

Determinants of household out-of-pocket expenditure on noncommunicable diseases: Evidence from the 2018 National Health Expenditure Survey

Philippine Institute for Development Studies
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Outline



Background and motivation



Empirical strategy



Data: 2018 NHES dataset



Estimation results

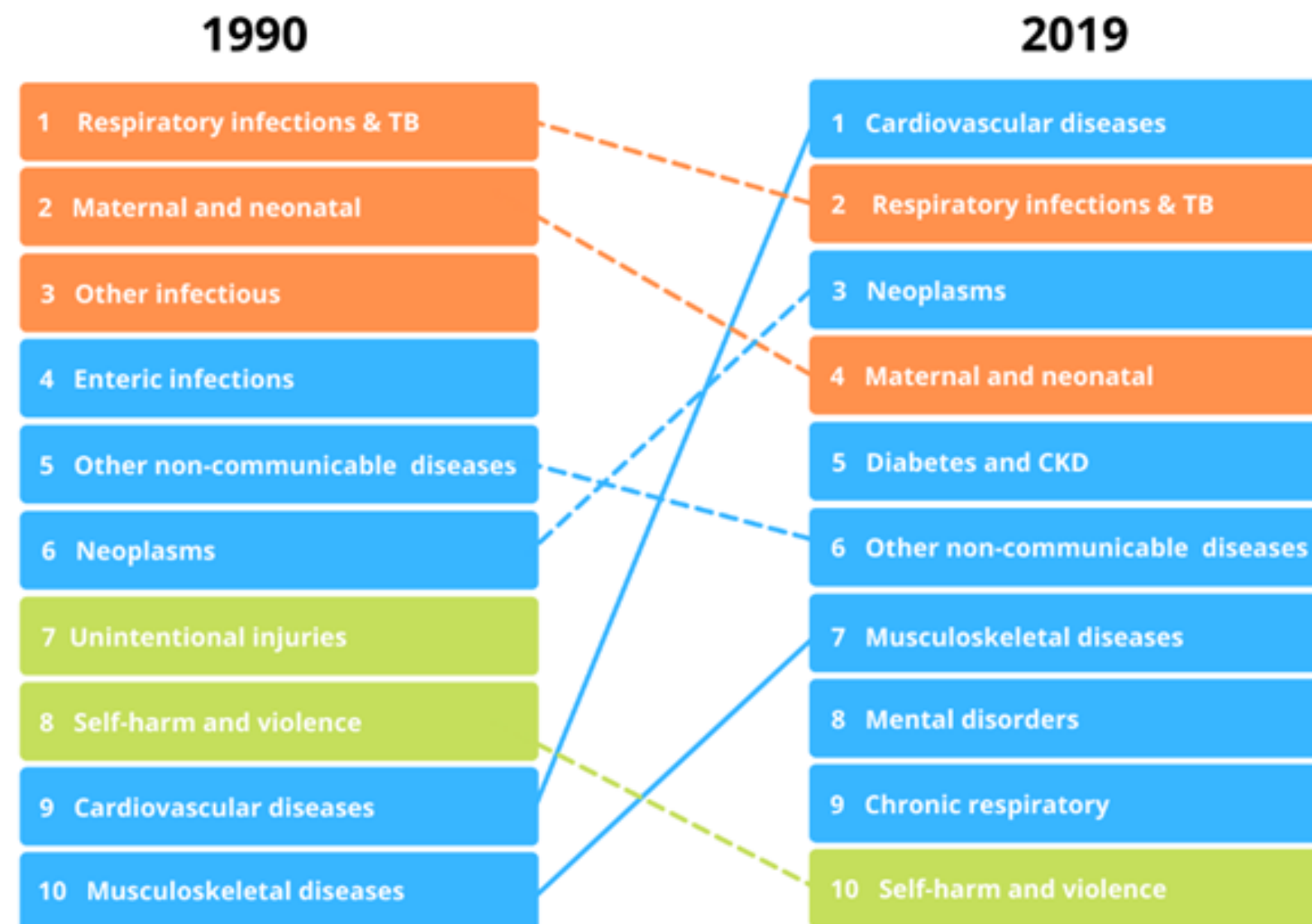


Conclusion

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Background and Motivation (1)

Top 10 causes of disability and death 1990 and 2019 (DALYs per 100,000)



- NCDs kill over 41 million people per year, constituting to approx. 71% of all deaths worldwide.
- In the Philippines, NCDs have also overtaken communicable diseases as the top cause of mortality.

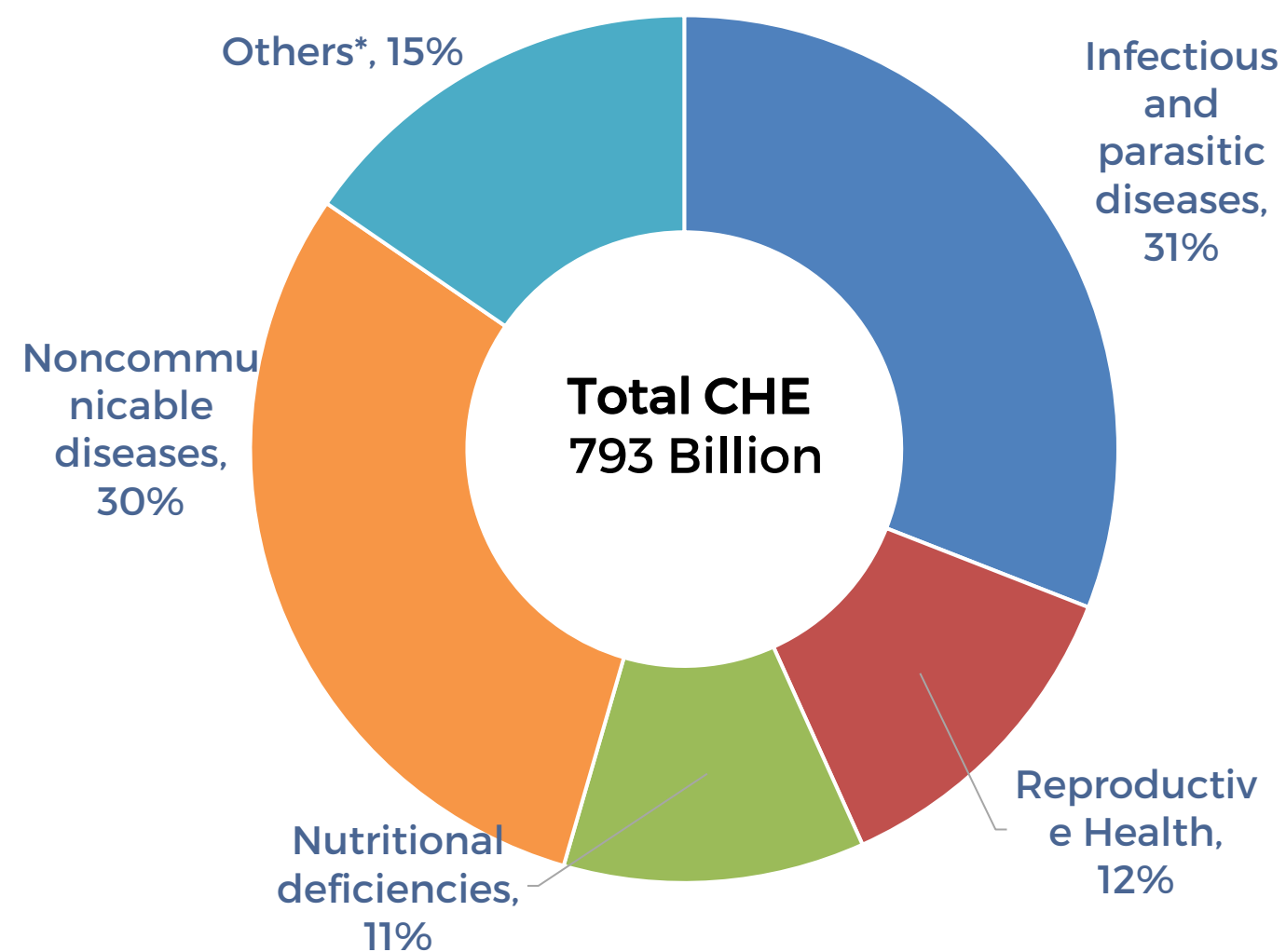
Source: Institute for Health Metrics and Evaluation, Global burden of disease

