incidence, Intensity and Distribution of Catastrophic Payment
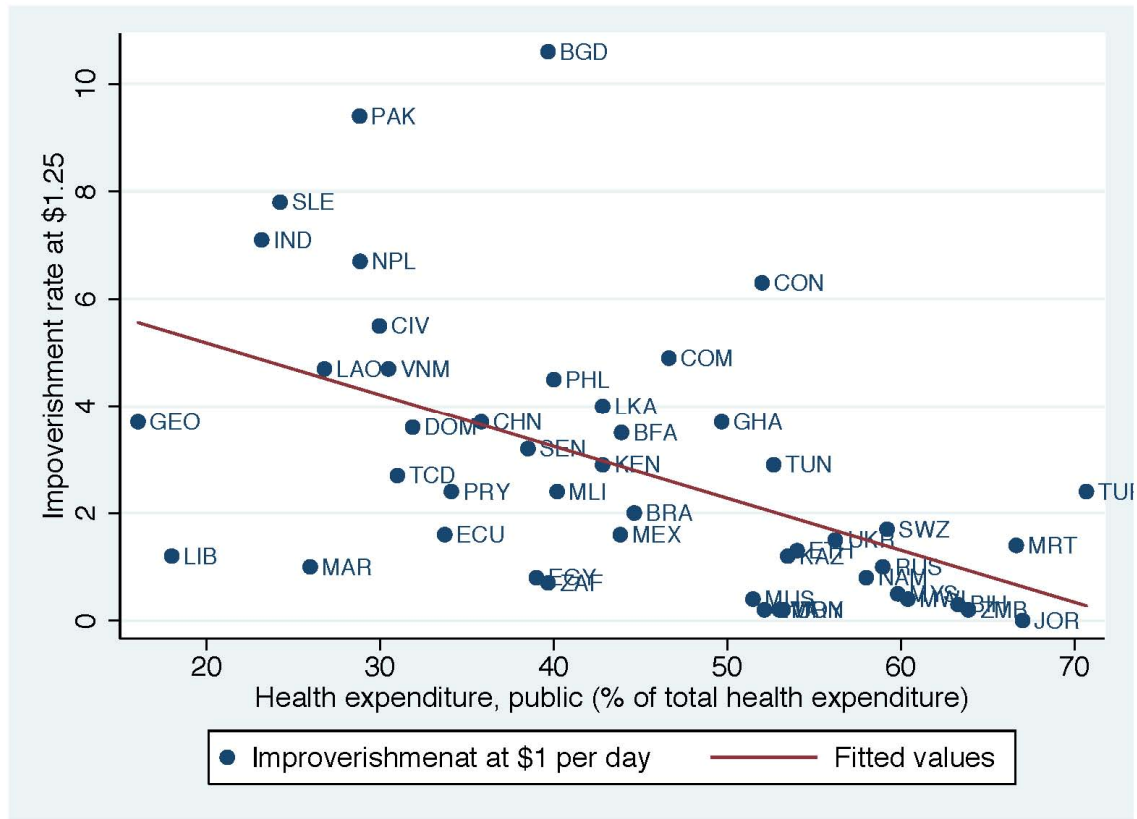
Table 1: Public Health Spending in Egypt, Jordan and Palestine

Indicator	Egypt	Jordan	Palestine
GDP per capita (US$)	2646	4445	1697
Per capita total expenditure on health (US$)	123	357	248
Per capita government expenditure on health (US$)	46	242	91
Government expenditure on health as a % of total health expenditure	37	68	37

Table 2: The Distribution of OPP

Indicator	Egypt	Jordan
Private hospitals (%)	8.2	22
Private clinics (%)	38.4	6
Public hospitals (%)	9.1	22
Pharmaceuticals (%)	33.1	48
Others (%)	11.2	2
Total (%)	100	100

Table 3: Incidence, Intensity and Distribution of Catastrophic Payments

		Using Total Expenditure				Using Non-Food Expenditure			
	Threshold	**10%**	**15%**	**25%**	**40%**	**10%**	**15%**	**25%**	**40%**
Egypt	Headcount (H)	22.4	11.2	3.4	0.6	57.7	41.3	20.9	7.1
	Overshot (O)	11.7	0.9	0.3	0.1	88.2	55.8	22.8	0.8
	Mean Positive Overshot (MPO)	7.7	8.4	9.1	10.1	14.3	14	13.3	11.9
	Concentration Index	0.183	0.295	0.448	0.646	0.037	0.063	0.135	0.313
Jordan	Headcount (H)	2.7	1.2	0.4	0.1	9.8	5.5	1.7	0.7
	Overshot (O)	0.7	0.4	0.2	0.1	1	0.6	0.3	0.1
	Mean Positive Overshot (MPO)	7.6	10.3	11.3	14.3	10	11.3	16.4	15.2
	Concentration Index	0.45	0.56	0.482	0.963	0.276	0.299	0.56	0.543
Palestine	Headcount (H)	6.7	3.4	1.2	0.5	18.7	11.4	4.8	1.9
	Overshot (O)	0.7	0.4	0.2	0.1	2.3	1.5	0.8	0.3
	Mean Positive Overshot (MPO)	9.9	12.5	17.1	17.2	12.1	13.3	16	15
	Concentration Index	0.075	0.207	0.507	0.755	0.002	-0.02	0.079	0.241

