Does Improved Hospital Management Enhance Healthcare Efficiency? Evidence from County-Level Hospitals in China

RWD308

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BACKGROUND

- Efficiency is a fundamental principle in healthcare systems.
- large-scale quantitative analyses of how management practices affect efficiency remain scarce, especially in developing countries with limited data.
- County-level hospitals in rural China face a paradox of both resource underutilization and waste, which highlights the need to identify practical management levers to meet the policy goal of ”treating major illness within the county”.

OBJECTIVE

- To evaluate hospital management and healthcare efficiency in county-level hospitals in rural western China.
- This study examines the association between hospital management practices and healthcare efficiency among county-level hospitals.

METHDODS

Data Sources

Questionnaire Survey

- 73 county-level hospitals were surveyed in both 2015 and 2018 to assess the basic conditions and management practices.

Health Insurance Claims Data

- We used inpatient health insurance claims data from the sample counties in 2015 and 2018.

Measurements

Hospital Management Practice

- Development World Management Survey for Hospitals (D-WMS-H)
  - Overall management score
  - Scores across four dimensions:
    a) Operations management
    b) Target management
    c) Personnel management
    d) Performance management.

Efficiency

- Data Envelopment Analysis (DEA)
  - Static : DEA Slack-Based Measure (SBM)

Indicators	Meaning
Total Factors Productivity, TFP	TFP=1, decision-making units(DMU) is considered efficient, TFP<1, DMU is considered inefficient
Pure Technical Efficiency, PTE	PTE>1,technology contributes to productivity, PTE<1 ,depresses productivity
Scale Efficiency, SE	SE>1, scale contributes to productivity, SE<1, depresses productivity

  - Dynamic : DEA-Malmquist Index (MI)

Indicators	Meaning
Malmquist Index, MI	MI>1, productivity is increasing, MI<1, decreasing
Technical Efficiency Change, EC	EC>1, technical efficiency is increasing, EC<1, decreasing.
Technical Progress Change, TC	TC>1, technology is increasing, TC<1, decreasing

Statistical Analysis

Tobit regressions were applied to examine the effects of management practices on efficiency.

RESULTS

- Between 2015 and 2018, the average hospital management score increased from 2.53 to 2.69. **(Table 1)**

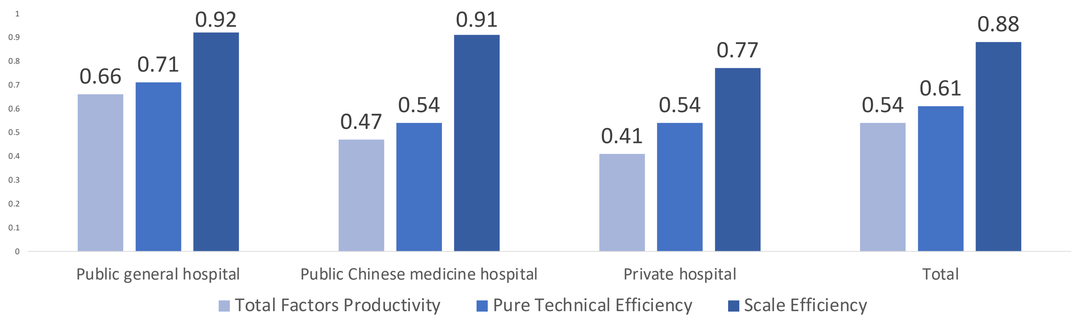
Table 1 Management practice scores of county-level hospitals in 2015 and 2018

Dimension	2015	2018	*P-Value*
	Mean ± SD	Mean ± SD	
Operation	2.69±0.48	2.81±0.48	0.071
Monitoring	2.57±0.56	2.81±0.61	0.001*
Target	2.39±0.66	2.54±0.61	0.046*
Personnel	2.55±0.40	2.62±0.36	0.283
Overall	**2.53±0.46**	**2.69±0.46**	**0.013***

*Notes: Comparisons by paired t test; personnel management analyzed with Wilcoxon signed-rank test due to non-normality; * P < 0.05*

- DEA-SBM analysis showed that the average TFP was 0.54 in 2018, with PTE and SE at 0.61 and 0.88 respectively. **(Figure 1)**
- MI results indicated a 15% increase in TFP over the study period, attributable to the dual effects of TC (1.08) and EC(1.09) improvement.

