Uncovering the Recipe for Financial Protection in Asia

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Abstract

Background

In 2015, 930m households incurred Catastrophic Health Spending. The highest percentage of those lacking Financial Protection were in Asia and middle-income countries. There is much variation within income groups in the attainment of Financial Protection. SDG 3.8 aims to realise Universal Health Coverage, including Financial Protection.

Methods

Health Systems Financing and Economic Indicators from 11 countries in South East Asia and Pacific were analysed to study which elements were associated with Financial Protection. Catastrophic Spending at the 10% and 25% thresholds were used as measures of Financial Protection. Data were obtained from HEFPI and GHE databases. Fixed-effects regression was used to exploit within country variation.

Results

Out-of-pocket expenditures (OOPs) remain a major source of Health Financing in Asian and Pacific countries. OOPs decrease Financial Protection. Voluntary Health Insurance increases Financial Protection. Government Schemes decrease Financial Protection.

Conclusion

Poor policy design in China and India resulted in Government Schemes decreasing Financial Protection. Special considerations must be made to avoid unintended consequences, protect the poor and other vulnerable groups. When used appropriately, Government Schemes are a progressive form of prepayment. Voluntary Health Insurance can protection against Catastrophic Spending however enrolment is often too low to have a great effect. Vietnam offers many lessons in how to achieve improved Financial Protection. China and India demonstrate what should not be done.

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Introduction

Over a clement sunny weekend in late September 2015, representatives from 193 countries met in an assembly hall in Turtle Bay, Midtown Manhattan. Their noble goal was to produce a 'blueprint to achieve a better and more sustainable future for all' (United Nations, 2017). As a result the Sustainable Development Goals (SDGs) were conceived.

The 17 goals, intended to be achieved in the subsequent 15 years, promote aspects of human capital, equality, environmental stewardship, a sustainable economy, and peace (United Nations, 2015). The SDGs have been instrumental in guiding domestic policy as well as foreign aid.

This thesis will explore ideas related to SDG 3.8 - to 'achieve universal health coverage, including financial risk protection, access to quality essential healthcare services and access to safe, effective, quality and affordable essential medicines and vaccines for all' (United Nations, 2015). This thesis will focus on one dimension of universal health coverage: financial protection.

Research is essential in the field of health economics because the slow progress of universal health coverage (UHC) is tragic and causes much suffering. In the same year that the SDGs were adopted, 930 million people incurred catastrophic health spending as a result of seeking the health care they required (World Health Organization & World Bank Group, 2019). The highest percentage of the population experiencing catastrophic health spending occurred in Asia and middle-income countries (World Health Organization, 2019). Furthermore, much heterogeneity is observed in UHC achievement among countries within the same income groups (Wagstaff & Neelsen, 2020b). This demonstrates that there are better and worse ways to achieve UHC, and improvements are not limited to only richer countries.

I aim to explore health systems financing factors explaining the differences observed in UHC achievement (specifically financial protection) across 11 Pacific and Southeast Asian countries. Pacific and Asian countries face a constellation of problems such as a large informal sector, high out-of-pocket expenditures and inequity, minimal prepaid schemes, and relatively small financial means. These characteristics complicate the goal of UHC however some countries in this region have made excellent progress whilst others have regressed.

My primary research question is: 'What characteristics of health system financing are shared between the countries with the most financial protection in the Pacific and Southeast Asia?'. Secondary research questions include:

a. Which Pacific and Southeast Asian countries have made the most progress in terms of protecting their populations financially?

b. Do countries which decrease their share of out-of-pocket financing experience decreased levels of catastrophic and impoverishing health?

Theoretical Framework

Concepts

Sustainable Development Goals

The Sustainable Development Goals (SDGs) are a collection of 17 ambitious targets spanning economic, social and environmental domains.

Conceived in 2015, the SDGs provide a programme for change over the subsequent 15 years with overarching aims to reduce the evils of poverty, promote human rights and justice, and protect the planet. Progress towards reaching the 17 goals are measured through the use of 169 targets (United Nations, 2015).

The SDGs were created to correct the failures of the MDGs and align the goals of the UN member states with the challenges faced in a rapidly developing world.

Universal Health Coverage

'The right to the enjoyment of the highest attainable standard of physical and mental health' was enshrined first in the Constitution of the WHO in 1946 (World Health Organization, 1946). Two years later, the right to medical care was included in The Universal Declaration of Human Rights (United Nations, 1948).

These ideas developed into what would eventually become Universal Health Coverage (UHC) which is included as target 3.8 in the SDGs. Target 3.8 aims to 'Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all' (United Nations, 2015). Essentially, UHC means that people get access to the health services they need without suffering financial hardship as a result. 'Health services' covers a broad spectrum of health-related resources including "health promotion to prevention, treatment, rehabilitation, and palliative care" (World Health Organization, 2021).