Table 4: OPP Effect on Poverty Estimates in Egypt Using $1.25 Poverty Line

Indicator	Conventional Method	Net of Health Payments
Poverty headcount	1.2	2.0
Poverty gap	2.5	3.6
Normalized poverty gap	0.2	0.2

Table 5: OPP Effect on Poverty Estimates Using $2 Poverty Line

	Indicator	Gross of Health Payments	Net of Health Payments
Egypt	Poverty headcount	13.7	17.5
	Poverty gap	61.5	80.6
	Normalized poverty gap	2.4	3.2
	Normalized mean positive poverty gap	17.6	18
Jordan	Poverty headcount	2.2	2.3
	Poverty gap	2	2.1
	Normalized poverty gap	0.4	0.4
	Normalized mean positive poverty gap	17.3	17.4
Palestine	Poverty headcount	0.7	0.8
	Poverty gap	1.1	1.4
	Normalized poverty gap	0.1	0.1
	Normalized mean positive poverty gap	8.5	9.1

Table 6: List of Countries and Surveys

Country	Country Code	Year	Survey
Bangladesh	BGD	2003	World Health Survey
Bosnia and Herzegovina	BIH	2003	World Health Survey
Brazil	BRA	2003	World Health Survey
Burkina Faso	BFA	2003	World Health Survey
Chad	TCD	2003	World Health Survey
China	CHN	2003	World Health Survey
Comoros	COM	2003	World Health Survey
Cote d'Ivoire	CIV	2003	World Health Survey
Dominican Republic	DOM	2003	World Health Survey
Ecuador	ECU	2003	World Health Survey
Egypt	EGY	2010	HIECS
Ethiopia	ETH	2003	World Health Survey
Georgia	GEO	2003	World Health Survey
Ghana	GHA	2003	World Health Survey
India	IND	2003	World Health Survey
Jordan	JOR	2010	HIES
Kazakhstan	KAZ	2003	World Health Survey
Kenya	KEN	2003	World Health Survey
Lao	LAO	2003	World Health Survey
Latvia	LVA	2003	World Health Survey
Liberia	LIB	2007	Liberia Welfare Questionnaire
Malawi	MWI	2003	World Health Survey
Malaysia	MYS	2003	World Health Survey
Mali	MLI	2003	World Health Survey
Mauritania	MRT	2003	World Health Survey
Mauritius	MUS	2003	World Health Survey
Mexico	MEX	2003	World Health Survey
Mongolia	MON	2007	Mongolia Socio-Economic Survey
Morocco	MAR	2003	World Health Survey
Namibia	NAM	2003	World Health Survey
Nepal	NPL	2003	World Health Survey
Pakistan	PAK	2003	World Health Survey
Paraguay	PRY	2003	World Health Survey
Philippines	PHL	2003	World Health Survey
Republic of Congo	CON	2003	World Health Survey
Russia	RUS	2003	World Health Survey
Sierra Leone	SLE	2003	World Health Survey
Swaziland	SWZ	2003	World Health Survey
Senegal	SEN	2003	World Health Survey
South Africa	ZAF	2003	World Health Survey
Sri Lanka	LKA	2003	World Health Survey
Tunisia	TUN	2003	World Health Survey
Turkey	TUR	2003	World Health Survey
Ukraine	UKR	2003	World Health Survey
Uruguay	URY	2003	World Health Survey
Vietnam	VNM	2003	World Health Survey
Zambia	ZMB	2003	World Health Survey

