OPI-ESRC Seminar Series on Health Services Productivity

Measuring health service productivity in developing countries: comparisons between countries and over time

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Summary

In general, more attention has been given in both developed and developing countries to resource mobilisation than to productivity improvements. Yet, cross-country comparisons suggest that the potential returns to productivity improvements, in terms of services delivered, are greater than the marginal gains from additional resources. In spite of this, it is harder to generate productivity improvements than to raise additional resources, particularly where production incentives are weak and distorted. Nonetheless, it is not true to say that productivity gains are predictable in richer countries; nor is it true to say that they never occur in low-income countries. Documenting and understanding differentials in productivity and productivity trends in low-income countries remains a hugely neglected, but potentially important, research area.

Comparisons between countries

Background

The current state of knowledge about cross-country differences in health service productivity is limited. It is surprising that so much attention has been given to mobilising resources while the potential for productivity gains has been largely understudied and ignored.[1] For example, although the WHO collected data on the cost of producing health services, they were analysed to determine cost effectiveness and not productivity. Although the costs of hospital services are known to vary systematically with income per capita, there are large variations in these costs within and between countries (Fig 1)[2] arising from poorly understood sources.

Fig 1: Variations in hospital costs 1973 - 2000

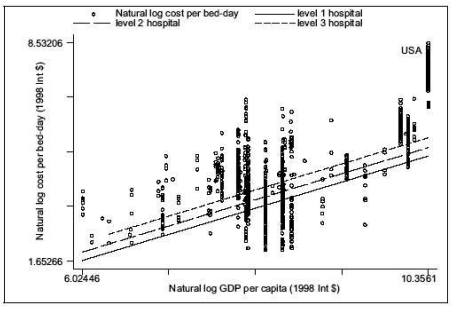


Figure I
Regression lines for level one, two and three hospitals against the natural log of GDP per capita. (The Y-axis is the dependent variable: natural log of cost per bed day) Cost in 1998 I$ N = 1171

1. Barnum, Howard, and Joseph Kutzin. (1993) Public Hospitals in Developing Countries: Resource Use, Cost, Financing. Baltimore, MD: Johns Hopkins University Press]. World Bank. 1993. World Development Report: Investing in Health. New York, USA: Oxford University Press.
2. Adam, Taghreed, David B Evans, and Christopher JL Murray (2003) Econometric estimation of country-specific hospital costs: Cost effectiveness and resource allocation 1 (3).

Variations in productivity between countries can also be inferred from differences reported in the very few multi-country productivity studies that have been published, e.g., the costs of reproductive health services provided in Sri Lanka and Egypt. The cost of providing reproductive services in Sri Lanka is about 50% less than in Egypt and about 1/5th of the expenditure recommended as a minimum by the 1993 World Development Report (Fig. 2). In Sri Lanka there is relatively universal access while in Egypt only about half of the population has access to these services.

Fig. 2: Variations in service delivery costs: reproductive health services

	Egypt 1994/95	Sri Lanka 1997	WDR 93 1993
Per capita income	1,100	738	430
Family Planning	0.76	0.23	1.11
MCH/Infant care	1.93	0.47	1.97
Child birth	1.26	0.74	4.67
Other OB/GYN OP	1.21	0.52	NA
Other OB/GYN IP	0.35	0.59	NA
Subtotal for FP/MCH/Cl	3.95	1.44	7.75
TOTAL	5.51	2.55	NA

Productivity and efficiency in Bangladesh and Sri Lanka

This study examined differences in health services productivity measures in Bangladesh MOHFW inpatient facilities and Sri Lanka public hospitals, using a nationally representative sample of 121 facilities. Figure 3 shows the size and structure of the samples in each country. In both countries, a facility questionnaire was used, which was based on a Sri Lanka MOH/World Bank (1991) study questionnaire. This was adapted to the individual country situations in Sri Lanka and Bangladesh by the respective research teams. In addition, there were extensive interviews with hospital directors, pilot tests, and a final revision in order to ensure that both countries adhered to same survey protocol.

Fig 3: The Bangladesh and Sri Lankan samples

Bangladesh hospital type	Sample size
THC's	83
District and General hospitals	21
Medical College hospitals	8
Specialist hospitals	9
TOTAL	121

Sri Lankan hospital type	Sample size
MOOH/MCH Units	40
Outpatient only facilities	19
Basic inpatient facilities	123
Intermediate inpatient facilities	22
Complex inpatient facilities	14
TOTAL	218

The data were analysed to compare costs, outputs, time and resource allocations and quality. Efficiency was estimated using ratio measures (staffing ratios and service indicators), unit costs (step-down cost accounting) and cost and production functions. Unit costs were estimated by allocating recurrent costs to inpatient (IP) and outpatient (OP) care. This included staff time, drugs (utilisation volumes were used to allocate drugs and medical supplies costs) and overheads (pro-rated on the basis of all other cost allocations).