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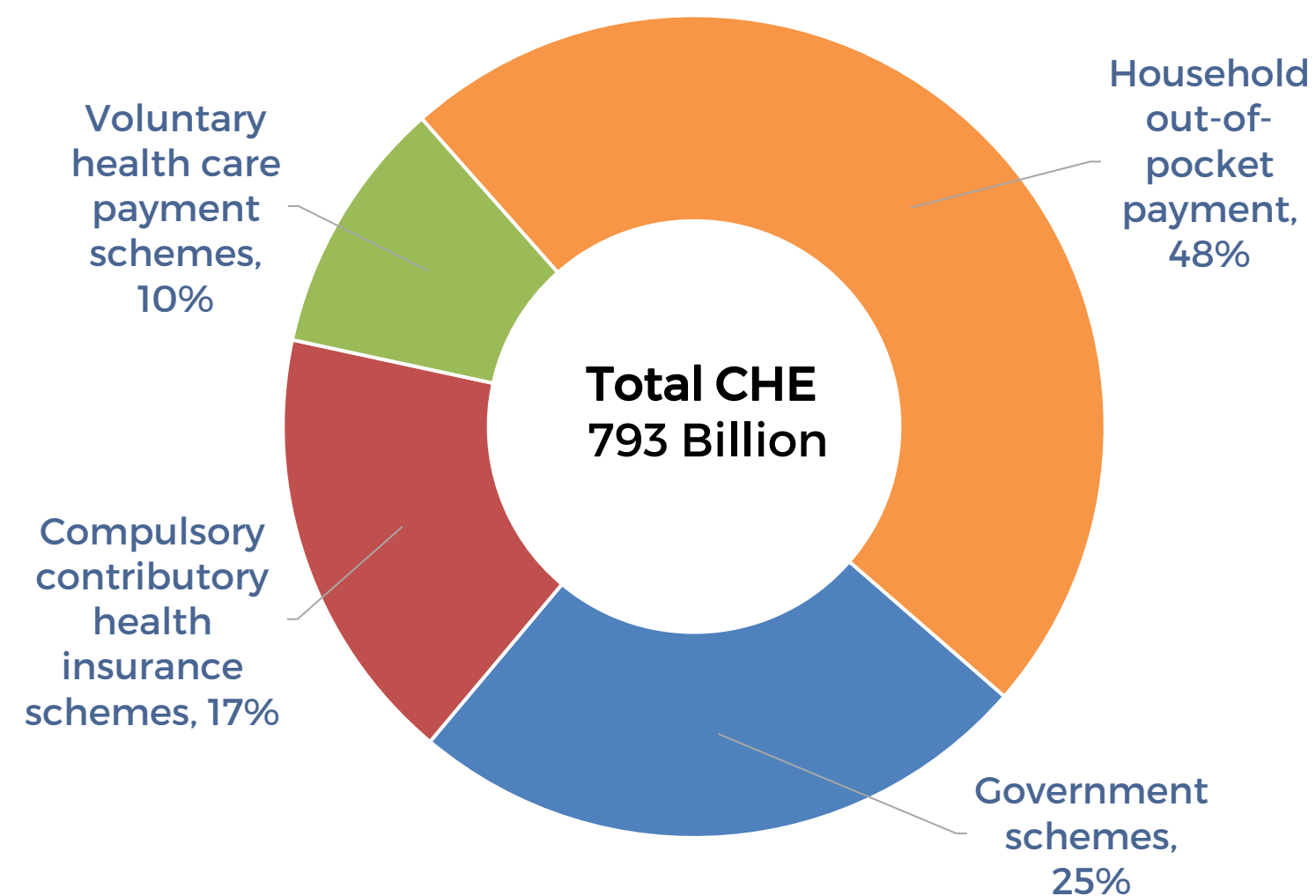
Philippine setting (1)

Current health expenditure (% share), 2019

a. By disease group



b. By financing scheme

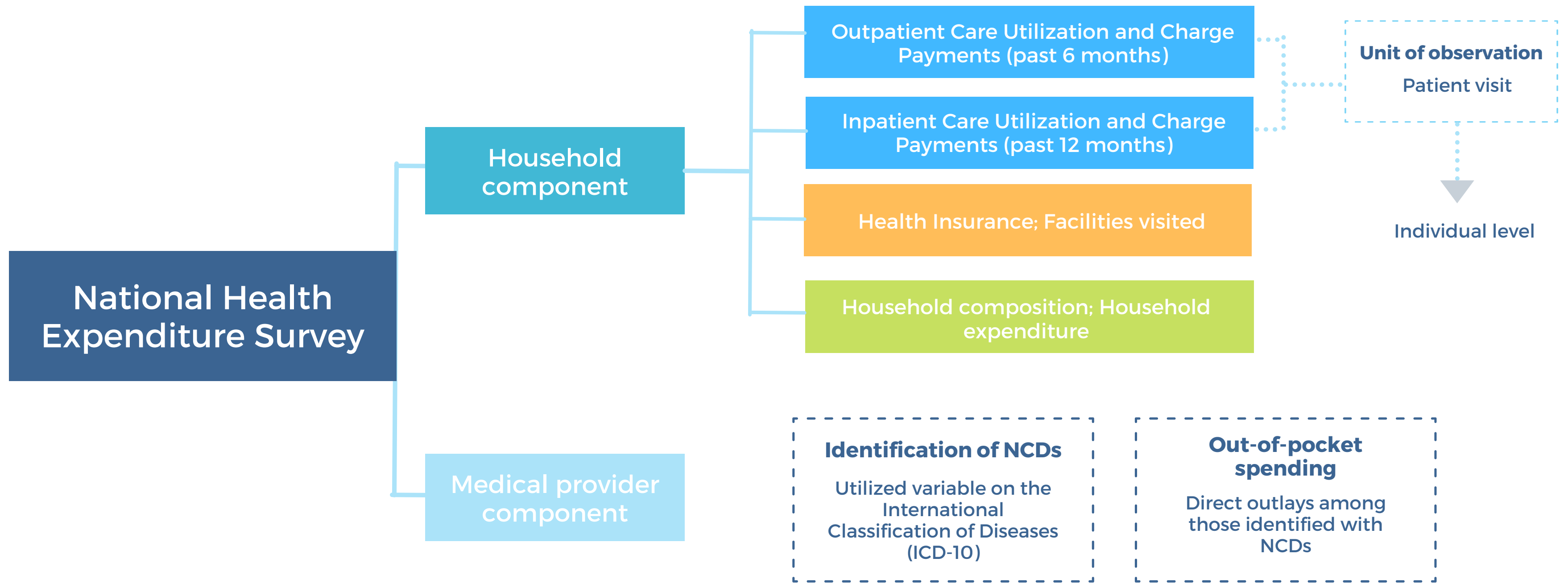


Aim of the study

Research objectives

- Examine the incidence of NCDs among households, and their main sources of health care financing.
- Measure the incidence of catastrophic health expenditures (CHE) in NCDs.
- Model health expenditure on NCDs as a function of socioeconomic, demographic, and clinical factors deemed relevant based on existing research.

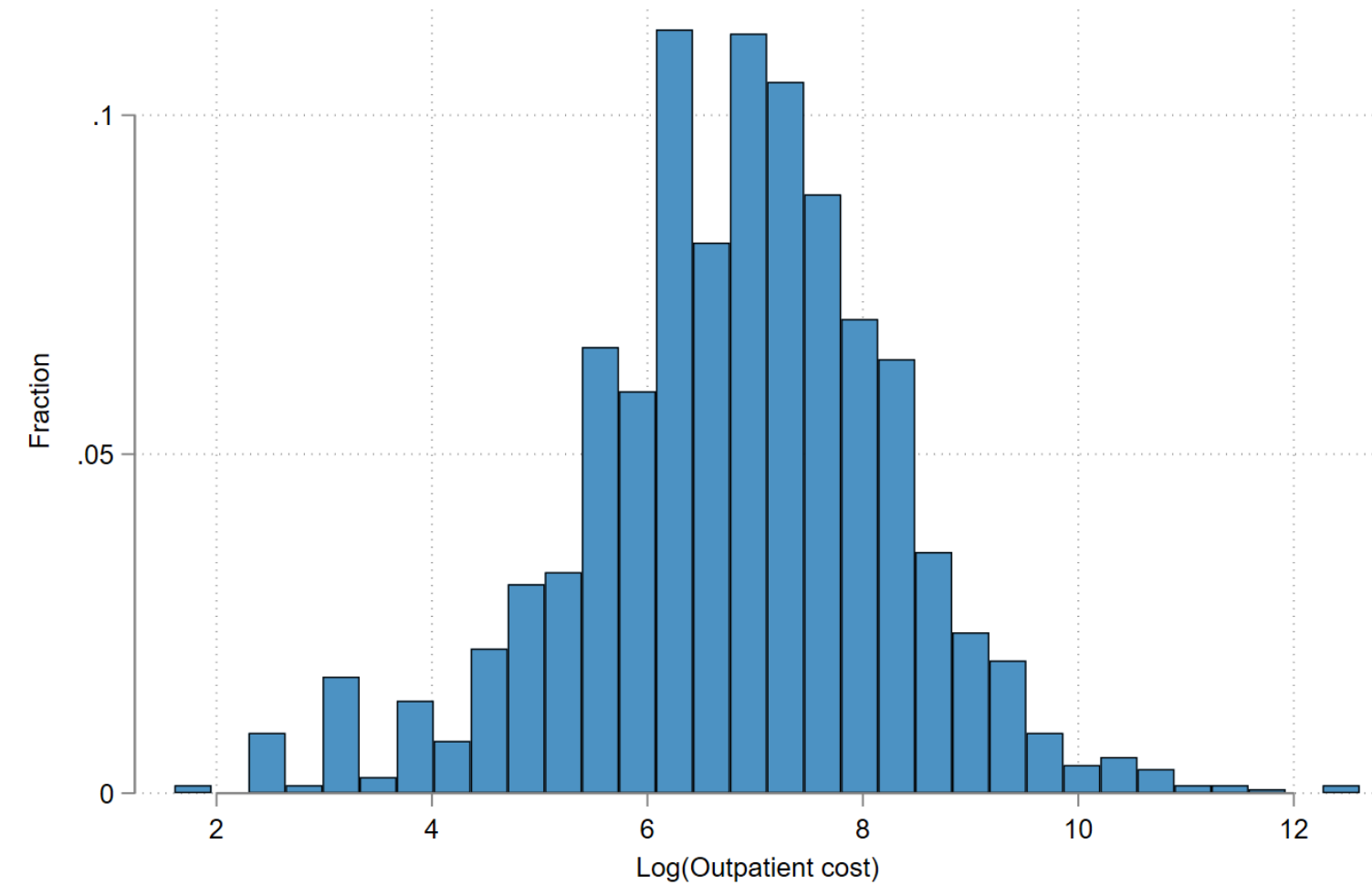
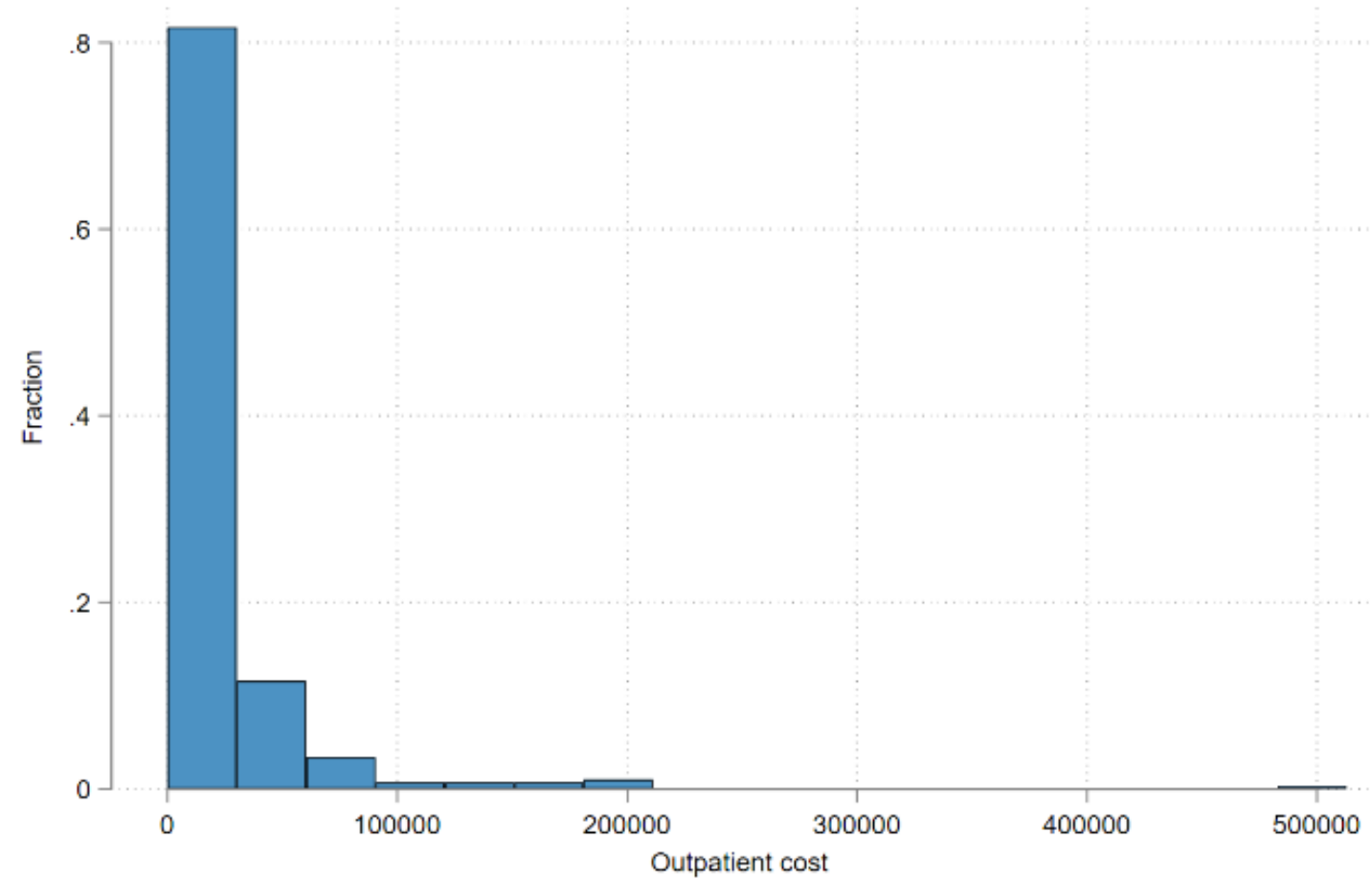
Data: NHES 2018



Estimation strategy (1)

- Distribution for outpatient and inpatient services is highly skewed with a large mass at zero

Distribution of outpatient costs for NCDs



Estimation strategy (2)

- **Two-part model:** zero values are handled by first modelling for the probability of any costs, and second through a conditional regression model for positive costs

Equation 1:
$$Pr(Y > 0|X) = \frac{\exp(X\alpha)}{1 + \exp(X\alpha)}$$

Equation 2:
$$E(Y|Y > 0, X) = \exp(X\beta)$$

- Generalized linear model (GLM)
- Log link functional form
- Gamma distribution (confirmed using modified Park test)

Equation 3:
$$E(Y|X) = Pr(Y > 0|X) * E(Y|Y > 0, X)$$

Summary statistics (1)

| Independent variables | Outpatient utilization/cost (%) | Inpatient utilization/cost (%) |
|--|---------------------------------|--------------------------------|
| Observations | 2,843 | 618 |
| Household size (mean) | 6.05 | 6.02 |
| Age (mean) | 44.69 | 43.69 |
| Expenditure quintile | | |
| 1 | 10.20 | 12.63 |
| 2 | 13.96 | 16.16 |
| 3 | 18.55 | 19.64 |
| 4 | 22.04 | 18.14 |
| 5 | 35.25 | 33.44 |
| Insurance type | | |
| No insurance | 38.87 | 25.43 |
| PhilHealth only | 53.63 | 68.65 |
| Private/HMO/GSIS/SSS* | 2.12 | 1.91 |
| PhilHealth + Others | 5.38 | 4.01 |
| Comorbidity | | |
| No comorbidity | 18.72 | 90.05 |
| 1 comorbidity | 15.01 | 7.68 |
| 2 or more comorbidities | 3.71 | 2.27 |
| Health facility type | | |
| Barangay health station (BHS) | 13.00 | |
| Rural health unit (RHU)/Health center | 15.79 | 0.27 |
| Private clinic | 24.55 | 1.39 |
| Public hospital | 25.66 | 60.16 |
| Private hospital | 19.98 | 38.19 |
| Others | 1.01 | 0.00 |
| Travel time to health facility (hours) | 0.36 | 0.58 |

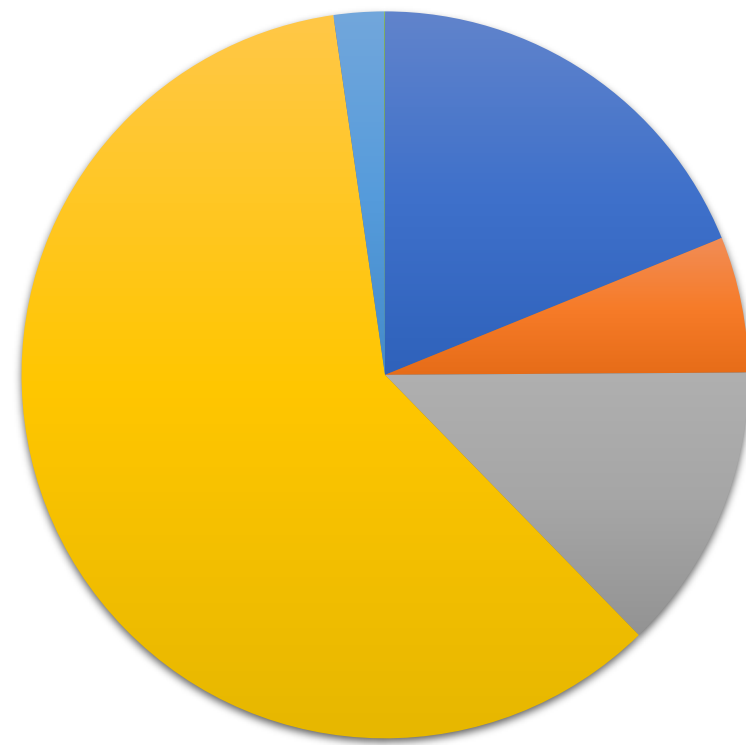
Note: Educational attainment, gender and dummies for regions are also included in the set of covariates

- ▶ More than half of the individuals are covered by PhilHealth at least, while a very small fraction is covered by other types of health insurance (e.g., private, HMO, SSS, GSIS)
- ▶ Public hospitals tend to be utilized the most for both inpatient (25.66%) and outpatient services (60.16%), followed by private hospitals

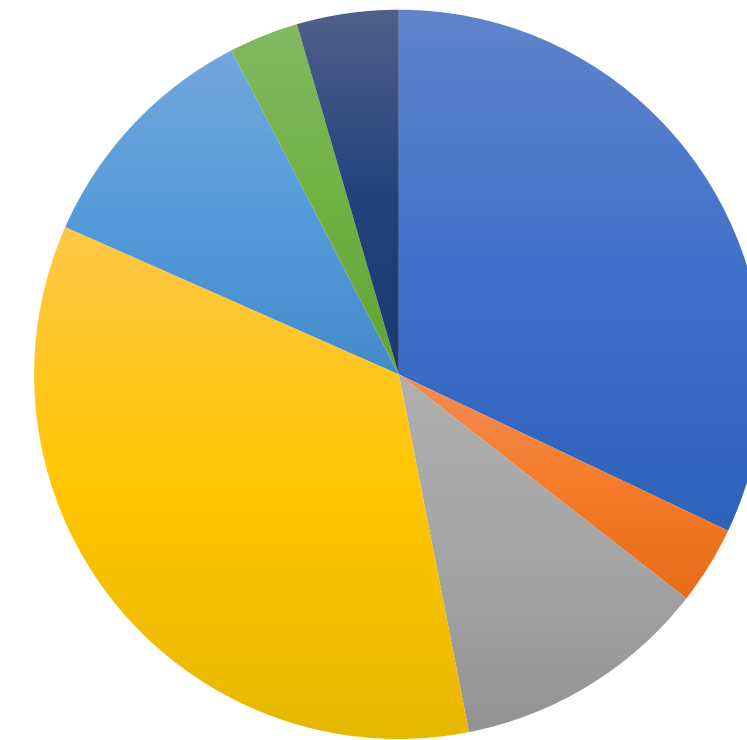
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Summary statistics (2)

Outpatient and inpatient care by service type (% of total expenditure), 2018



- Professional care
- Surgical procedure
- Diagnostic/laboratory exam
- Medicines
- Medical equipment/supplies
- Other medical services



- Professional care
- Surgical procedure
- Diagnostic/laboratory exam
- Medicines
- Medical equipment/supplies
- Room
- Other medical services