Table 7: Impoverishment Prevalence due to Health Care Cost

Country	At Poverty Line $1.25 (%)	At Poverty Line $2(%)
Bangladesh	10.6	5.5
Bosnia and Herzegovina	0.3	1.3
Brazil	2	4
Burkina Faso	3.5	2.3
Chad	2.7	1.8
China	3.7	5.4
Comoros	4.9	8.4
Cote d'Ivoire	5.5	3.9
Dominican Republic	3.6	4.7
Ecuador	1.6	2.4
Egypt	0.8	3.8
Ethiopia	1.3	0.7
Georgia	3.7	4.6
Ghana	3.7	4
India	7.1	4.5
Jordan	0	0.1
Kazakhstan	1.2	2.7
Kenya	2.9	1.8
Lao	4.7	3.2
Latvia	0.2	0.5
Liberia	1.2	0.8
Malawi	0.4	0.1
Malaysia	0.5	1.5
Mali	2.4	1.3
Mauritania	1.4	2.8
Mauritius	0.4	1.9
Mexico	1.6	2.6
Mongolia	0.2	1.1
Morocco	1	2.2
Namibia	0.8	0.5
Nepal	6.7	4.1
Pakistan	9.4	5.2
Paraguay	2.4	4.4
Philippines	4.5	4.1
Republic of Congo	6.3	5.6
Russia	1	2
Sierra Leone	7.8	7.3
Swaziland	1.7	1.3
Senegal	3.2	2.6
South Africa	0.7	0.6
Sri Lanka	4	2.9
Tunisia	2.9	5
Turkey	2.4	3.8
Ukraine	1.5	3.3
Uruguay	0.2	0.2
Vietnam	4.7	4.3
Zambia	0.2	0.4

Table 8: Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Dependent Variable					
IMPOVRATE at $1.25 ($1.25)	2.84	2.534	0	10.6	47
IMPOVRATE at $1.25 at ($2)	2.926	1.947	0.1	8.4	47
Regressors					
GDP per capita $	1514.374	1501.31	110.276	7031.971	47
OPP	44.928	16.83	3.929	72.108	47
DEMOC	0.489	0.505	0	1	47
LIFEXP	62.823	10.177	39	75.086	47
TOTHE	5.808	2.478	2.5	16.767	47
GOVHS	44.176	13.948	16.053	70.683	47
Legal Origin Dummies					
British	0.319	0.471	0	1	47
French	0.468	0.504	0	1	47
Socialist	0.213	0.414	0	1	47
Regions Dummies					
Africa	0.404	0.496	0	1	47
East Asia	0.128	0.337	0	1	47
Europe Central Asia	0.149	0.36	0	1	47
Latin America	0.128	0.337	0	1	47
Middle East	0.085	0.282	0	1	47
South Asia	0.106	0.312	0	1	47

Table 9: Cross-correlation Table

Variables	IMPOVRATE at $1.25	IMPOVRATE at $2	GOVHS	LOGGDP	HE	LIFEXP
IMPOVRATE at $1.25	1					
IMPOVRATE at $2	0.755	1				
GOVHS	-0.533	-0.416	1			
LOGGDP	-0.453	-0.246	0.339	1		
TOTHE	-0.166	-0.096	-0.174	0.076	1	
LIFEXP	-0.162	0.081	0.036	0.578	-0.152	1

Table 10: Estimation results : IMPOVRATE at $1.25

Variable	Coefficient	(Std. Err.)
Main Regressor		
GOVHS	-0.043**	(0.012)
Controls		
LOGGDP	-0.19	(0.21)
TOTHE	-0.097	(0.067)
LIFEXP	-0.02	(0.028)
DEMOC	-0.2	(0.31)
Legal Origin Dummies		
British	-0.57	(0.42)
Socialist	-1.711	(1.222)
Region Dummies		
East Asia	0.76	(0.71)
Europe & Central Asia	1.71	(0.8)
Latin America	0.26	(0.71)
Middle East	-0.41	(0.77)
South Asia	1.24**	(0.7)
Intercept	1.27**	-1.72
N		47
R^2		0.58
$F_{(12,33)}$		3.83

Notes: Significance levels: † 10%, * 5%, ** 1%.

Table 11: Estimation Results : IMPOVRATE $2

Variable	Coefficient	(Std. Err.)
Main Regressor		
GOVHS	-0.042*	(0.012)
Controls		
LOGDP	0.052	(0.235)
TOTHE	-0.096	(0.071)
LIFEXP	0.002	(0.031)
DEMOC	-0.27	(0.34)
Legal Origin Dummies		
British	-0.64	(0.46)
Socialist	-0.94	(0.68)
Region Dummies		
East Asia	0.52	(0.78)
Europe & Central Asia	1.03	(0.88)
Latin America	-0.093	(0.78)
Middle East	-0.66	(0.82)
South Asia	0.62	(0.77)
Intercept	-1.64	(1.85)
N	47	
R^2	0.42	
$F_{(12,34)}$	2.07	

Notes: Significance levels: † 10%, * 5%, ** 1%.