

# Marginal Benefit Incidence of Public Health Spending: Evidence from Indonesian sub-national data

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# Motivation

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- Objectives
  - How do district revenues translate into health spending?
  - How does district health spending benefit their populations?
    - Effectiveness of public health spending in increasing access to health services
    - Transfer of public resources
- Decentralization in Indonesia in 2001
  - Responsibility for public service delivery with districts
  - Districts free in setting health budgets
  - Variation in district endowments, revenues and health spending but also in poverty, household constraints and access to health care

## Existing literature: weak links in the chain

- Cross country data shows little correlation between health outcomes and public health spending, after controlling for income
  - Governance
  - Crowding out
- Within-country heterogeneity
  - Cross country evidence of effect on the poor
  - Sub-national analysis does find evidence of effect of public spending
- Shortcomings of cross country evidence
  - Endogeneity and omitted variable bias
  - Measurement error: inconsistencies in data quality, data collection tools and underlying source of micro-data

## ***Contribution of this paper***

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- Sub-national analysis of health spending
  - Similar institutional setting and data collection tools
  - Elasticity of health spending w.r.t. revenue
  - Effect of public health spending on health care utilization
    - Outpatient utilization (by provider type)
    - OOP health care spending by households
  - Distributional effects
- Test for crowding out
  - Do increased public services crowd out private sector?
  - Does increased public spending crowd out OOP spending?
- Marginal benefit incidence analysis
  - Control for behavioral response to spending

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$$B_q(S) = \frac{S}{H(S)} H_q(S)$$

$$\frac{\partial B_q}{\partial S} = \frac{H_q}{H} \left[ 1 + \frac{\partial H_q}{\partial S} \frac{S}{H_q} - \frac{\partial H}{\partial S} \frac{S}{H} \right]$$

## *Indonesia's health spending*

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- Decentralization in 2001 to districts
  - Districts have legal responsibility to provide basic health care
  - Accountable to districts parliaments, not to central government
  - Free to set user fees and allocate resources
- District health spending
  - Routine expenditures: salaries and operational costs of providing public health services
  - Development expenditures: investments, upgrading of health facilities, training
  - Increased annually by 23% (in nominal terms) from 2001-2004
- Central influence remains through
  - Civil service regulations
  - Central health spending: social safety net, national hospitals