Results: First part of the model

Regression results: probability of healthcare resources utilisation

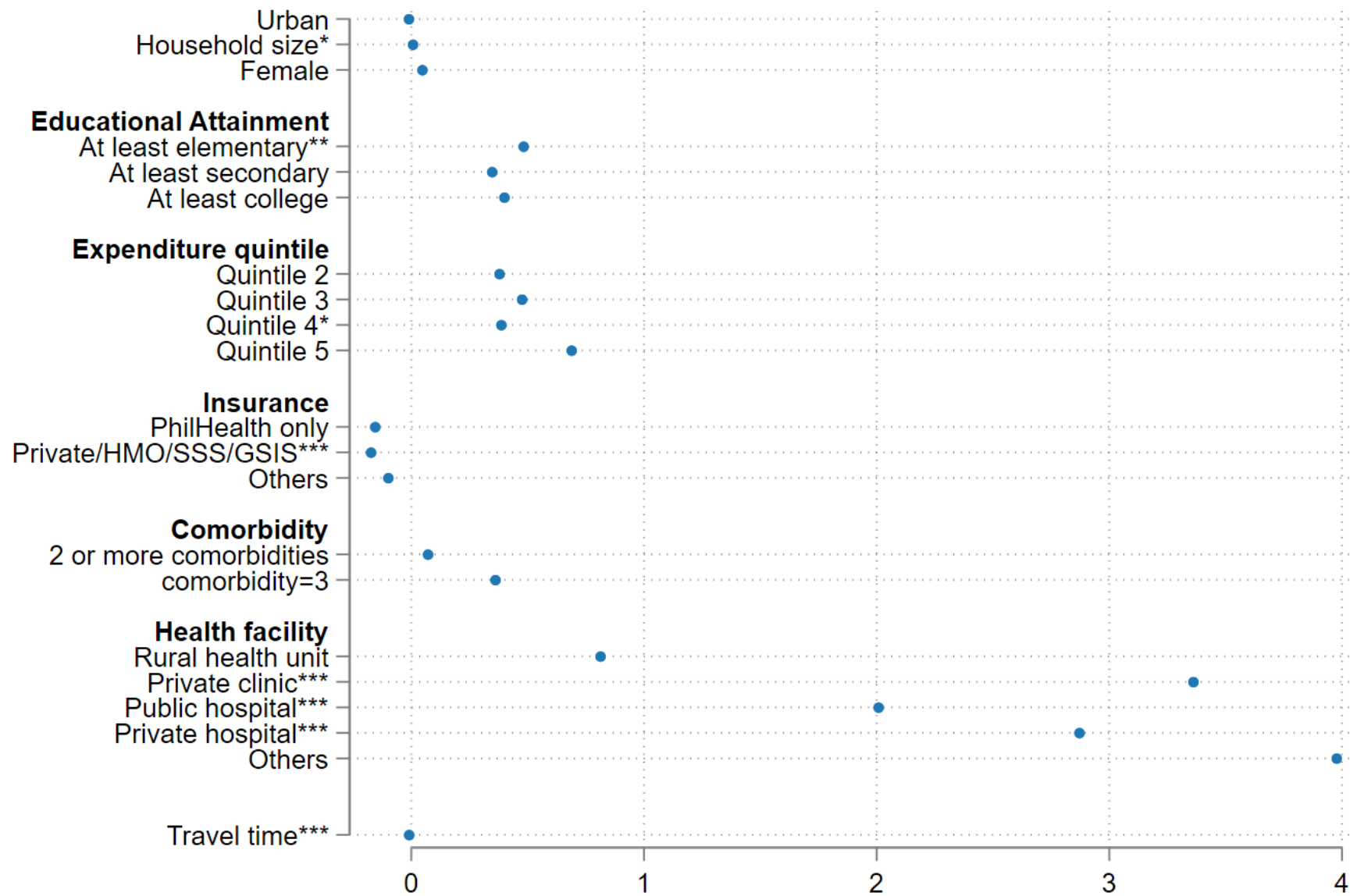
| Covariates | Outpatient | Inpatient |
|------------------------|------------|-----------|
| | Coef. | Coef. |
| Location | | |
| Rural | Reference | |
| Urban | -0.011 | -0.012 |
| Household size | 0.007 | 0.02 |
| Sex | | |
| Male | Reference | |
| Female | 0.047 | 0.183 |
| Age | -0.000 | -0.011** |
| Educational attainment | | |
| No grade completed | Reference | |
| At least elementary | 0.482 | -0.563 |
| At least high school | 0.347 | -0.29 |
| At least college | 0.399 | -0.483 |
| Expenditure quintile | | |
| 1 | Reference | |
| 2 | 0.378* | 0.886** |
| 3 | 0.475** | 0.034 |
| 4 | 0.386* | 0.421 |
| 5 | 0.688*** | 0.595 |

| Covariates | Outpatient | Inpatient |
|--|------------|-----------|
| | Coef. | Coef. |
| Insurance type | | |
| No insurance | Reference | |
| PhilHealth only | -0.156 | -0.458 |
| Private/HMO/GSIS/SSS* | -0.174 | 1.916** |
| PhilHealth + Others | -0.099 | -0.825 |
| Comorbidity | | |
| No comorbidity | Reference | |
| 1 comorbidity | 0.071 | 0.234 |
| 2 or more comorbidities | 0.361 | 1.644** |
| Health facility type | | |
| Barangay health station (BHS) | Reference | N/A |
| RHU/Health center | 0.813*** | Reference |
| Private clinic | 3.361*** | 0.506 |
| Public hospital | 2.007*** | 0.133 |
| Private hospital | 2.871*** | 1.091 |
| Others | 3.976*** | |
| Travel time to health facility (hours) | -0.01 | 0.06 |
| Constant | -2.063** | 1.724 |

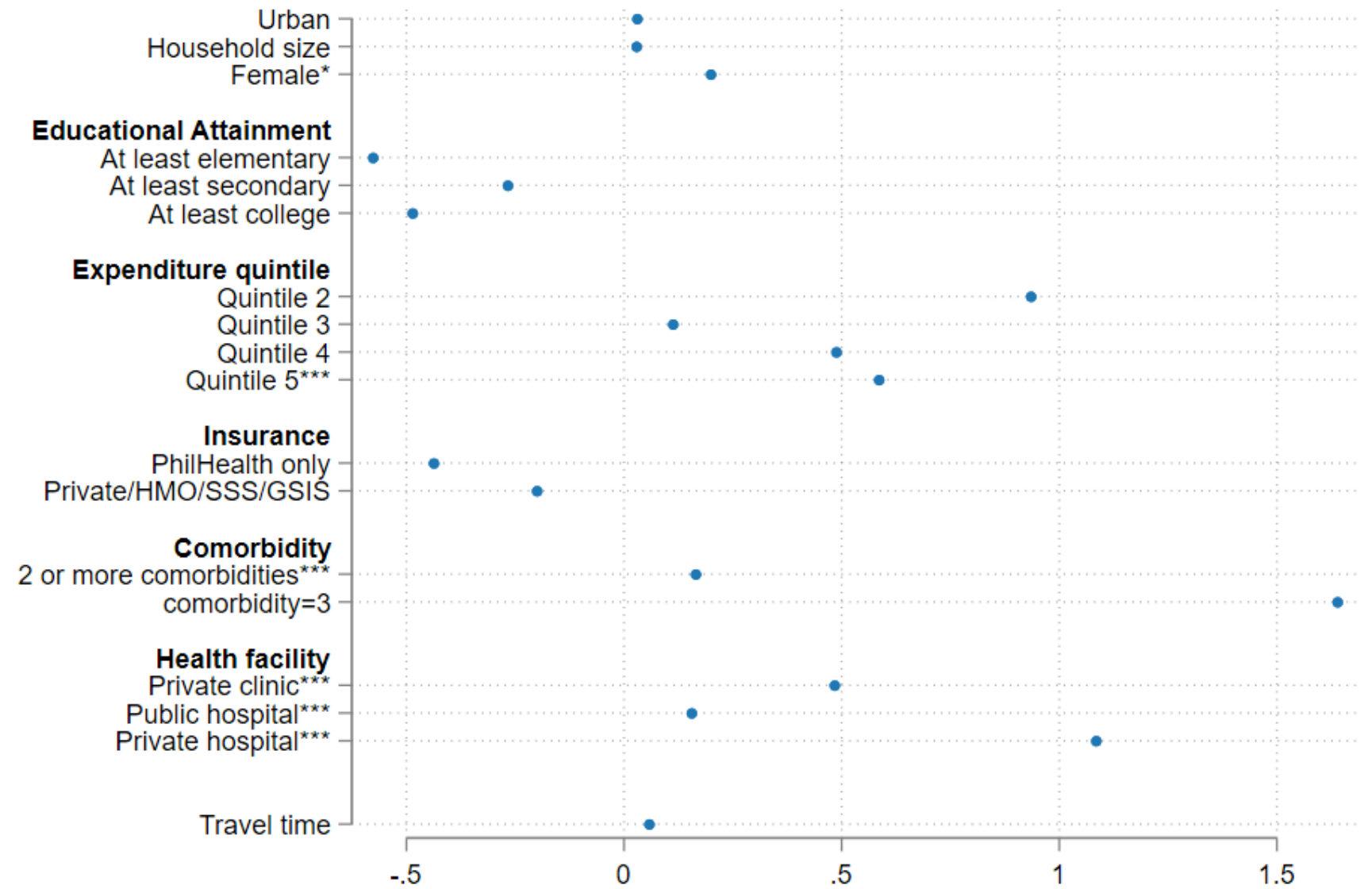
Results: Second part of the model

Coefficient plot: Second part (Cost ratios)