Figure 1. DEA-SBM results of county-level hospitals in 2018



- Tobit regression analysis found a significant positive association between higher overall management scores and improved hospital efficiency (β = 0.125, p < 0.05), particularly in public hospitals.
- Further analysis showed that management practices significantly influenced SE, but not PTE. **(Table 2)**

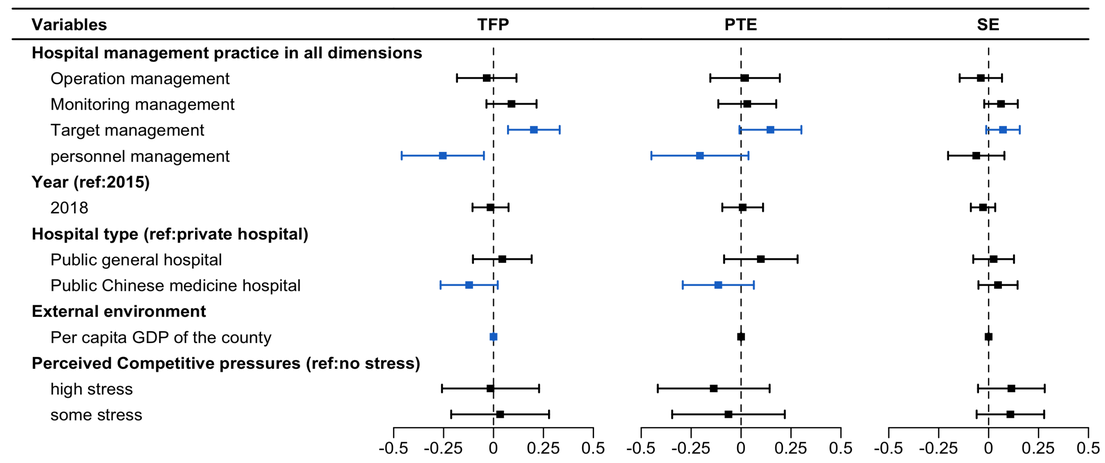
Table 2 Tobit panel regression results of the effects of hospital management practice on efficiency

Variables	TFP		PTE		SE	
	Coef.	std. err.	Coef.	std. err.	Coef.	std. err.
Hospital management practice	0.105*	0.059	0.064	0.067	0.075**	0.038
Year （ref：2015）						
2018	-0.006	0.047	0.013	0.051	-0.024	0.031
Hospital type （ref：private hospital）						
Public general hospital	-0.142*	0.075	0.163*	0.091	-0.052*	0.047
Public Chinese medicine hospital	-0.011	0.071	-0.044	0.087	0.083	0.045
External environment						
Per capita GDP of the county	-0.000**	0.000	0.000	0.000	0.000	0.000
Perceived Competitive pressures （ref：no stress）						
high stress	-0.007	0.132	-0.127	0.145	0.124	0.083
some stress	0.045	0.133	-0.051	0.146	0.121	0.084

Notes: Values shown as 0.000 or −0.000 indicate that the absolute value of the coefficient is < 0.001
**: ** p<0.05, * p<0.1*

- Across the four management dimensions, target management showed the strongest positive association with TFP (p<0.05), whereas personnel management showed a significant inverse association (p<0.05), which may reflect higher case complexity in hospitals with more formalized staffing.
- Comparable patterns were observed for PTE and SE. **(Figure 2)**

Figure 2 Tobit panel regression results of the effects of hospital management practice of each dimension on efficiency



CONCLUSIONS

- This longitudinal study demonstrates that systematically measuring hospital management using D-WMS-H reveals efficiency drivers in rural China.
- The dual positive impact of target management on technical and scale efficiency underscores the importance of strategic goal-setting for resource optimization.
- It provides empirical evidence from a low- and middle-income country setting and offers practical insights to improve hospital performance through better management.

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