Discover New Models of Health Insurance through Social Experimentation

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Major Problems Facing Two Billion Farmers in Low and Lower Middle-income Countries

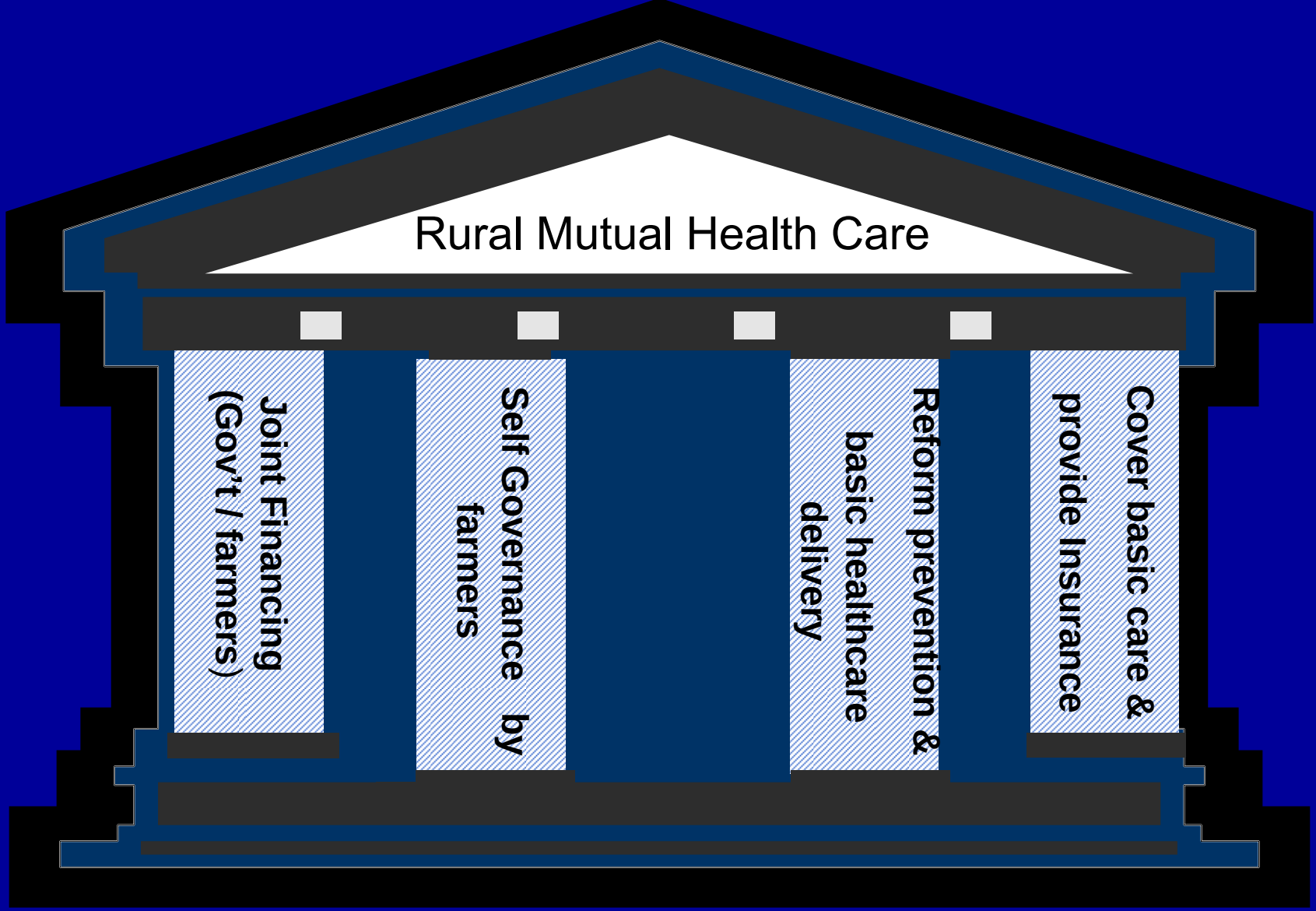
- Inadequate funding: people lack access to basic health services because of shortage of providers, low salary, inadequate health manpower, lack of drugs and supplies, and unaffordable fees.
- Government failures in public provisions: Inefficiency, low quality of services, unable to manage basic health care at the village level where people demand.
- Misallocation of resource: Lack of adequate prevention and public health.
- Lack of adequate insurance protection: People face impoverishment when serious illness strikes
- Emerging new communicable diseases: HIV/AIDS, SARS, Avian Flu