UHC can be thought of as consisting of 3 dimensions. The dimensions are:

- 1. The proportion of the population covered
- 2. The proportion of services covered, referred to as 'service coverage'
- 3. The proportion of the costs covered, referred to as 'financial protection' (WHO, 2010)



Figure 1 The 3 Dimensions of Universal Health Coverage (WHO, 2010)

Financial Protection in Health

Financial protection in health is a form of economic protection against the direct costs incurred by healthcare (Wagstaff, 2010). These costs can be related to diagnosis, prophylactic and curative treatment, medications etc. A common criticism is that financial protection does not encompass the indirect costs of healthcare such as lost earnings, or transportation (Wagstaff, 2010).

Financial protection ensures that people can receive the health care they require without experiencing undue financial hardship as a result. Therefore households should not have to forgo spending on necessities such as food and shelter (Wagstaff, 2010).

Without financial protection, low-income households are faced with a dilemma when faced by a health shock. They must either suffer financial hardship or suffer the stigmata of their disease and risk being unable to work (McIntyre et al., 2006).

Out-of-pocket expenditures per capita in Purchasing Power Parity International-\$

Out-of-pocket medical expenses (OOPs) are paid at the point of care by patients. OOPs are often involuntary and unexpected. They can cover a wide variety of costs including for medication, consultation fees, cost of procedures, curative care, palliative care and rehabilitative care.

Purchasing Power Parity International-\$ (PPP int\$) are used to compare the prices paid at the point of use by consumers across countries.

Catastrophic health spending

Catastrophic health spending was a concept introduced by Berki and Wyszewianski in 1986. It is rooted in the ethical principle that much of the financial risk related to healthcare is random and unknown. Therefore people should not have to pay greater than a pre-specified percentage of their income on health care in order to avert suffering.

Catastrophic spending occurs when households spend more than a pre-specified (yet arbitrary) fraction of their pre-payment income on healthcare (Wagstaff & van Doorslaer, 2003).



Figure 2 Visualising Catastrophic Health Spending and Medical Impoverishment (Wagstaff, 2010)

2 thresholds are commonly used to determine if health spending is catastrophic. These thresholds are 10% and 25%.

Catastrophic health spending incidence is measured through the catastrophic headcount. This is the proportion of the population which spends more than a pre-specified portion of their budget (10% or 25%) on healthcare (Wagstaff & van Doorslaer, 2003). Incidence of catastrophic health spending is one of the official indicators to measure progress towards target 3.8 (UN - United Nations, n.d.).

Gross Domestic Product per Capita PPP \$int

Gross Domestic Product (GDP) per capita is the sum of all goods and services produced within a country divided equally among all its citizens (OECD, 2014). It measures a country's

economic output per person. It is a crude way to compare resources available to spend on health

Gini Index of Income Inequality

The Gini Index of Income Inequality (henceforth referred to as Gini) is a measure of how much income deviates from a perfect distribution. It is a measure of relative wealth, quantifying income inequality where 0 is perfect equality and 100 is absolute inequality (World Bank, 2021a). It is included in this study to quantify the dispersion between individuals of wealth and therefore inequality within each country.

Government schemes, as % of current health expenditure Current Health Expenditure

Government schemes (GS) provide non-contributory entitlement benefits either universally or to a specific group (e.g. disease-specific, or the poor) (WHO, 2011b). Participation is automatic and regulated by public law. Revenues are raised mostly through compulsory taxes, but indirect taxes, foreign aid and financial transfers within the government are also included (WHO, 2011b). Risk pooling can occur at the national, regional or programme level.

Reporting government schemes as % of current health expenditure (CHE) enables figures to be compared across different countries, with vastly different resources available for health.

Voluntary Health Insurance, as % of current health expenditure (CHE)

Another type of financing scheme is Voluntary Health Insurance (VHI). Unlike government schemes, they are not automatic and individuals must opt-in. Voluntary health insurance is a form of prepayment. Benefit entitlement is entirely contributory and depends on the policy which is purchased (WHO, 2011b). Fund raising is through (often risk-related) premiums which may be subsidised by the government (WHO, 2011b). Risk pooling only occurs within insurance scheme only.

Research

Catastrophic payments

MICs are likely to be at great risk of low rates of financial protection. This is due to 'the triad of poverty, health-service access and use, and the failure of social mechanisms to pool financial risks' (Xu et al., 2003). Incidence of catastrophic expenditure is lower in countries which channel health expenditure through government schemes (Wagstaff et al., 2020).

Ceteris paribus, countries with higher OOPs as a share of health expenditure have higher rates of catastrophic expenditure; a 1% increase in the proportion of health expenditure accounted for by OOPs resulted in a 2.1% increase in the incidence of catastrophic payments (Xu et al., 2003).

However caution must be applied; low rates of catastrophic expenditure may be the result of low service utilisation (Wagstaff & Neelsen, 2020a). Furthermore, an increase in prices could result in a reduction of service utilisation, misleadingly manifesting as an increase in financial protection(Wagstaff & van Doorslaer, 2003).