## ***District revenues***

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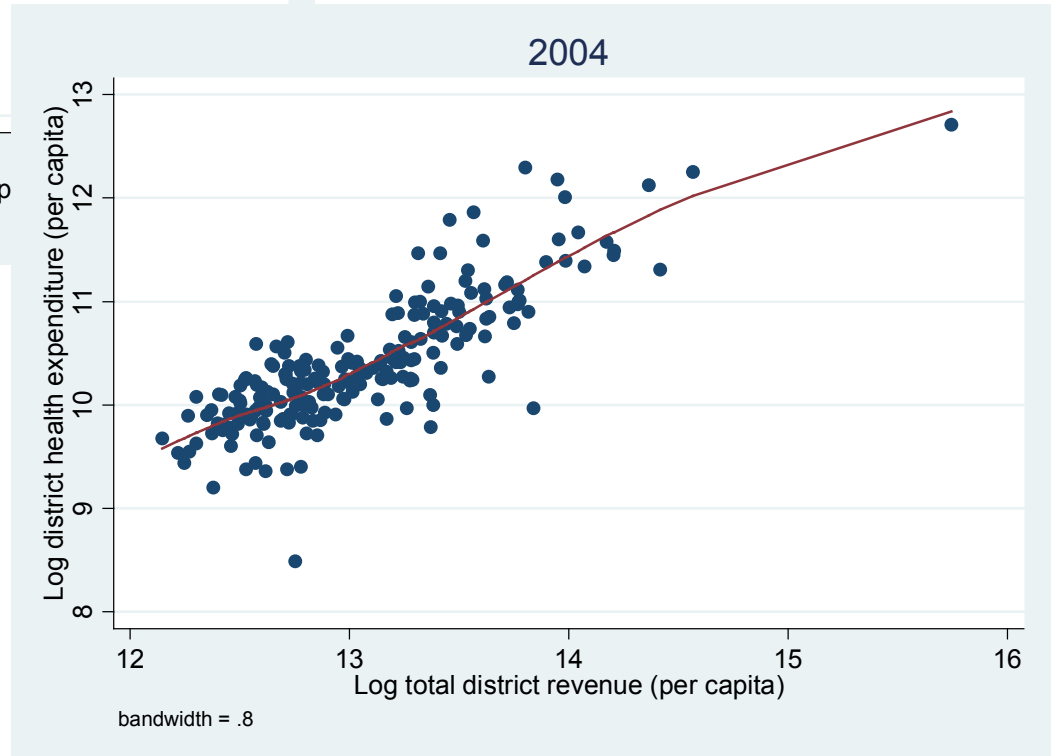
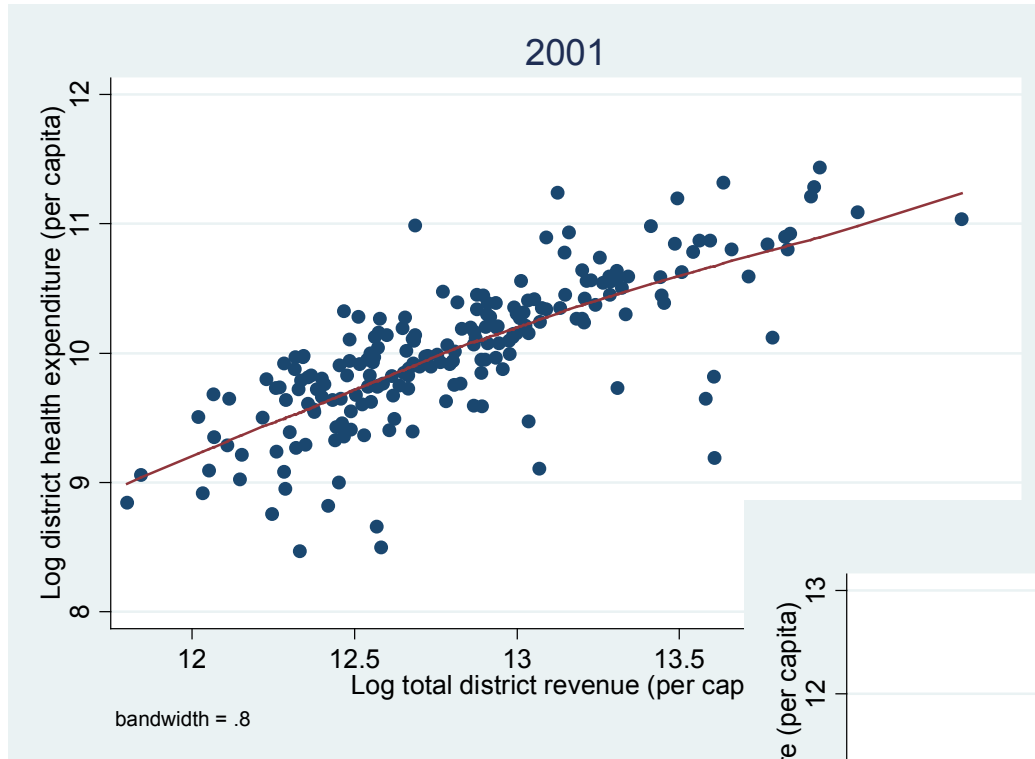
- Composition of district government resources in 2001
  - General allocation grant (56 %)
  - Shared tax revenues (property and income tax 11%)
  - Shared non tax revenues (natural resources 12%)
  - District own revenues (15%)
  - Tied grants from center (3%)
- Decentralization resulted in variation in budgets
  - Variation in natural resource endowments
  - Allocation formulas for central allocation grant

