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Association of hospital ownership with patient transfers to outpatient care under a prospective payment system in Taiwan

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Abstract

Case payment, a prospective payment system akin to diagnosis-related groups (DRGs) has in-built incentives for hospitals to transfer inpatients to their own ambulatory care units following early discharge. This study used nation-wide inpatient claims data on a total of 100,730 patients treated in 2000 in (Taiwan): cesarean section (59,364 cases), femoral/inguinal hernia operation (18,675 cases), and hemorrhoidectomy (22,691 cases), all reimbursed by case payment, to explore the relationship between hospital ownership and patient transfers to outpatient treatment. For all three diagnoses, for-profit (FP) hospitals not only had lower lengths of stay (LOS) compared to public hospitals, but also showed very high odds of patient transfer to their own outpatient units, after controlling for institutional variables, (hospital level, teaching status, and geographic location), hospital competitive environment (the Herfindal–Hirschman index), and patient variables (gender, age, length of stay, and number of secondary diagnoses, a proxy for severity of illness). Similar, though slightly lower odds were observed with not-for-profit (NFP) hospitals relative to public hospitals. The findings support the property rights theory, suggesting that in Taiwan, institutional profit maximization motives may be driving patient transfers under the case payment diagnoses, rather than medical care needs. In NFP hospitals, their physician compensation mechanism, driven largely by care volumes provided by each physician, appears to be driving the disproportionately greater likelihood of patient transfer to outpatient care.

Keywords: Case payment; Patient transfer; Institutional ownership; Herfindal index

1. Introduction

Progressive introduction of the case payment system, a form of prospective payment system (PPS) in Taiwan, has reduced the cost of care for disease items brought under its ambit [1–3]. Case payment is similar to the diagnosis-related groups (DRGs) system in the US, providing for fixed reimbursement rates based on diagnostic codes rather than the actual costs incurred/charged by the provider for diagnosis and treatment. PPS allows hospitals to retain the difference between the cost of care and the reimbursed rate, but inevitably, induces early, and sometimes premature discharge to maximize institutional profits

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[4]. This is reflected in significantly reduced hospital lengths of stay (LOS) under PPS reimbursement as documented by several authors in Taiwan [5–7] and in other countries, chiefly the United States [8,9].

The case payment system in Taiwan has some checks to ensure quality of care and to prevent additional reimbursement for care provided in other care units. Taiwan's BNHI specifies the minimal care requirements including standardized procedures for each diagnosis. To obtain full reimbursement, at least 65% of the minimal required items should have been accomplished. Case payment also specifies optional care items to be provided if needed without extra charge, which is also monitored. The patient's health status at discharge must meet prescribed standards for the hospital to be reimbursed. Hospitals are not paid for unscheduled readmissions for the same disease within 14 days. This is to prevent premature discharge, known as the "quicker and sicker" syndrome in the US. Despite these caveats, cost reduction under case payment in Taiwan could be more apparent than real, given that the restrictions are limited to inpatient care. There are no restrictions on continuing outpatient care, which continue to be reimbursed on a cost-plus basis. Therefore, to accurately assess the impact of case payment on health care costs in Taiwan, it is essential to take into account patient transfers to outpatient care.