Outpatient



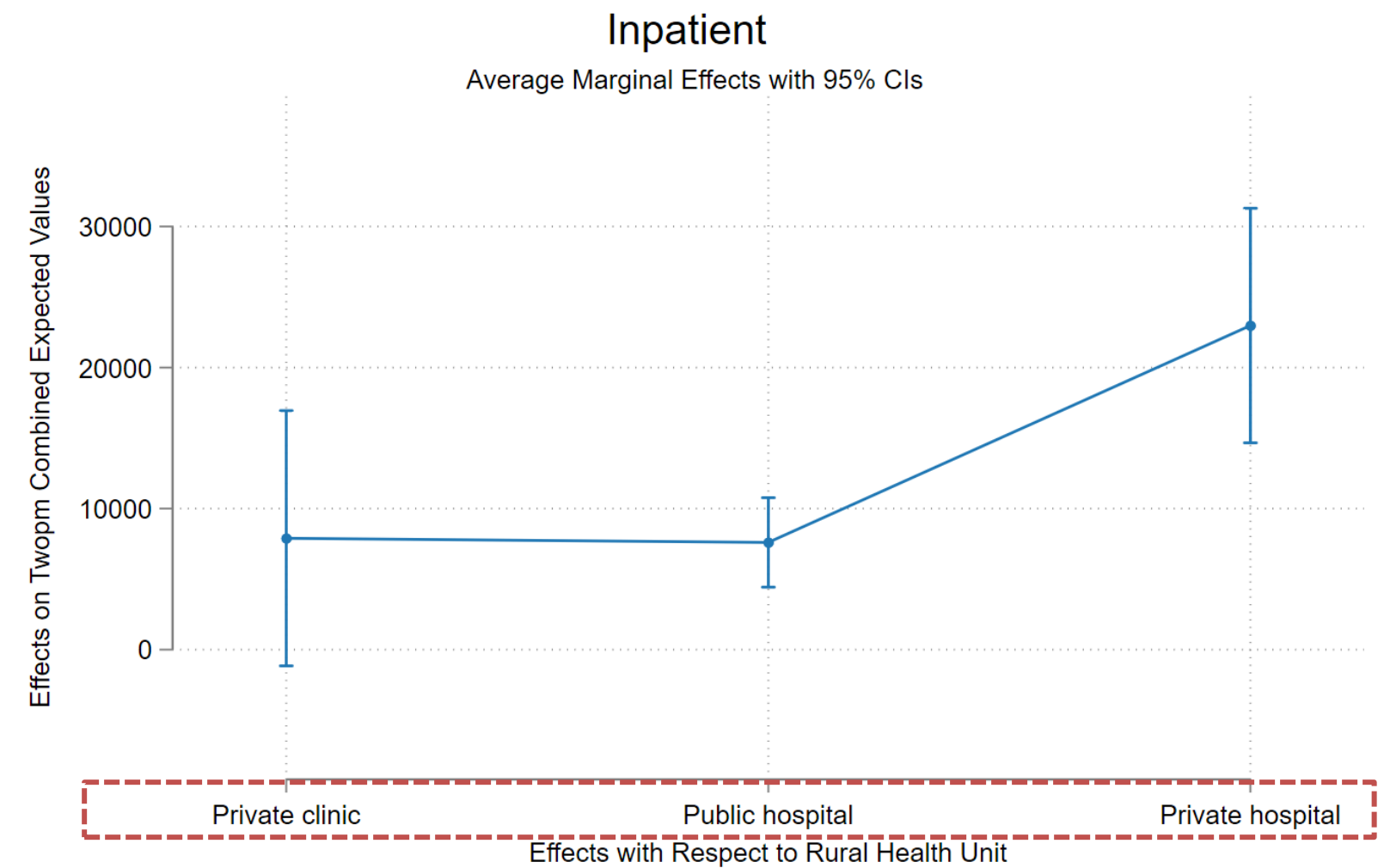
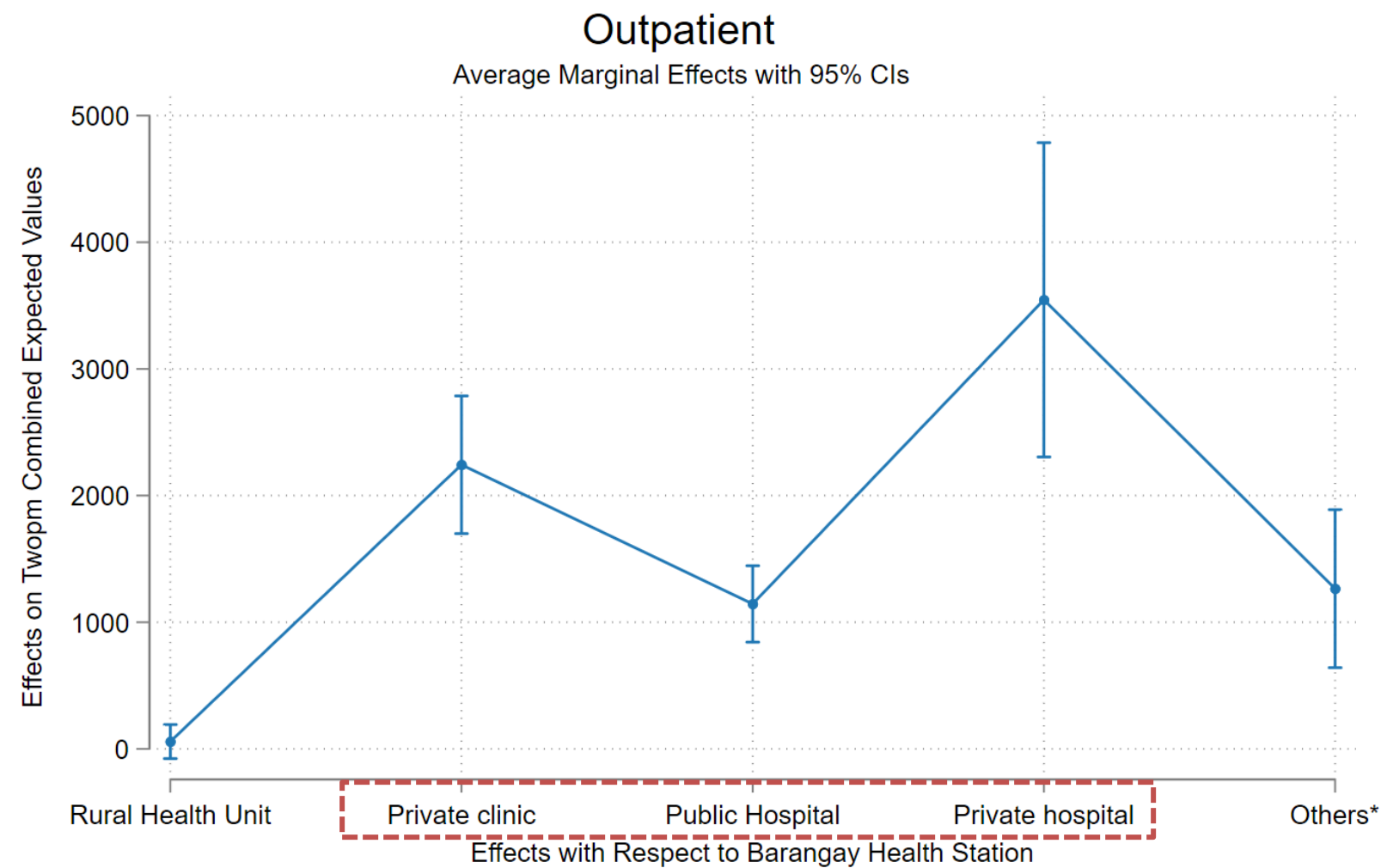
Inpatient