## Data

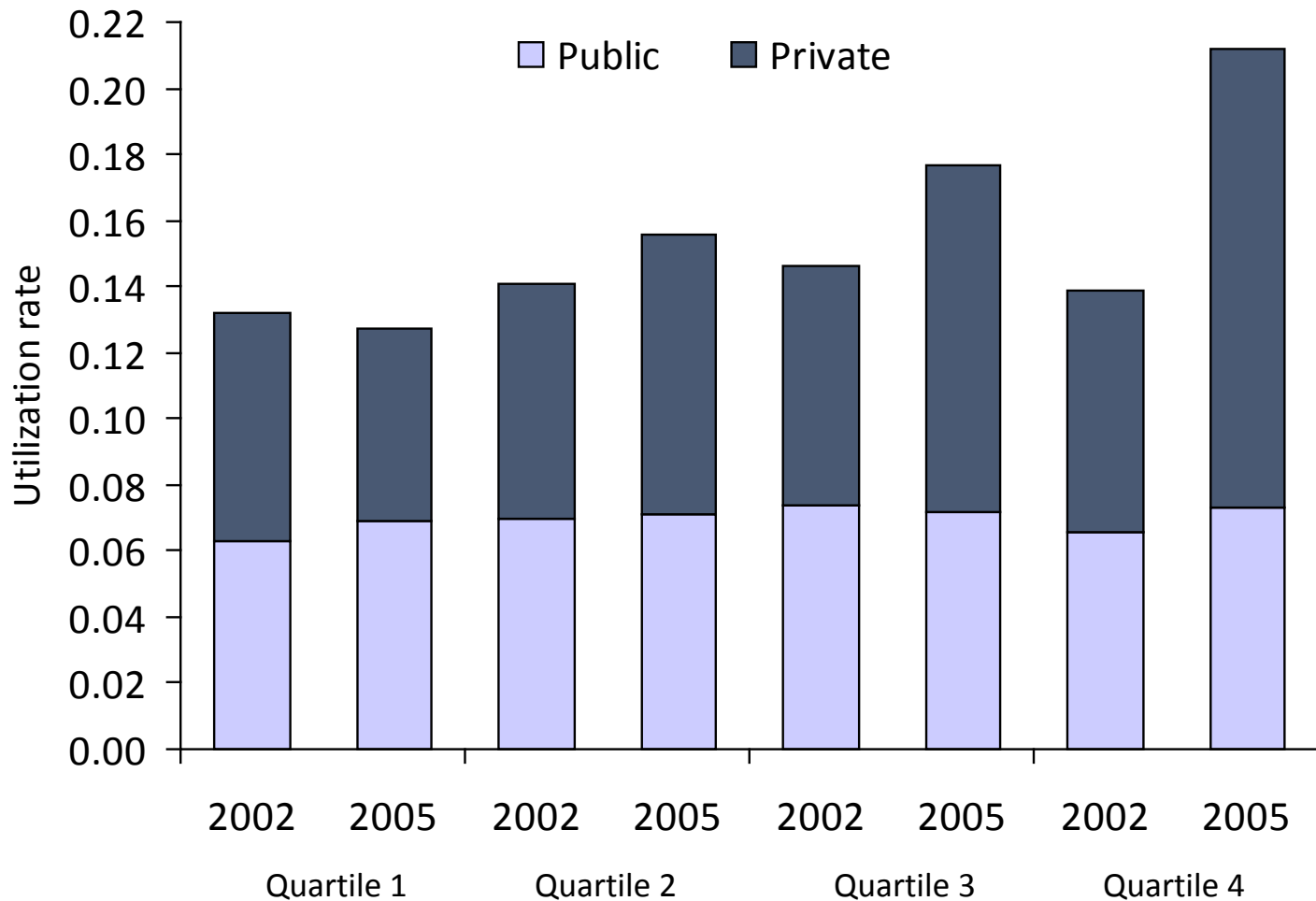
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- Panel of 207 districts from 2001 tot 2005
- Ministry of Finance
  - Detailed district revenues
  - Detailed district spending
- Household survey (*Susenas*)
  - Annual cross section; 200,000 HH/year
  - Representative at district level
  - Health care utilization, OOP health spending, demographics, socio-economic information