Many authors in the United States have documented the incentive to transfer patients to outpatient and other care units outside the ambit of PPS restrictions to compensate for diminished inpatient revenues under DRGs [10–12]. Kominski and Biddle [9] also demonstrated the concurrent reduction in inpatient claims with an increase in outpatient claims, following implementation of PPS in the United States. Building on these findings from the United States, we hypothesized that in Taiwan, for case payment diagnoses, for-profit (FP) hospitals would manifest significantly increased patient transfer to their ambulatory care units, compared to not-for-profits (NFP) and public hospitals. Under the assumptions of the property rights theory propounded by Furubotn and Pejovich [13], NFP and public institutions lack the incentive to fulfill the objectives set out by their principals, and therefore, FP hospitals tend to outperform the NFP and public institutions. Since FP ownership allows managers and owners to benefit from the profits, there is an incentive to maximize profits. In public institutions, the benefits of efficiency and increased profits accrue to the public that owns the public institution, and therefore, the managers of these institutions have no incentive to exert unduly to maximize efficiency and profits [14]. Many authors have documented the differences in profit-maximizing behaviors of FP and NFP hospitals under PPS. Friedman and Shortell [15] reported that investor-owned hospitals were more responsive to cost containment pressures under PPS in the United States. Sorrentino [16] reported significant relationships between LOS and hospital ownership for seven DRGs. Younis et al. [17] concluded that hospital ownership was a significant determinant of hospital profitability under PPS. In Taiwan, Lin et al. [18] found that FP hospitals had shorter LOS compared to NFP under case payment. The average costs per discharge of uncomplicated thyroidectomy and two other diagnoses covered by case payment were higher in public hospitals than in FP hospitals, with the reverse being true in respect of three diagnoses that were reimbursed by cost-plus reimbursement [19]. Similarly, Yang reported that uncomplicated appendectomy that is covered by cost-plus reimbursement cost more in FP compared to public hospitals [20]. These studies support the assumptions of the property rights theory under PPS reimbursement conditions. While institutional differences in costs per discharge between the FP and public sector are documented, to date, there is no documentation on patient transfers in Taiwan, which represent yet another form of profit maximization behavior under case payment pressures. We used nation-wide data on cesarean section, femoral/inguinal hernia operation, and hemorrhoidectomy to explore the association between hospital ownership and inpatient to outpatient transfers under the case payment system.

2. Methods

2.1. Data sources and study sample

The data were sourced from the National Health Insurance Research Database (NHIRD) for the year 2000, covering all medical benefit claims for Taiwan's population of over 23 million. The NHIRD provides one principal diagnosis (ICD-9-CM code) and up to four secondary diagnoses for each patient.

Patients admitted to hospitals between 1 January 2000 and 31 December 2000 with a diagnosis of 0371A (cesarean section), 0163A (hernia operation), and 0158A (hemorrhoidectomy alone or with anal fistulectomy) were included in the study. Cesarean section and hernia operation were selected since they were among the earliest procedures brought under case payment (1995 and 1997, respectively), and we expected that the institutional responses should have stabilized by 2000. Hemorrhoidectomy was selected due to high volume of the procedure throughout Taiwan. All three diagnoses also satisfied the condition of relative homogeneity in clinical severity within each diagnosis.

Discharge status in the NHIRD is classified into recovered, transferred to outpatient care in the same hospital, dead, discharged at the patient's request, and transferred to another hospital. Transfer to outpatient care does not include patients asked to come for routine follow-up, suture removal or allied routine outpatient procedures. After excluding dead, discharged at patient's request, and transferred to another hospital to their very low volumes, a total of 59,364 cesarean section cases, 18,675 hernia operation cases, and 22,691 hemorrhoidectomy cases were included in the study (total 100,730 patients).

2.2. Statistical analysis

Multiple logistic regression analysis was conducted separately for each diagnosis to determine the adjusted odds of being discharged to the hospital's outpatient unit relative to being classified as recovered. The key independent variable of interest was hospital ownership, classified as FP, public, and NFP. The control variables were patient, hospital, and hospital competitive environment variables. Patient variables included age, LOS, (both continuous variables), gender and presence of co-morbidities (nil, one, two, or three-plus secondary diagnoses). The latter two were coded as categorical variables. Hospital variables included geographic location (north, central, south, and east), hospital level (medical centers with >500 beds, regional hospitals, 250–499 beds, district hospitals, 20–249 beds, and private ob-gyn clinics, <10 beds), and teaching status. The degree of hospital competition is known to be an important predictor of hospital behavior in respect of cost reduction, pricing, and offering advanced technology [21–23]. In this study, degree of hospital competition is measured by Herfindal–Hirschman index (HHI) $\sum s_i^2$ where s_i is the market share of total discharges of each hospital competing in a given healthcare market network, and the summation runs over all hospitals in the individual healthcare network [24]. In Taiwan, the healthcare market is classified by the Department of Health into 17 healthcare networks, for which the Herfindal index was calculated and used as a control variable. Since information on clinical severity is not available, the number of secondary diagnoses was used a proxy, representing the potential medical need for outpatient care following surgery. LOS was used as another control variable to represent the dimension of clinical severity not captured by the secondary diagnoses, for example, anesthetic or post operative complications, transient hypertension, etc. that may be resolved before discharge and therefore fail to qualify as a discharge diagnosis. A significance level of $P < 0.05$ was used.

3. Results

3.1. