China Economic Review 27 (2013) 326–338

Contents lists available at ScienceDirect

China Economic Review

Health insurance reform and efficiency of township hospitals in rural China: An analysis from survey data

Martine AUDIBERT [a], Jacky MATHONNAT [a], Aurore PELISSIER [a,*], Xiao Xian HUANG [a], Anning MA [b]

[a] Centre d'Études et de Recherches sur le Développement International (CERDI) and Institut d'Économie de la Santé et de Santé Publique (IESSP), University of Auvergne, 65 bd François-Mitterrand, 63000 Clermont-Ferrand, France
[b] Weifang Medical University, PR China

ARTICLE INFO

Article history:
Received 14 February 2012
Received in revised form 20 January 2013
Accepted 28 January 2013
Available online 4 February 2013

JEL classification:
G22
I1
I38
O12

Keywords:
Data Envelopment Analysis
Technical efficiency
China
New Rural Cooperative Medical Scheme
Township hospitals

ABSTRACT

In the rural health-care organization of China, township hospitals ensure the delivery of medical services above village health stations and below county hospitals. Particularly damaged by the economic reforms implemented from 1975 to the end of the 1990s, the efficiency of township hospitals has been questioned, mainly because of the implementation since 2003 of the reform of health insurance in rural areas (New Rural Cooperative Medical Scheme). From a database of 24 randomly selected township hospitals observed over the period 2000–2008 in Weifang Prefecture (Shandong), this study examines the efficiency of township hospitals through a two-stage approach. As curative and preventive medical services delivered at township hospital level use different production processes, two data envelopment analysis models are estimated with different orientations to compute scores. The results show that technical efficiency has declined over time. The factors explaining technical efficiency are mainly environmental characteristics rather than internal ones. Among these environmental factors, NRCMS have in average a negative effect on the evolution of THs efficiency, although efficiency have improved for some of them. Our results suggest also that, in the context of China, the efficiency of township hospitals is influenced by unobservable factors. From our findings, we suggest five main orientations to improve THs efficiency.

1. Introduction

In the rural Chinese healthcare system, township hospitals (THs) play an essential role: they represent the main providers of primary healthcare in rural areas (Hillier & Shen, 1996). THs constitute the intermediate level of healthcare facilities and ensure the link between village health stations at the grassroots level and county or above-level hospitals. They supervise healthcare delivery at the level of village health stations, and act as gate keepers, orienting patients toward higher health facility levels. They offer a wide-ranging set of general medical services by delivering curative and preventive activities, from vaccinations and laboratory tests to outpatient visits and inpatient care.

The Chinese rural healthcare system has greatly changed since the 1950s. From 1950 to 1975, China achieved significant improvements in health outcomes, thanks to the definition of an efficient three-tier system of healthcare delivery and a successful community-based rural health insurance scheme (Hsiao, 1995; World Bank, 1997). However, the economic transition (1975–1990)

Abbreviations: THs, township hospitals; NRCMS, New Rural Cooperative Medical Scheme; DMU, decision making unit; SFA, Stochastic Frontier Analysis; DEA, Data Envelopment Analysis; SBC, soft budget constraint; GBS, global budget system; SMP, self-management project; BNHI, Bureau of National Health Insurance.

* Corresponding author at: CERDI-CNRS, IESSP, France. Tel.: +33 4 73 17 74 35; fax: +33 4 73 17 74 28.
E-mail addresses: martine.audibert@udamail.fr (M. Audibert), jacky.mathonnat@udamail.fr (J. Mathonnat), pelissier.aurore@gmail.com (A. Pelissier), huang.xiaoxian@gmail.com (X.X. Huang), ma.a@126.com (A. Ma).

1043-951X/$ – see front matter © 2013 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.chieco.2013.01.004

caused the deterioration of these two pillars of the rural healthcare system (Liu, Xu, & Wang, 1996; Wagstaff, Lindelow, Wang, & Zhang, 2009).[1] First, the Cooperative Medical System (CMS) collapsed. While in 1975 quasi-universal coverage was achieved in rural areas, less than 10% of the rural population was still insured in the 1990s (World Bank, 1997). Secondly, the three-tier system, consisting of village health stations, township and county hospitals (from the lower level to the upper one), was disrupted. The efficiency of THs has declined due to the economic reforms (Hsiao, 1995; Liu, Rao, & Hu, 2003). The budget decentralization (1979) and the management reform of THs (1983) led them to look for profitable activities (Hillier & Shen, 1996; Liu et al., 1996). As a consequence, negative externalities came to light: the quality of healthcare declined, healthcare prices increased, expensive technologies were overused, drugs were overprescribed, the average length of stay increased and preventive activities were neglected to privilege expensive curative activities (Eggleston, Ling, Qingyue, Lindelow, & Wagstaff, 2008; Hillier & Shen, 1996; Hsiao, 1995; World Bank, 1997). The collapse of the CMS disturbed the referral system. Moreover, as THs suffered from a bad reputation, patients bypassed them to go directly to county hospitals (World Bank, 1997). This phenomenon was enhanced by the increase of rural incomes, leading patients to look for higher quality services and enhancing their capacity to pay for health (Liu et al., 1996). Thus, the activity of THs fell off.