# Converging spending patterns



# Health care utilization 2002-2005





## ***Empirical specification***

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# Determinants of district health spending

$$\log H_{it} = c + \beta \log R_{it} + \sum_{r=2}^6 \gamma S_{rt} + f(X_{it}) + \alpha_i + \delta_t + \varepsilon_{it}$$

## Empirical specification

### Determinants of district health spending

$$\log H_{it} = c + \beta \log R_{it} + \sum_{r=2}^6 \gamma s_{rt} + f(X_{it}) + \alpha_i + \delta_t + \varepsilon_{it}$$

### Determinants of utilization and OOP

$$u_{it} = c + \pi \log H_{it-1} + \eta_d s_{dt} + f(X_{it}) + \alpha_i + \delta_t + v_{it}$$

## Elasticity of public health spending

	Routine	Development	Total
Total district revenue	0.83**	1.12**	0.88**

### By source of revenue

	Routine	Development	Total
Total district revenue	0.87**	1.05**	0.88**
Interaction revenue shares			
Own revenue	2.03**	1.25	1.44**
Shared tax revenue	0.36	-3.37**	-0.99*
Shared non tax revenue	-0.87	-0.20	-0.70+
DAK revenue	-1.11	3.08*	0.13
Revenue from other sources	-0.50	0.42	-0.29

## Public health spending and utilization

	Public	Private	Total	OOP
District health spending	0.0114**	0.0042	0.0156**	-94.42

### By source of spending

	Public	Private	Total	OOP
District health spending	0.0111**	0.0059+	0.0170**	-1.40
Interaction development health spending share	0.0037	-0.0234**	-0.0197	-1,269.52

## *Distribution of health spending effects*

	Public	Private	Total	OOP
Quartile 1 (poorest)	0.0175**	-0.0032	0.0143+	-65.80
Quartile 2	0.0164**	0.0032	0.0197**	64.38
Quartile 3	0.0063	0.0005	0.0068	-216.31
Quartile 4 (richest)	-0.0055	-0.0048	-0.0104	-1,685.68

## Marginal benefit incidence

	$\theta_q$	$1 + \theta_q - \theta$	$u_{q,2002}$	$u_q(1 + \theta_q - \theta)$
Quartile 1 (poorest)	0.144+	<b>1.054</b>	0.232	<b>0.244</b>
Quartile 2	0.142*	<b>1.052</b>	0.257	<b>0.271</b>
Quartile 3	0.082	0.992	0.272	0.270
Quartile 4 (richest)	-0.040	0.876	0.243	0.213
Overall	0.090+			

## Conclusions

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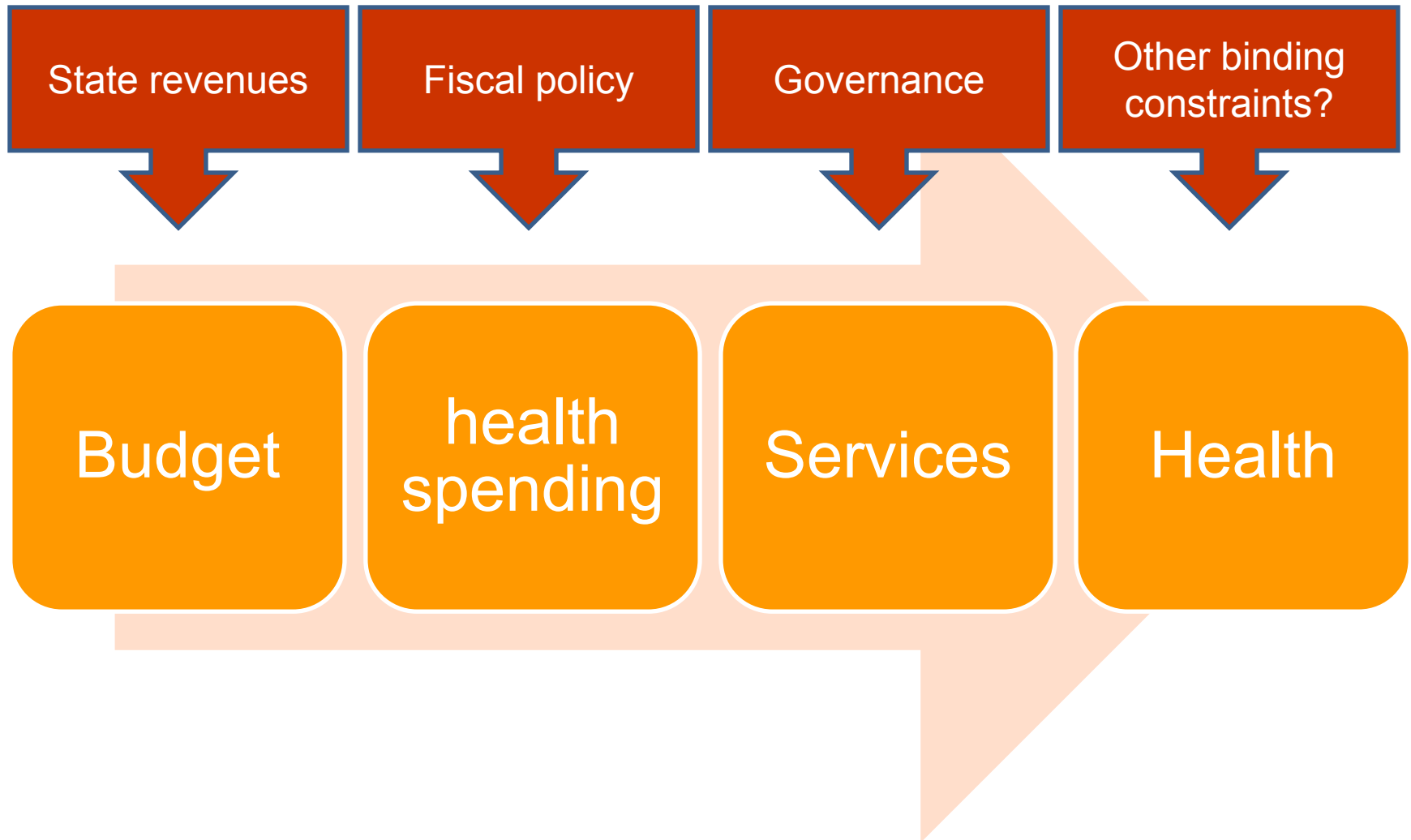
- Revenues translate into health spending
  - Mainly driven by central transfers and local revenues
  - Center retains influential fiscal instruments
- More spending translates into
  - Higher utilization of public services by the poor
  - No crowding out with private services
  - No change in private health expenditures
- Increased public spending improves targeting
  - Net resource transfer from richest to poorest
  - But initial shares dominate marginal benefit