Burden of Diseases, China

	BOD (DALY)
Total BOD	200,134,562
(1) Communicable	36,944,372
HIV/AIDS, TB & Malaria	5,698,015
(2) Respiratory infection	6,030,661
(3) Perinatal	11,273,423
(4) Diarrhoeal	5,005,434
Sub-total [2+3+4]	22,309,518

Social Experiments Designed to Answer Twelve Questions

- Is the RMHC model viable?
- Is the RMHC replicable?
- How much are poor farmers willing to pay and enroll when they are subsidized with $2.50/person/year?
- How much adverse selection in voluntary schemes?
- **HOW MUCH DID RMHC IMPACT ACCESS?**
- **WHAT ARE THE EQUITY CONSEQUENCES?**
- **HOW MUCH DID RMHC AFFECT HEALTH STATUS?**
- How can RMHC enhance and integrate prevention?
- **HOW MUCH DID RMHC REDUCE MEDICAL IMPOVERISHMENT?**
- How much efficiency gains can RMHC produce?
- How much quality gains can RMHC produce?
- How satisfied are the people?



The Four Pillars of RMHC

Rural Mutual Healthcare In China

- Voluntary payment and enrollment .
- Project pays $2.50/person/year, farmers select one of three packages and prepay $1.50 to $2.20/person/year, depending on the package. Very poor fully subsidized.
- Cover prevention, primary care, drugs and hospitalization with patients still have to pay 50%-60% of cost when seek services.
- Reform the delivery system at village level, select and contracted village doctors, central purchase/distribution of drugs, quality assurance of services and payment for hospitalization.
- Partial self-governance by farmers through village committees and town board; government supervise, regulate and monitor performance.

Site Selection and Sites

- RMHC Intervention sites:
  - One town in Guizhou province: $220 avg income p.c.
  - Two towns in Shaanxi province: $180 avg income p.c.
  - Together: 60,000 farmers and family members.
  - Began enrollment in Dec 2003 and started operation immediately
- Control sites: 2 sites, matched to intervention site based on socioeconomic conditions, demographic characteristics, availability of health care facilities.
- One Catastrophic insurance intervention site
- Longitudinal household/individual surveys:
  - Baseline: Nov/Dec 2002
  - Follow-ups: Nov/Dec 2004, 2005, 2006

Evaluation I and II

- What is the impact of RMHC on health care utilization?
- What is the impact of RMHC on health status?
- How do the impacts vary by:
  - Household income?
  - Those with and without chronic conditions?

Evaluations III

- What is the impact of RMHC on improving financial risk protection?
- Following van Doorslaer and Wagstaff's approach:
  - Catastrophic expenditure is defined by out-of-pocket health expenditure exceeding a certain threshold of "ability to pay"—household income less food consumption expenditure
  - Medical impoverishment is measured by:
    - Headcount: Probability of being pushed below the poverty line due to medical expenditures (USD 1 per day)
    - Poverty gap: The amount of short fall among those below the poverty line.

Data Used in the Evaluation in this Presentation

- Baseline and 2005 follow up
- Sample size: RMHC (4271); Control site (1340); Catastrophic insurance only site (1220)
- Follow up rate (household, individual): RMHC (85%, 80%); Control site (88%, 84%); Catastrophic insurance only site (72%, 56%)
- We use 2005 because 2004 was only one year after the intervention and responses may not have been stable yet.