GDP per capita PPP

GDP per capita is positively correlated with incidence of catastrophic spending (Wagstaff, Flores, Hsu, et al., 2018).

OOPs as % of CHE

The vast majority of OOPs are borne by a small subset of the population. This is evidenced by the fact that within countries, the mean OOPs is much larger than the median, and there are great variations (van Doorslaer et al., 2006). Every unit spent on health care must result in one unit forgone elsewhere. Therefore, medical care spending negatively affects household welfare by superseding spending that positively influences household welfare (Wagstaff, 2010).

Prepayments are distinguished from OOPs in two distinct ways. Firstly, as the name implies, prepayments are not made at the point in time of when care is received. Instead prepayments are made pre-emptively. Secondly, prepayments are paid regardless of if care is received or not. This makes health spending predictable and it can be included in the household budget. Therefore, it is not surprising to learn that when countries decrease the share of health spending consisting of OOPs financial protection increases.

Prepayment schemes have the added benefit of increasing the use of health services (Fleck et al., 2012). This is likely to be due to a decline in foregone care because high OOPs can create barriers to access care. This results in an increase in health.

Government schemes as % CHE

Government schemes are largely funded by taxation (WHO, 2011b). Direct taxes have been found to be the most progressive form of health system financing (Yu et al., 2008). Health care financing which is prepaid, especially through taxes is identified as one of the most effective ways to reduce catastrophic payments (Wagstaff, Flores, Hsu, et al., 2018).

Voluntary Health Insurance

Voluntary health insurance has been shown to be the second most progressive form of health system financing after direct taxation (Yu et al., 2008). VHI is a form of prepayment, which is crucial in reducing the incidence of catastrophic payments (Wagstaff, Flores, Hsu, et al., 2018).

Gini

The Gini is positively correlated with catastrophic spending (Wagstaff, Flores, Hsu, et al., 2018).

Research Methods

Data

Data will be obtained from public databases provided by The World Bank and The World Health Organisation.

The Health Equity and Financial Protection Indicators (HEFPI) collects microdata through 1846 household surveys on financial protection and service coverage. The collection is then harmonised and compiled into aggregate macro dataset by country. The HEFPI dataset will be used for the independent variables in this study which were collected through Household Income and Expenditure Surveys and Living Standards Measuring Studies.

The Global Health Expenditure Database (GHED) contains data on health spending , availability of health resources and how they are used. It is updated annually in collaboration with member states using health accounts studies and government expenditure records through the use of the Joint Health Accounts Questionnaire and the Health Accounts Production Tool. The GHED will be used for the explanatory variables in this study.

Chosen countries

Countries included in the study were selected biased on the following criteria:

- 1. Categorised in World Bank region 'South Asia' or 'East Asia & Pacific'
- 2. Data available in 3 separate 5-year time periods for 'Catastrophic Health Spending'
- 3. Included in the GHED

Chosen indicators

Indicators were chosen to cover a selection of health financing methods and economic indicators. This enabled financing methods to be compared between countries of differing economic characteristics.

STATA

STATA version 16 will be used for all statistical analyses and production of figures in this study. Data was imported from the 2 databases and combined into a single data set. The mean value for each variable in each of the 4 time periods was used to create a balanced panel.

Regression analysis

Regression analysis will be employed to estimate the relationship between dependent and explanatory variables. Both dependent and explanatory variables will undergo logtransformations to permit the interpretation of coefficients as elasticities. Time dummies and country dummies will be used. Population weighting will be used to more accurately reflect relationships between the variables.

A fixed-effects model will be used on the panel data. A strength of this method is that it accounts for unobserved time-invariant heterogeneity. This is caused by unobserved factors correlated with both the dependent and explanatory variables (e.g. geography, and approximately time-invariant factors such as demographics). It does this by disregarding country-specific differences in the average of any explanatory variable, effectively using each country as its own control through a process called the 'fixed effects estimator' (Farkas, 2005).

By treating observations from different countries differently, this method exploits within country variation to explain the associations between the variables. By removing unobserved, country-specific, time-invariant heterogeneity, fixed-effects provides a more accurate estimation of causal effects than pooled OLS. Equation

$$\ln(y_{it}) = \beta_0 + \beta_1 \ln\left(\frac{OOPs}{CHE}\right) + \beta_2 \ln\left(\frac{GS}{CHE}\right) + \beta_3 \ln\left(\frac{VHI}{CHE}\right) + \beta_4 \ln(Gini) + \beta_5 \ln\left(\frac{GDP PPP}{Population}\right) + \alpha_i + \delta_t + \mu_{it}$$

Where:

- y = dependent variable, i.e. catastrophic spending at 10% or 25% threshold
- β = coefficient of independent variable, i.e. the elasticity once both dependent and independent variables have been log-transformed
- $\left(\frac{OOPs}{CHE}\right)$, $\left(\frac{GS}{CHE}\right)$, $\left(\frac{VHI}{CHE}\right)$ = methods of health financing
- $\left(\frac{GDP PPP}{Population}\right)$, (Gini) = economic characteristics
- α_i = country-specific, time-invariant heterogeneity
- δ_t = time trend
- μ_{it} = idiosyncratic error term
- *i* = specific country
- *t* = time period

Significance levels of p<0.1 will be used.