*** p < 0.01, ** p < 0.05, * p < 0.1
Dots represent coefficients

Results: Health facility type

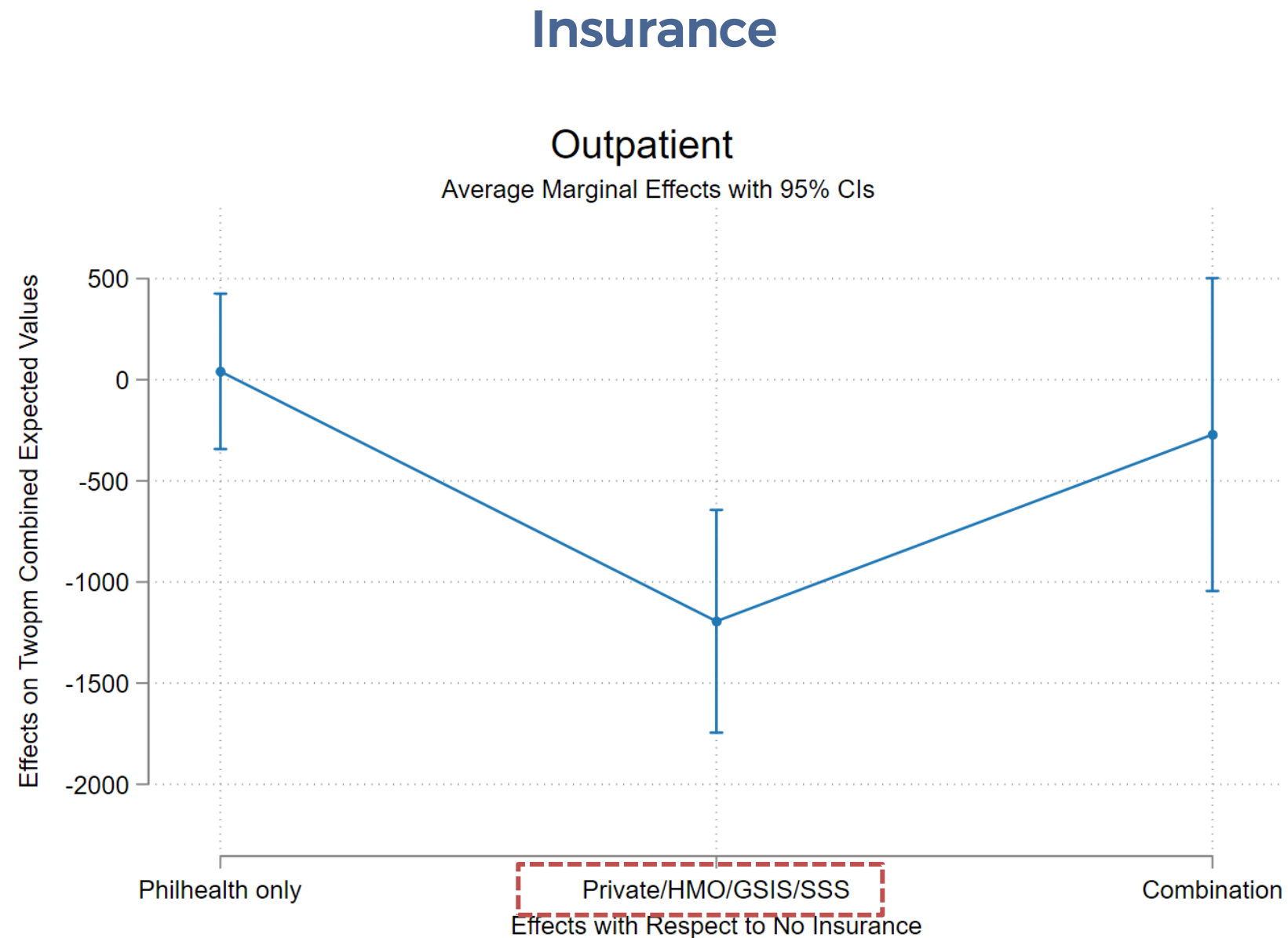
- ▶ Type of health facility utilized is found to be highly significant in terms of its association with OOP spending for NCDs



Note: Reference period is past 6 months for outpatient costs and 12 months for inpatient costs. Reference variable is barangay health unit. Under the health facility, the 'others' category include the following facilities: eye, tuberculosis dispensary/chest clinic, independent laboratory/testing facility, alternative care provided, special therapy provider, medical mission/outreach program provider.

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Results: Insurance and others



Note: Reference period is past 6 months for outpatient costs.

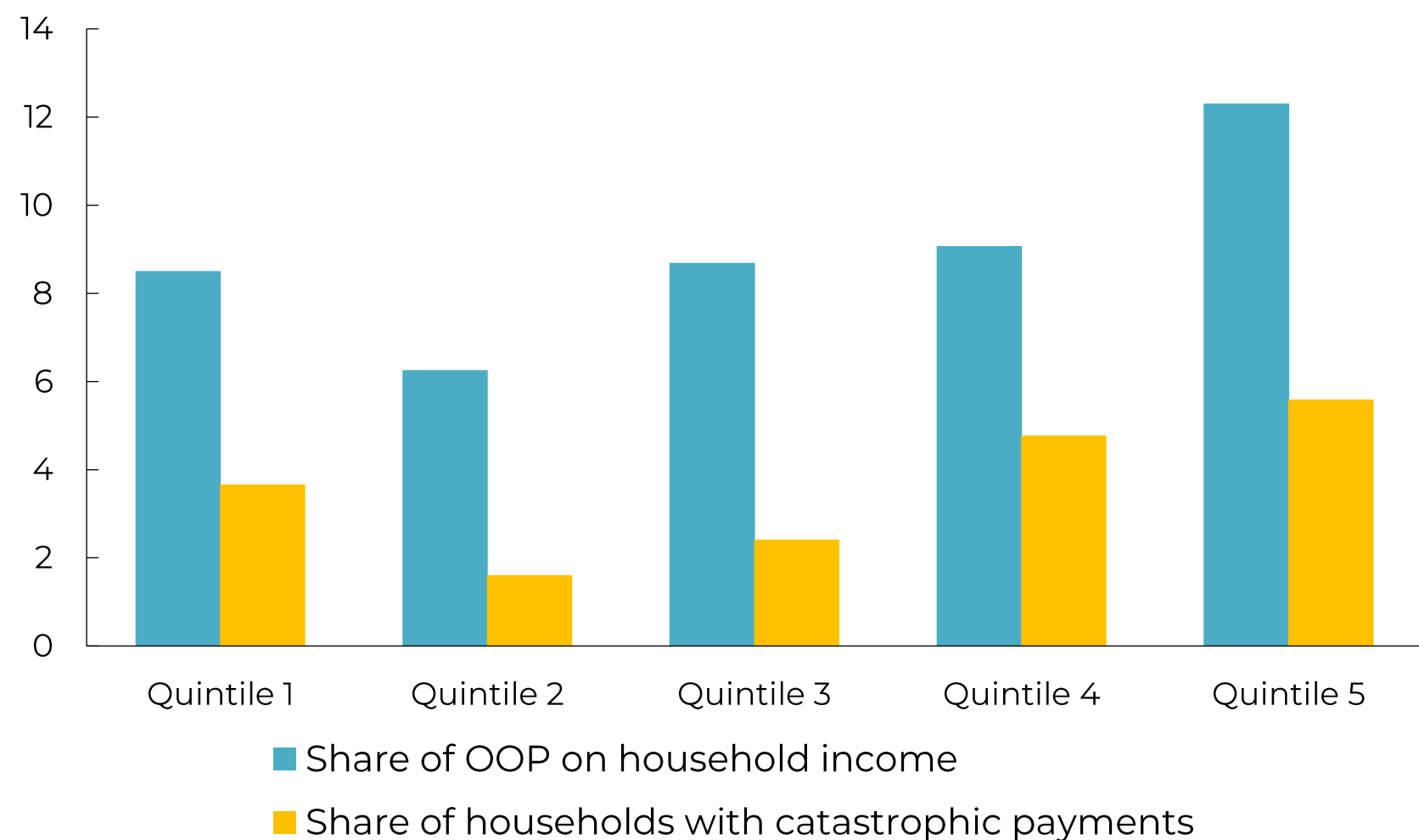
- ▶ For outpatient services, only private/HMO/GSIS/SSS insurance were found to significantly reduce outpatient OOP spending significantly
- ▶ Travel time to the health facility is highly significant, and it tends to increase outpatient OOP spending for NCDs by 17%
- ▶ Having 2 or more comorbidities leads to higher inpatient OOP spending