## Health care utilization 2002-2005

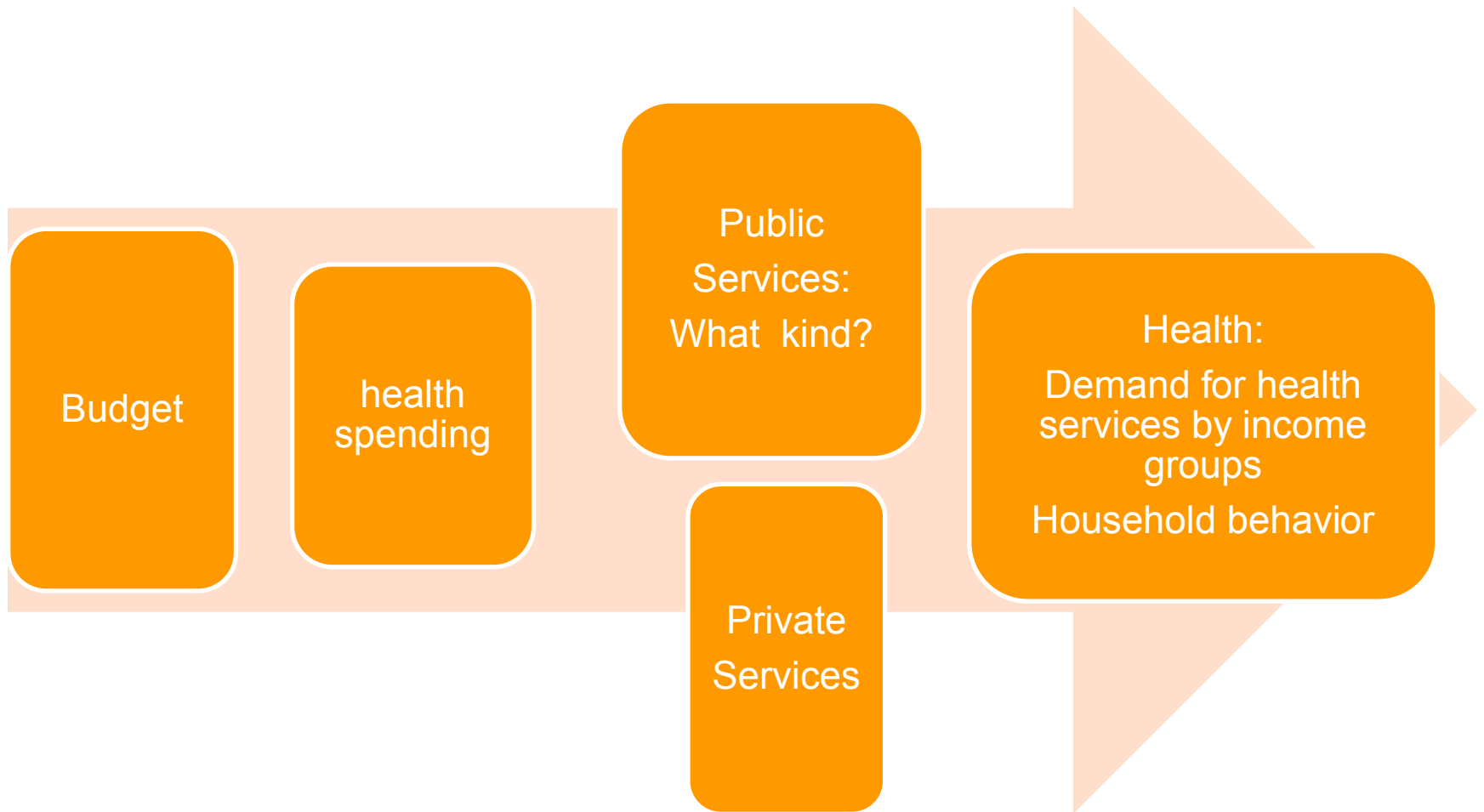
	Public		Private		Total	
	2002	2005	2002	2005	2002	2005
Quartile 1 (poorest)	0.063	0.069	0.058	0.053	0.122	0.122
Quartile 2	0.070	0.071	0.085	0.074	0.156	0.145
Quartile 3	0.074	0.072	0.105	0.091	0.179	0.163
Quartile 4 (richest)	0.066	0.073	0.139	0.115	0.205	0.188
Urban	0.065	0.067	0.109	0.087	0.174	0.154
Rural	0.071	0.075	0.087	0.080	0.159	0.155
Indonesia	0.068	0.071	0.097	0.083	0.165	0.155



## The Chain



# The Chain



# Indonesia: 17,000 islands

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## *Indonesia's population*

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Province size shows the proportion of provincial population relative to national population

# Indonesia's economy

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Province size shows the proportion of provincial GDP relative to national GDP

# Indonesia's fiscal decentralization

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Province size shows the proportion of provincial fiscal revenue relative to national fiscal revenue