Compound Annual Growth Rate

Compound annual growth rate (CAGR) is a term borrowed from investing. It is a measure of the annualised average growth rate, assuming profits are reinvested at the end of the year. It is often used to measure the performance of stocks over many years and can smoothen out bumpy rates of returns.

It will be used in this study to represent the average growth or decline of certain variables over the entirety of study period.

Equation

$$CAGR = \left(\frac{EV}{BV}\right)^{\frac{1}{n}} - 1$$

(Fernando, 2021)

Where:

- *EV* = Ending value
- BV = Beginning Value
- *n* = Number of years

Results

Looking at the data

There was much variation seen in the mean incidence of catastrophic health spending at the 10% threshold across the 4 time periods (see Figure 2). Observations ranged from 0% in Timor-Leste time periods 2 and 3, to almost 20% in China in period 3. The population-weighted mean incidence of catastrophic health spending at the 10% threshold was 13.7% (SD 5.7), the median was 16.6% (IQR 11.7-17.7).

As would be expected, incidence was considerably lower at the 25% threshold of catastrophic health spending. The highest incident of mean catastrophic health spending at this threshold was 5.4% in China in period 3. Once again, Timor-Leste recorded 0 incidence of catastrophic spending, this time in time periods 1-3. The population-weighted mean incidence of catastrophic spending at the 25% threshold was 3.3% (SD 1.7), the median was 3.9% (IQR 2.5-4.8).

A Spearman rank-order correlation test was performed to assess the relationship between the two measures of catastrophic incidence. A total of 37 observations were used. This test yielded a coefficient of 0.90 and p< 0.001 indicating a very strong positive correlation. Thus, countries with low catastrophic payment incidence at the 10% threshold had low incidence at the 25% threshold, when compared to other countries.

Generally there are 3 groups of countries. Countries with a relatively high incidence of catastrophic health spending include China and India. Middling countries include Vietnam and Bangladesh. Finally, countries with a relatively low incidence include Philippines, Sri Lanka, Pakistan, Bhutan, Indonesia, Mongolia and Timor-Leste. Overall rates are quite steady but noticeably increasing in China, India, and Bangladesh. Incidence of catastrophic health spending are decreasing considerably in Vietnam.



Figure 3 Incidence of Catastrophic Health Spending at the 10% (top) and 25% (bottom) thresholds.

Which characteristics of health system financing are shared between the countries with the most financial protection?

A population-weighted fixed-effects regression was completed to investigate the relationship of catastrophic spending with a variety of health financing and economic indicators, and dummy time variables. Both the independent and dependent variables underwent log-transformation permitting the beta coefficients to be interpreted as elasticities.

The explanatory variable which had the greatest effect on catastrophic health spending at the 10% threshold was OOPs as a % of CHE. A 10% increase in the share of health financed through OOPs resulted in a 12.5% increase in the incidence of catastrophic health spending at this threshold. Counterintuitively, government schemes as a % of CHE also had a significant effect. A 10% increase in health expenditure financed this way resulted in an increase in catastrophic spending incidence of 9.1%. Other explanatory variables were not statistically significant regarding catastrophic spending at the 10% level. However, Gini index had an elasticity of 1.1, GDP per capita PPP had an elasticity of 0.3 and voluntary health insurance had an elasticity of -0.2.

The time trend was not statistically significant. Bangladesh was used as the reference country. Only China, India and Vietnam were statistically significant, and all were positively associated with catastrophic spending.

Performing the same regression on catastrophic health spending at the 25% threshold the story is slightly different. The explanatory variable which had the largest effect on this measure of financial protection was government schemes as a % of CHE. A 10% increase in government schemes resulted in a 26% increase in the incidence of catastrophic spending at this threshold. This is counter intuitive. GDP per capita also had a large effect; a 10% increase resulted in a 22.5% decrease in catastrophic spending. Again, this is surprising. A 10% increase in voluntary health insurance resulted in a 4.7% decrease in rate of

catastrophic health spending. Other explanatory variables were not statistically significant. Gini had an elasticity of -2.1 and OOPs as a % of CHE had an elasticity of 1.5.