Estimation Method

- Difference-in-difference to remove:
  - time-invariant person-specific, and site-specicfic, unobservable factors and
  - trends that are similar between experiment and control site
- Propensity score matching to remove heterogeneity between “treatment” and control group: where “treatment” are those who enrolled in the experiment.
- Matching algorithm
  - Nearest 4 neighbor
  - Kernel weights

Estimation

$$Y_{ikt} = \beta_0 + \beta_1 RMHC_{kt} + \beta_2 X_{ikt} + \alpha_i + \theta_k + \nu_t + \varepsilon_{it}$$

$$\Delta Y_{ik} = \beta_1 RMHC_k + \beta_2 \Delta X_{ik} + \Delta \nu + \Delta \varepsilon_i$$

Heckman's Difference-in-Differences Matching Estimator

$$ATT = \frac{1}{n_1} \sum_{i \in I_1 \cap S_p} \{(Y_{1ti} - Y_{1t'i}) - \sum_{j \in I_0 \cap S_p} W(i,j)(Y_{0tj} - Y_{0t'j})\}$$

Enrolled in the set of common-support.

Multiple individuals in the control group who are in the set of common-support.

Difference .....in..... Differences

Heckman's Difference-in-Differences Matching Estimator

1. Kernel matching:

$$W(i,j) = \frac{G\left(\frac{P_j - P_i}{a_n}\right)}{\sum_{k \in I_0} G\left(\frac{P_k - P_i}{a_n}\right)}$$

where G(.) is a kernel function and α_n is a bandwidth parameter.

Impact on Access (Utilization)

	Baseline	Diff-in-Diff	DD+ Nearest 4 neighbor	DD+ Kernel
Visit an outpatient provider in the last 2 weeks? (1/0)	0.173	0.036** (0.010)	0.121** (0.026)	0.120** (0.018)
Number of outpatient visit in the last 2 weeks	0.352	0.007 (0.033)	0.155** (0.052)	0.148** (0.040)
Self-treat in the last 2 weeks? (1/0)	0.056	-0.045** (0.009)	-0.032** (0.015)	-0.039** (0.013)
Hospitalized in the last year? (1/0)	0.033	0.010 (0.009)	-0.023 (0.012)	-0.011 (0.011)

Impact Estimates of RMHC on Outpatient/Inpatient Utilization and Self-Medication

	Baseline	DD (univariate) (N = 4175)		DD (multivariate)† (N = 4175)		Nearest 4 neighbor† (N = 4066)		Kernel† (N = 4147)	
		β	s.e.	β	s.e.	β	s.e.	β	s.e.
tpatient Visit (0/1)	0.173	0.022	(0.016)	0.036	(0.010)**	0.121	(0.026)**	0.12	(0.018)**
Visit to Village Clinic	0.141	0.023	(0.014)	0.033	(0.011)**	0.108	(0.027)**	0.098	(0.015)**
Visit to Township Health Center	0.022	0.013	(0.007)	0.016	(0.007)*	0.018	(0.013)	0.02	(0.010)*
Visit to County Hospital and above	0.010	-0.014	(0.006)*	-0.013	(0.006)*	-0.005	(0.015)	0.001	(0.009)
)utpatient Visits	0.352	-0.018	(0.040)	0.007	(0.033)	0.155	(0.052)**	0.148	(0.040)**
f-Medication	0.056	-0.052	(0.010)**	-0.045	(0.009)**	-0.032	(0.015)*	-0.039	(0.013)*
atient Visit	0.033	0.006	(0.009)	0.01	(0.009)	-0.023	(0.012)	-0.011	(0.011)
Visit to Township Health Center	0.012	0.001	(0.005)	0.001	(0.005)	-0.018	(0.013)	-0.007	(0.007)
Visit to County Hospital and above	0.021	0.005	(0.007)	0.009	(0.007)	-0.005	(0.008)	-0.004	(0.006)

* Significant at 5% ** Significant at 1%

Impact on Utilization by Household Income and Chronic Condition

- Household income:
  - Lowest 25%: increase OP visit by 100%
  - Middle 50%: increase OP visit by 62%
  - Highest 25%: increase OP visit by 90%
- With chronic condition:
  - Increase OP visit by 100%
- Without chronic condition:
  - Increase OP visit by 70%

Impact on Health Status—EQ-5D

	Baseline	DD+ Nearest 4 neighbor	DD+ Kernel
Mobility (1=problem, 0=no problem)	0.08	-0.030** (0.015)	-0.022 (0.014)
Self-care	0.05	-0.004 (0.012)	0.001 (0.012)
Usual activity	0.11	-0.031 (0.017)	-0.018 (0.015)
Pain/Discomfort	0.31	-0.121** (0.027)	-0.117** (0.023)
Anxiety/depression	0.40	-0.220** (0.028)	-0.217** (0.026)
Any of the 5 dimension with problem	0.49	-0.246** (0.028)	-0.238** (0.026)

Impact on health status by…

- Income: lowest income experienced the greatest health improvement
- Those who were “ill” in the baseline experienced a greater reduction in reporting “any problem” in EQ-5D
- Those above 55 years old benefit most in terms of improved mobility and usual activities.

Impact on Catastrophic Expenditure

	Baseline	Diff-in-Diff	DD+ Nearest 4 neighbor	DD+ Kernel
Out-of-pocket health expenditure > 10% income net of food expenditure	0.285	-0.069** (0.019)	-0.122** (0.036)	-0.091** (0.028)
> 20%	0.197	-0.062** (0.017)	-0.075** (0.032)	-0.054* (0.025)
> 30%	0.153	-0.056** (0.016)	-0.072** (0.028)	-0.062** (0.022)

Impact on Catastrophic Expenditure (30% of income) by income classes

	Baseline	Diff-in-Diff	DD+ Nearest 4 neighbor	DD+ Kernel
Lowest 25% income	0.128	-0.098** (0.034)	-0.125* (0.056)	-0.116** (0.043)
Middle 50%	0.138	-0.035 (0.023)	-0.009 (0.029)	-0.009 (0.028)
Highest 25%	0.201	-0.075** (0.030)	0.011 (0.055)	0.024 (0.049)

Impact on Impoverishment

	Baseline	Diff-in-Diff	DD+ Nearest 4 neighbor	DD+ Kernel
% below $1/day: full sample	0.201	-0.028* (0.013)	-0.021 (0.027)	-0.023 (0.020)
% below $1/day: lowest 25% income sample	0.621	-0.107** (0.027)	-0.093* (0.042)	-0.099* (0.046)
Poverty gap (RMB): full sample	59	-8.02 (6.16)	-1.2 (9.66)	0.82 (8.96)
Poverty gap (RMB): lowest 25% income sample	157	-25.5 (17.5)	-65.9* (32.9)	-72.0** (30.04)

Catastrophic + Saving Accounts

- Benefit package:
  - Outpatient: 8 RMB saving accounts
  - Inpatient: high deductible, high ceiling (copayment)
- Continue with public provision
  - FFS
  - Earns profit from selling drugs

Rural Mutual Health Care (RMHC)

- Benefit package:
  - Covers both outpatient and inpatient, no deductible, but ceilings
- Insurance fund acts as purchaser:
  - Use competition to select village doctor
  - Pay village doctor salary
  - Use bulk purchasing for drug

Conclusions on Access and Utilization

- RMHC
  - Enrolled benefits by increasing outpatient utilization by 70%
  - Most benefits are at village level
  - Highest and lowest income group's increase mostly at village level, the middle income group's increase at township level.
  - Increase greater for those with chronic conditions
  - No statistically significant effect on inpatient use
- Catastrophic + MSA
  - No overall statistically significant effect.

Overall Summary

- Willingness to pay—70%+ would voluntarily enroll and prepay average of $1.50 if subsidized $2.50.
- Adverse selection—Serious (increased average cost of premium by more than 10%)
- Prevention, basic health services and essential drugs made available at the village level.
- Access and use—significantly improved
- Equity--improved
- Risk protection—reduced impoverishment by 30%-50%, depending on measurement used.
- Efficiency Improvements—At least 30%.
- Quality Improvements—Significant at village level.
- Public Satisfaction—More than 90%.

Replication (go to scale)

- GUIYANG MUNCIPAL GOVERNMENT REPLICATED RMHC TO COVER 1.7 MILLION FARMERS
- SHAANXI PROVINCIAL GOVERNMENT PLANS TO REPLICATE TO COVER 300,000 FARMERS IN A COUNTY AS AN INTERMEDIATE STEP TO GO TO SCALE PROVINCIAL WIDE.

Key Elements of Rural Mutual Healthcare Found Their Way Into Chinese Policy

- Joint Government and Household financing.
- Shift coverage from MSA/Cat to coverage of prevention, primary care and catastrophic.
- Encourage community governance.

Team Work

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