Since 2003, the implementation of the New Rural Cooperative Medical Scheme (NRCMS) has served mainly two objectives. The first one is to offer an insurance system to the rural population, in order to lower the financial barrier to accessing the healthcare system and to improve the rural population's health (Wagstaff, Lindelow, Wang, & Zhang, 2009). The second one is to make the THs, which suffered from the economic liberalization, more attractive by re-orientating patients toward this level.

The question of the THs' efficiency is crucial, with regard to their strategic position in the healthcare delivery chain and the changes they experienced over the preceding years, but also in a context of scarce resources, of vertical and horizontal competition and health insurance reform. By targeting THs more than other health facilities in Weifang Prefecture, on which this study is focused, the NRCMS can influence the activity and the efficiency of these facilities. The main channels are the likely increase in demand induced by insurance and the implementation of contracts. Therefore, identifying the determinants of THs' efficiency can help the design of relevant policy measures by highlighting the factors on which policy makers can act.

This study investigates technical efficiency by examining the production process of healthcare services in a sample of 24 randomly selected THs, observed over the period 2000–2008 in rural areas of Weifang Prefecture in China. According to the reviews of Hollingsworth (2003) and O'Neill, Rauner, Heidenberger, and Kraus (2008), the literature on the efficiency of health facilities mainly concentrates on North American and European case studies. But there is a growing literature on developing countries, such as Ersoy, Kavuncubasi, Ozcan and Harris (1997) for Turkey, La Forgia and Couttolenc (2008) for Brasil, Hajialiafzali, Moss and Mahmood (2007) for Iran, Kirigia, Emrouznejad and Sambo (2002) for Kenya, Puenpatom and Rosenman (2008) for Thailand, among others. In addition, there are two articles related to technical efficiency in Taiwan (Chang, 1998; Chang, Cheng, & Das, 2004), and two recent studies which examined hospital efficiency in China using a Data Envelopment Analysis (DEA) approach (Hu, Qi, & Yang, 2012; Ng, 2011). The first one (Ng, 2011) focuses on Guangdong Province while the second (Hu et al., 2012) is considering regional hospitals nationwide. Our study adds complementary findings to the recent literature in examining THs, well-described as facing efficiency issues (Hsiao, 1995; Liu et al., 2003), but never studied through an efficiency analysis. National studies revealed serious discrepancies throughout China, both in terms of the effects of reform and the functioning of the healthcare system (Brown, de Brauw, & Du, 2008; Feng & Song, 2009; Hu et al., 2012), stressing the importance of investigating more at local level through case studies to deepen knowledge and guide specific regional policies, as mentioned by Eggleston et al. (2008). A two-stage approach is applied: technical efficiency of THs is computed from DEA and then technical efficiency scores are regressed on a set of explanatory variables through a Tobit approach.

The remainder of the paper is organized as follows. Section 2 presents the data. The methodologies to estimate technical efficiency and its determinants are respectively examined in Sections 3 and 4, and the results are presented in Section 5. Sections 6 and 7 end with a discussion and a conclusion.

2. Data

The original dataset covers 24 randomly selected THs of Weifang Prefecture, in Shandong Province (about 14% of total THs in Weifang Prefecture) observed over a nine-year period, from 2000 to 2008. Information was collected from the Weifang Health Bureau database and the registers/books of the THs during the third quarter of 2009 in collaboration with the Weifang Medical University and Chinese authorities. Data were checked and when necessary new investigations were implemented in THs and completed with interviews.

Table 1 presents the descriptive statistics on the environmental characteristics of the THs. Over the period, the THs were operating in a quite rapidly-changing environment. The population in the sample was mainly rural and the density increased by 6%. The rural net income per capita (in constant prices) increased by 66% over the period, from on average 3387 Yuan over the period 2000–2002 to 5251 Yuan over the period 2006–2008. The implementation of the NRCMS was gradual among the townships studied, from 2003 to 2006. The cover rate increased largely between 2003 and 2008 and over the period 2006–2008 the vast majority of the population adopted the NRCMS (95.28%). The ratio of the number of village health stations per 1000 households reflecting the physical accessibility to village health stations remained quite stable over the period. The distance of the THs to the county hospital was between 10 and 50 km with an average of 25 km. The good quality of roads in Weifang Prefecture lowered the physical constraints on

[1] For more details about the evolution of the healthcare system in China, see: Eggleston et al. (2008); Hillier and Shen (1996); Hsiao (1984); Hsiao (1995); Liu et al. (1996, 2003); Wagstaff, Lindelow, Wang, and Zhang (2009); World Bank (1997); and Yip and Hsiao (2008).