The time trend was statistically significant, positive, and increasing in magnitude. This time, China, India, Vietnam, Indonesia, and Philippines were all positively and significantly associated with catastrophic spending. Note that incidence of catastrophic spending was 0 in the first 3 time periods and missing in the fourth for Timor-Leste.

| Variables | Catastrophic Spending 10% (In) | | | | atastrophic Spending 10% (In) Catastrophic Spending 25% (In) | | | |
|-------------------------|--------------------------------|-----------|-------|-------|--|-----------|-------|-------|
| | Coef. | Std. Err. | t | P> t | Coef. | Std. Err. | t | P> t |
| GDP per Capita PPP (In) | 0.309 | 0.414 | 0.75 | 0.468 | -2.248 | 0.899 | -2.50 | 0.025 |
| OOPs as % CHE (In) | 1.252 | 0.595 | 2.10 | 0.054 | 1.545 | 1.291 | 1.20 | 0.251 |
| Government Schemes | 0.913 | 0.421 | 2.17 | 0.048 | 2.590 | 0.912 | 2.84 | 0.013 |
| as % CHE (ln) | | | | | | | | |
| Voluntary Health | -0.153 | 0.119 | -1.28 | 0.222 | -0.468 | 0.259 | -1.81 | 0.092 |
| Insurance as % CHE (In) | | | | | | | | |
| Gini Index (ln) | 1.109 | 0.911 | 1.22 | 0.243 | -2.081 | 1.975 | -1.05 | 0.310 |
| | | | | | | | | |
| Time Period | | | | | | | | |
| 2 | -0.091 | 0.216 | -0.42 | 0.679 | 1.203 | 0.468 | 2.57 | 0.022 |
| 3 | 0.161 | 0.352 | 0.46 | 0.655 | 2.680 | 0.764 | 3.51 | 0.003 |
| 4 | 0.355 | 0.428 | 0.83 | 0.421 | 3.495 | 0.929 | 3.76 | 0.002 |
| | | | | | | | | |
| Country | | | | | | | | |
| Bhutan | -0.498 | 2.955 | -0.17 | 0.869 | 1.121 | 6.409 | 0.17 | 0.864 |
| China | 1.625 | 0.717 | 2.27 | 0.040 | 7.118 | 1.555 | 4.58 | 0.000 |
| Indonesia | -0.402 | 0.640 | -0.63 | 0.540 | 3.645 | 1.388 | 2.63 | 0.020 |
| India | 1.280 | 0.482 | 2.66 | 0.019 | 4.126 | 1.045 | 3.95 | 0.001 |
| Sri Lanka | -0.669 | 0.739 | -0.91 | 0.381 | 2.546 | 1.603 | 1.59 | 0.135 |
| Mongolia | -1.388 | 0.928 | -1.50 | 0.157 | -0.771 | 2.014 | -0.38 | 0.708 |
| Pakistan | -0.469 | 0.275 | -1.70 | 0.111 | -0.551 | 0.597 | -0.92 | 0.371 |
| Philippines | -0.060 | 0.754 | -0.08 | 0.938 | 4.327 | 1.635 | 2.65 | 0.019 |
| Timor-Leste | -3.936 | 2.408 | -1.63 | 0.124 | | | | |
| Vietnam | 1.195 | 0.446 | 2.68 | 0.018 | 3.560 | 0.967 | 3.68 | 0.002 |
| | | | | | | | | |
| Constant | -17.589 | 7.378 | -2.38 | 0.032 | 2.954 | 16.005 | 0.18 | 0.856 |

Table 1 Estimates of fixed-effects regression. Both dependent and explanatory variables have been log-transformed. Bangladesh is used as the reference country.

Which countries have made the most progress?

Figure 4 shows the compound annual growth rate of the incidence of catastrophic spending at the 10% and 25% threshold. CAGR measures whether variables grew or shrunk over the time period, and by how much. The first and last data between the year 2000-2016 (inclusive) were used to calculate this, however catastrophic spending data were reported irregularly. First data points ranged from 2000 (Bangladesh and India) to 2006 (Sri Lanka). Final data points ranged from 2011 (India, Timor-Leste) to 2016 (Bangladesh, Sri Lanka, Vietnam).

Overall, Timor-Leste has made the greatest improvement in the incidence of catastrophic spending with a CAGR of -0.36% at the 10% threshold (at the 25% threshold, incidence was 0 for both first and last years). Bhutan also experienced annual improvements averaging - 0.03% and -0.06% for the 10% and 25% thresholds respectively. Similarly, Vietnam increased protection against catastrophic spending annually averaging -0.02% and -0.02% and -0.03%.

Mongolia performed the worst out of all countries studied. The incidence in catastrophic spending increased by 0.06% and 0.20% at the 10% and 25% thresholds respectively. Other poor performers include Philippines (0.06%, 0.07%), Bangladesh (0.06%, 0.06%), India (0.02%, 0.05%), and China (0.02%, 0.02%)

The picture is more complicated in Pakistan and Sri Lanka where the indicators moved in opposing directions. In Pakistan the annual change in incidence of catastrophic spending decreased at the 10% threshold by 0.02% but increased by 0.14% at the 25% threshold. Similarly in Sri Lanka, annual change in the incidence at the 10% threshold improved, averaging -0.002% annually. At the 25% threshold catastrophic spending incidence increased by 0.02% annually.



Figure 4 Compound Annual Growth Rate of the incidence of Catastrophic Spending at the 10% (top) and 25% (bottom) thresholds. A growth rate below 0 indicates that incidence is decreasing, and thus financial protection is improving.