Results

The results are summarised in Fig 4. Bangladesh facilities delivering comparable services was found to be smaller than Sri Lanka's, and Sri Lanka was more efficient than Bangladesh in terms of provision and delivered services at lower unit cost across both Type 1 and Type 2 facilities. However, although Bangladesh spent about 75% as much as Sri Lanka, it provided only about 1/10th of the density of facilities. In terms of productivity measures, ALOS was shorter in Sri Lanka and staff productivity generally higher, although Type 2 hospitals in Bangladesh were highly efficient. In addition, Sri Lanka spent more on drugs and used fewer staff than Bangladesh. About 46% of

Bangladesh's recurrent expenditure can be attributed to staff costs, although wage rates are very low.

Lower productivity in Bangladesh can be attributed to an inefficient staff mix (high non-medical/nursing personnel); an inefficient input mix (low drugs) and an inefficient network composition. In particular, Type 1 facilities were found to be over-staffed and over-capital and technology intensive. It is also noteworthy that financial incentives in both the Bangladesh and Sri Lanka government health sectors were equally weak and management highly centralised, leaving little room for managerial discretion, yet were associated with quite different outcomes. This suggests that non-formal incentives, which are currently poorly understood, play the critical role in determining performance.

Fig 4: Bangladesh and Sri Lanka efficiency comparisons

Indicator	Bangladesh	Sri Lanka
Type 1 Facilities		
Beds (mean)	31	47
Admissions (mean)	2,301	3,884
ALOS	4	3
Operating cost (US$ '000s)	143	78
Expenditure per million capita (multiple of GDP per capita)	1,345	1,096
Type 2 Facilities		
Beds (mean)	90	190
Admissions (mean)	7,656	14,633
ALOS	5	3
Operating cost (US$ '000s)	186	363
Expenditure per million capita (multiple of GDP per capita)	265	1,012

Conclusions

The findings of this comparative study confirmed evidence from previously published or unpublished data for countries around the world that there are wide variations in productivity and efficiency across countries. However, although some of the reasons for the differences observed in Sri Lanka and Bangladesh have been postulated, it is not clear whether the infrastructural differences or differences in the incentives governing manager and provider behaviour are more important. Given this, there is an urgent need to expand the research agenda to determine the reasons for these differences, and the relative impact of different strategies and policy levers on productivity. In particular, the role of institutions and culture, as well as financial and organisational factors, in the incentive structure governing manager and provider behaviour needs to be better understood if inter-country comparisons are to be interpreted correctly and if best practice lessons are to be applied successfully across countries.

Comparisons across time

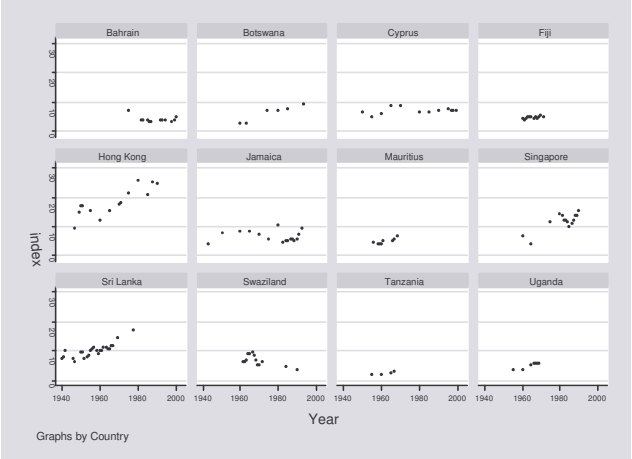
The assumptions

Policy relies on weakly supported assumptions about health services productivity growth. In OECD economies, for example in Hong Kong and the UK, steady improvement in public sector productivity is assumed for the purposes of budget planning. However, there is little evidence to support assumptions about system-wide improvements in productivity, although there is evidence of productivity gains in some areas (for example, 1-3% per annum in inpatient services). In other cases, for example, in several studies reported from Scandinavian countries, there is evidence that health sector productivity over the last decade has either modestly increased or decreased or oscillated around a zero average.[3] On the other hand, productivity in developing countries is either assumed to be fixed or is ignored.[4]

The evidence for health sector productivity growth

Moreover, although sparse, there is enough evidence to suggest that there has been sustained health service productivity growth in some developing countries. Fig 1 shows a time series analysis of heath sector productivity in twelve countries between 1940 and 2000 based on the costs of a composite inpatient and outpatient volume index. If this can be considered a robust index, statistical evidence of productivity growth is observable in six countries: Botswana, Mauritius, Uganda, Sri Lanka, Singapore and Hong Kong; and a statistically significant decline in only two, Bahrain and Swaziland.