Catastrophic health expenditure among households with NCDs

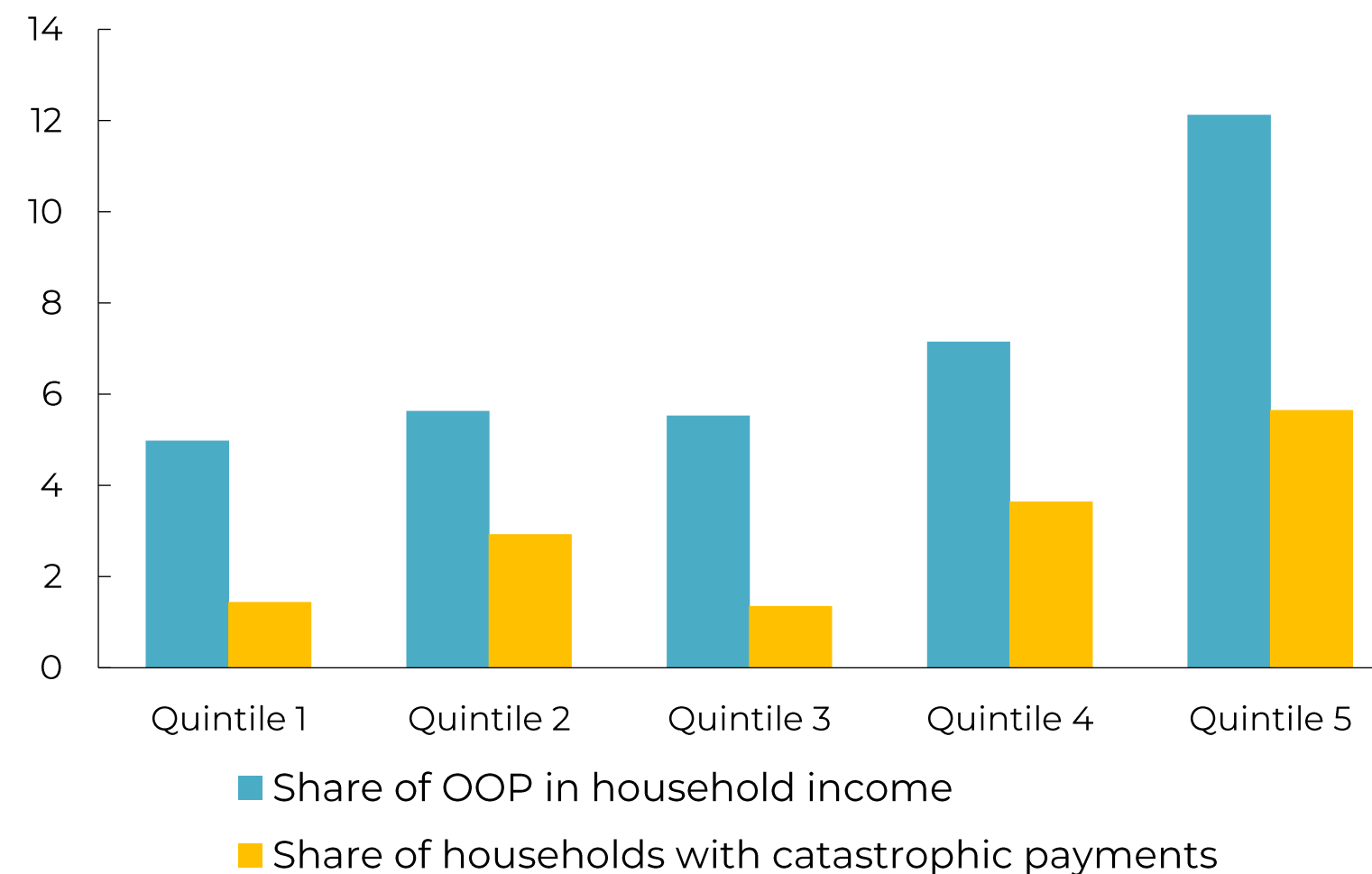
► Catastrophic health expenditure (CHE) refers to any expenditure for medical treatment that can pose as a threat towards a household's financial ability to maintain its subsistence needs

Incidence of catastrophic payments among households with members identified to have:

a. Noncommunicable



b. Communicable



Note: health expenditure is considered catastrophic if the household's out-of-pocket payment for healthcare exceeds 40% of the household's capacity to pay

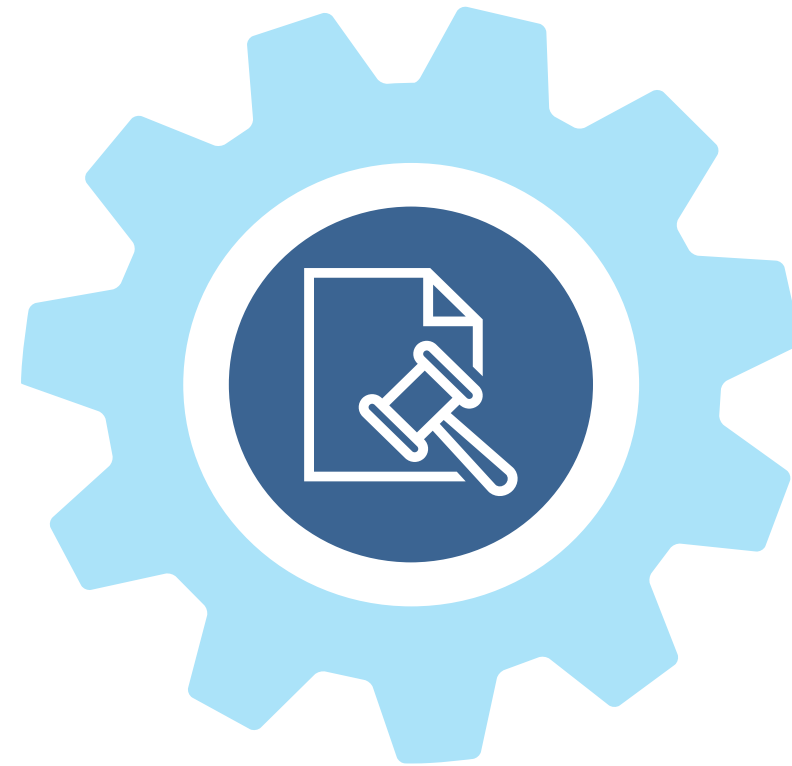
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Summary



Key findings

- Significant relationship between OOP spending and health facility and travel time.
- PhilHealth as sole insurance does not seem to be significantly decrease OOP spending – although *various underlying factors need further exploration.*



Policy implications

- Improve primary health care system
- Early detection by preventive screenings; better access (e.g., through telemedicine)
- Increase awareness of insurance system and copayment structure



Limitations and further study

- Underestimation due to recall bias
- Extended time series of the NHES data could be exploited to establish causal inference
- Applications to other types of diseases

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THANK YOU!