The connection between Pre-payments and Financial Protection – if OOPs decrease does catastrophic spending decrease?

To further investigate the relationship between prepayments and rates of financial protection the principle of CAGR was used. The CAGR for both OOPs (a proxy for prepayments) and catastrophic spending at the 10% threshold (a measure of financial protection, or lack thereof) was calculated for each country. CAGR measures whether variables grew or shrunk over the time period, and by how much.

The CAGRs were plotted on a scatter graph to show the relationship between the two variables. A line of best fit was included with the equation:

CAGR of catastrophic spending (10%) = 2.86(CAGR of OOPs) + 0.003

An R² value of 0.82 indicates a high large degree of correlation between the change in OOPs and change in catastrophic spending rates. However, this correlation is driven almost entirely by Timor-Leste (n.b. the regressions were population-weighted).

When Timor-Leste is omitted the results are very different. The line of best fit was:

CAGR of catastrophic spending (10%) = 0.611(CAGR of OOPs) + 0.01

An R² value of 0.08 demonstrates a negligible correlation between changing the OOPs the effect of Timor-Leste.



Figure 5 Compound Annual Growth Rate of OOPs and Catastrophic Spending at 10% threshold.

Discussion

Overall, the findings in this study have been a mixture of intuitive (and backed by other research) and counter-intuitive (and conflicting with other research). Financial protection is still a major issue in China India and Bangladesh, affecting more than 10% of the population. Perhaps what is more alarming is that it is a growing problem in these countries too.

Characteristics of health system financing shared between countries with high financial protection

Government schemes

Perhaps the most striking finding in this study was the positive association between Government schemes as % of CHE and the incidence of catastrophic spending. This was significant at both the 10% and 25% thresholds. This conflicted with current research (Wagstaff, Flores, Hsu, et al., 2018; Wagstaff, Flores, Smitz, et al., 2018; Jowett & Kutzin, 2012) and intuition.

A key challenge in achieving UHC is the adequate financial protection of the poor and vulnerable. This role can often only be fulfilled by the government due to market failure. Often the government protects large swathes of the population. Funding health care this way creates larger risk pools, prevents adverse selection and allows for greater purchasing power (Kwon, 2011).

As countries move towards UHC, there should be a focus on public funding for the provision of health services For these reasons the explanation behind the positive correlation found in this study is not immediately clear and requires more investigation. Due to the population weighting of the regression, the results will be driven in a large part by China and India. Both of these countries greatly increased catastrophic spending at both levels. Over the course of the study period China increased incidence of catastrophic health spending by 19% and 29% at the 10% and 25% thresholds respectively. India increased incidence by 25% and 77% respectively. Over this same period China increased government schemes as % of CHE by 36% and India by 20%. Therefore it is easy to understand why this is reflected in the results.

In 2009 China introduced a new health insurance system which aimed to cover all the Chinese population (Fang et al., 2019). However it has been unable to stymy the increasing rates of catastrophic health expenditures (see Figure 3). This is in a large part because it has been plagued by inefficient use of resources and increasing cost of medical care. In the 3 years following 2010 per person inpatient medical expenditures increased 22% (Fang et al., 2019). A fee-for-service payment model may cause providers to over provide and universal health coverage may cause users to over-consume (Fang et al., 2019). These poor design choices are likely at the root of decreasing financial protection in China, despite increased government schemes.

India too has been the victim of poor policy choices. In 2018 it launched a publicly funded health insurance scheme covering 500m of the Indian population (Garg et al., 2020). The main goal way to protect individuals from the high OOPs of private hospitals which are 5 times greater than those of public ones (Ranjan et al., 2018). However this policy was mainly utilised by wealthier households and failed to protect poorer ones due to design failures resulting in lack of awareness and the unintentional exclusion of vulnerable groups (Garg et al., 2020). Despite this 32% of the poorest quintile in rural areas and 48% in urban areas chose a private provider, greatly exposing themselves to financial risk, highlighting the underperformance of the public system (Garg et al., 2020).

OOPs

The finding that OOPs were positively associated with catastrophic spending were in concurrence with the scientific community and uncontentious.

OOPs were the major source of health financing which has been found in other studies of Asian countries (Kwon, 2011), representing more than 50% of total health expenditure in Bangladesh, India, Pakistan and Philippines in this study in 2015-2019 (see appendix). Asia relies on OOPs more than any other region worldwide (see figure 2, SEARO = 'South-East Asia Region'). This is problematic because high levels of health spending are made possible through resource diversion, which has short-term consequences, accumulation of debt or use of savings, which has long-term consequences (van Doorslaer et al., 2007).



Figure 6 Median OOPs relative to THE by WHO world region. Source: M. Jowett et al., 2016

The fact that OOPs tend to finance a smaller proportion of total health spending in richer countries was also found in this study (see appendix). This indicates that it is not only the absolute value of OOPs that is important to the rate of catastrophic health spending but also the relative change.