Fig 1: Changes in health sector productivity in selected countries: 1940 - 2000

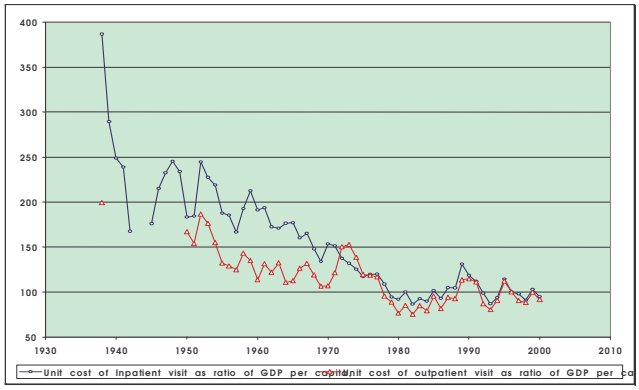


3. Färe, R., S. Grosskopf, B. Lindgren, and P. Roos. (1992) Productivity changes in Swedish pharmacies 1980-1989: A nonparametric Malmquist approach. The Journal of Productivity Analysis 3:85-101. Roos, P. (1996) Effectivitet och produktivitet inom folktandvarden. En pilot-studie. IHE Working Paper: Lund, Sweden: Institute of Health Economics. Linna, Miika. (1998) Measuring hospital cost efficiency with panel data models. Health Economics 7 (5):4 15-427. Halsteinli, Vidar, Jon Magnussen, and Sverre A.C. Kittelsen. (2003) Productivity growth in Norwegian psychiatric outpatient clinics: A panel data analysis of the period 1996-2001. Working Paper. 2003: 9. Oslo, Norway: University of Oslo, Health Economics Research Programme.

4. World Bank (1993) World Development Report: Investing in Health. New York, USA: Oxford University Press. Hutubessy, R C W., R Baltussen, T Tan Torres-Edejer, and D B Evans. (2003) Generalized Cost-effectiveness Analysis for priority setting in health. Applied Health Economics and Health Policy 1 (2): 39-54. Adam, Taghreed, David B Evans and Christopher JL Murray (2003) Econometric estimation of country-specific hospital costs: cost effectiveness and resource allocation 1 (3). Hensher, Martin (2001) Financing Health Systems through Efficiency Gains: CMH Working Paper Series. Paper No. WG3: 2. Geneva, Switzerland: Commission on Macroeconomics and Health.

There is more compelling evidence of sustained productivity growth in both outpatient and in inpatient services in Sri Lanka between 1935 and 2000. Fig 2[5] shows the unit cost of outpatient visits and inpatient admissions as a ratio of GDP per capita. The indexed cost of an inpatient admission fell from 400 to 100 over the period and the cost of an outpatient visit was halved between 1940 and 2000.

Fig 2: Changes in unit service costs in Sri Lanka: 1935 - 2000



There is also evidence at the micro-level from four districts in Sri Lanka of declining real unit costs of outpatient services and much greater declines in the real unit costs of inpatient services between 1991 and 1997. However these declines vary widely between districts (Fig 3). Moreover, changes in the costs of outpatient visits tend to mimic changes in the costs of inpatient admissions in the same districts.

Fig 3: Unit costs of health services in four Sri Lanka districts: 1991 - 1997

District	Outpatient visit (1991)	Outpatient visit (1997)	Change (%)	Inpatient admission (1991)	Inpatient admission (1997)	Change (%)
Colombo	81	199	146%	1,344	2,239	67%
Matale	26	63	145%	411	610	48%
Galle	30	106	258%	629	1,494	137%
Polonnaruwa	15	44	199%	550	965	76%
All (4) districts	49	109	122%	1,071	1,538	44%

	Outpatient unit costs	Inpatient unit costs
Nominal rate of change	14.2%	6.2%
Real rate of change (adjusted with GDP deflator)	4.1%	-3.2%
Real rate of change in relation to per capita GDP	-0.4%	-7.3%

Conclusions

These findings suggest that there is little evidence to support the fixed productivity assumption adopted in international policy proposals. They also suggest that more attention on strategies to improve productivity, relative to attention to mobilise resources, would be beneficial. Both are important although there is a particular issue about the extent to which additional resources result in an increase in the volume or quality of services delivered if the incentives for improved efficiency and productivity are weak.

The key question that arises is why does productivity growth differ between countries and, if the Sri Lanka example is anything to go by, between parts of countries? It may be significant that the six best performing countries shown in Fig 1 were all at one time British Crown Colonies. This does not necessarily support the superiority of the British colonial project but it does point to the possible importance of institutional history and raises an intriguing topic for future research.

However, although some explanations for differences in productivity growth can be advanced, much more needs to be known about how cultural, institutional, social, organisational and managerial factors play off against each other before strategies to improve productivity can be designed on the basis of evidence and before good practices from one country can be adopted successfully by another.

5. Source: Rannan-Eliya et al. 2003

Further reading

Hensher M (2001) Financing health systems through efficiency gains; CMH Working Paper No 3; Commission on Macroeconomics and Health (WHO)

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Acknowledgments: The figures are taken from a presentation by Ravi Rannan-Eliya, Institute of Policy Studies, Sri Lanka. Further details can be obtained by contacting Ravindra P. Rannan-Eliya at ravi@ips.lk.