Policies protecting the poor are important in Asia because OOPs are a major health financing stream and OOPs often disproportionately affect the poor. OOPs as a proportion

of total health expenditure by quintiles were not available in the dataset used. OOPs are regressive – the rich spend a smaller proportion of their resources obtaining the same care (WHO, 2008). Furthermore, OOPs offer no financial risk protection beyond the household (WHO, 2008). Consumers pay at the point of care delivery. This can be especially problematic if periods of ill health necessitate the cessation of work, threatening individuals with infirmity on top of financial hardship.

Policies protecting the poor from health-related outlays are present in Bangladesh, Indonesia, Philippines and Vietnam (van Doorslaer et al., 2007). However these public sector user fees and co-payment waivers are not always implemented due to shortages of medicines which must be purchased privately, especially in Bangladesh and Philippines (van Doorslaer et al., 2007).

GDP per capita

GDP per capita was positively corelated but not statistically significant at the 10% threshold of catastrophic spending

Much like Wagstaff et al.'s series of comprehensive 2018 papers, covering catastrophic spending, medical impoverishment and UHC, a positive correlation was found between GDP per capita and catastrophic spending at the 10% threshold. Presumably this is due to increased access to, and ability to pay for, care resulting in less forgone medical. In other words, catastrophic spending cannot occur if there is no functioning health care system on which to spend or if households are too poor to divert resources from subsistence.

Furthermore, Wagstaff et al showed that, although trending between groups, there was much variation in financial protection among countries in the same income groups (a categorisation that can be used to compare standards of living between different countries – much like GDP per capita) (Wagstaff, Flores, Hsu, et al., 2018). This finding was reflected in this study. Rates of catastrophic spending are lower in all LMIC countries included in this study than China, a UMIC. Most LMICs performed worse than Indonesia (the only other UMIC included), notable exceptions are Timor-Leste and Mongolia. However, this cannot be taken at face value. Access to care must also be considered –financial protection may not be necessary if there are no health care services on which to spend or poverty is so severe that funds cannot be diverted from other necessary expenses.

The fact that rates of catastrophic spending can vary so much as to cross between countries of appreciably different standards of living may indicate that economic growth will not 'fix' financial protection – other steps must be taken. Also, it should inspire countries (especially those with relatively lesser living standards) to spend money more efficiently and deliver evidence-based services to outperform countries with similar national wealth.

At the 25% threshold it was negatively corelated meaning that as GDP per capita increased, so did financial protection. Furthermore it was statistically significant. This is the opposite of what has been found in other studies. It could be that within Asian countries, only a certain amount of financial hardship is tolerated i.e. spending 10% of household income is accepted but 25% is not. However, this requires further investigation.

Implications for policy

Generally the aim of health policy should be to favour the poor over the rich to reduce inequality. Therefore progressivity of financing is often desirable, where the better off pay a larger portion relative to their wealth than the poor. Therefore financial protection must identify the poor, waive user fees and provide health care subsidies(Tangcharoensathien et al., 2011). A better solution would be to greatly reduce OOPs for all members of the population and move to a prepayment model instead either through taxes or mandatory contributions. Health policy should also protect people (especially the poor) from financial hardship, all the while ensuring access to health care. Contrary to the findings in this study, this likely cannot be done without government and mandatory schemes which pool funds and risk, as well as increasing bargaining power. This greatly reduces OOPs which disproportionately affect the poor. Though lessons should be learnt from the mistakes of China and India to avoid unintended consequences.

The existence of a large informal sector in many Asian countries is a major hurdle on the road to UHC because collection from this group (through taxes or mandatory contributions) is difficult to enforce (Tangcharoensathien et al., 2011). Typically, there are two methods of extending financial protection. A top-down approach was used in Philippines and Vietnam (Tangcharoensathien et al., 2011). This involves covering the formal sector employees first through social health insurance and gradually expanding coverage to low-income and informal workers (Kwon, 2011). The second approach is bottom-up. This may be more suitable for those Asian countries experiencing slower economic development (Kwon, 2011). This approach would reduce health inequalities by using general tax financing to protect the poor. These two approaches leave the middle forgotten for whom voluntary health insurance may currently be the best option. The middle refers to the 'not-so-poor informal sector' and covering this group will likely be the next challenge once the poorest member of a population are covered by UHC. After the poor have been covered by financial protection, a partial subsidy can be rolled out for the informal sector.

Voluntary Health Insurance

Voluntary health insurance was negatively corelated with catastrophic spending at both thresholds. It was significant at the p<0.1 level at the 25% threshold.

Although it is a form of financial protection, voluntary health insurance has low enrolment rates in Asia and the Pacific (see appendix). Therefore, it does not have as great an effect as government schemes.

Which countries have made the most progress? (CAGR)

CAGR was used to evaluate the progress of financial protection in every country. There was a wide spread of performance, with some countries always progressing financial protection no matter which measure was used. These countries include Timor-Leste, Bhutan, and Vietnam. Some countries continuously performed bad, notably Philippines, Bangladesh, China, and India. Some of the drivers of the changes seen in the aforementioned countries will be discussed below.

Timor-Leste

Timor-Leste is a special case because the absolute values of catastrophic and impoverishing health spending are so low. Health financing is incredibly progressive: the wealthiest 20% cover 74% of total health care payments and account for 39% of consumption (World Bank, 2014). Public health care is free with only 3% of visits incurring OOPs, which are low when compared to other Asian and Pacific countries (World Bank, 2014). Furthermore, 72% of health spending is by the government, demonstrating a highly centralised system (World Bank, 2014). Also the national Petroleum Fund accounts for 81% of government revenue(Asian Development Bank, 2019). This unique combination of factors and population of 1.3m results in a high degree of financial protection. Although it makes an interesting case study, the applicability to other countries is very limited.

Vietnam

Another top performer was Vietnam. Vietnam has been actively working towards UHC for almost 30 years which is far longer than most Asian countries. What is unique about Vietnam is that in the first 2 periods included in the study, it had among the lowest rates of financial protection of the countries included in this. In subsequent periods it made incredible progress (see figure 3). With such a long and successful quest in the pursuit of UHC and a population of almost 100m, the history of Vietnam undoubtedly has lessons for other countries. Following reforms which opened the pharmaceutical market and permitted private practice, OOPs reached 80% by 1998 (WHO, 2011a). In an effort to contain the costs of OOPs a SHI pilot was introduced in 1992 and extended to the whole population in 1993. It took the form of a mandatory scheme covering the formal sector and civil servants (WHO, 2011a). Vietnam gradually expanded coverage to include specific groups such as the poor, elderly, and easy to each (Mao et al., 2020). In 2009 the Social Health Insurance Law mandated the enrolment of the poor in compulsory health insurance, subsidised by the government with the explicit aim of universal coverage of social health insurance (WHO, 2011a). SHI in Vietnam is a single fund which maximises pooling. Subsidies and regulation encourage enrolment.

Vietnam also benefitted from a stable and growing economy; GDP per capita increased 2.7 times between 2002 and 2018 (World Bank, 2021b). Vietnam has a history of investing in its health sector. From 2002 to 2008, government health expenditure as a proportion of total government expenditure more than doubled from 5% to 10.2% (Ministry of Health & World Health Organization, 2010). This increase in financing largely funded health insurance premiums for the poor, children and other vulnerable groups and upgrading public health stations and hospitals (WHO, 2011a). Vietnam prioritised equity and ensured an inclusive and broad benefit package. In 2014 69% of SHI member were fully or partially subsidised by the government (Mao et al., 2020). The government subsidies 100% of health insurance premiums for the very poor and young children, at least 50% for the 'near poor' and at least 30% for children, students and informal workers; this approach of prioritising the vulnerable and poor is recommended for countries with limited financial means (WHO, 2011a).

A growing economy, political commitment, effective prioritisation, and savvy policy making has enabled Vietnam to greatly improve financial protection, especially among the poor and vulnerable.

Philippines

Philippines repeated appeared among the countries with the greatest decrease in financial protection no matter which indicator was used.

The increase in OOPs was mainly driven by the increase in the cost of medicine which increased from 45% of total health expenditure in 2009 to 62% in 2012 (Bredenkamp & Buisman, 2016). The share of health spending on medicines was even higher among the poorest quintile at 76% (Bredenkamp & Buisman, 2016). Although the increase in catastrophic spending is concentrated among the richer households, it is driven by increasing OOPs, indicating a degree of financial protection amongst the poor.

Philippines has made progress in financial protection lately by subsidising health insurance for the poor and waiving co-payments.

From the progress (or failures) mentioned in the countries above it is clear that a number of strategies are effective and increasing financial protection. Firstly, targeting specific groups, such as the poor, through subsidised health insurance is an effective way to extend financial protection from the formal sector. Secondly, containing OOPs through regulation, efficient use of medicines (such as use of quality, appropriate and generic medicines) and subsidies can greatly improve financial risk protection. Thirdly, a progressive method of health system financing can result in better financial protection.

The connection between changes in prepayments and changes in financial protection.

Another trend observed in this study and others is that lower OOPs are associated with lower rates of catastrophic health spending (Tangcharoensathien et al., 2011; Xu et al., 2003). This study attempted to go further and analysed what outcome country-specific changes in OOPs had on rates of catastrophic health spending. Changes in OOPs were barely positively correlated with changes in catastrophic health spending. This shows that OOPs are only one piece of the puzzle and reducing OOPs is not enough to improve financial protection

Conclusion

Poor policy making is a shared characteristic of countries with poor financial protection. This results in government schemes which hinder financial protection instead of improving it.

A strong political will, prioritisation of vulnerable groups, evidence-based decision making, effective pooling and revenue raising, and efficient use of resources can improve financial protection in Asian countries.

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Appendix



Figure 8 OOPs as % of CHE









Figure 11 GDP per capita



Figure 12 Gini index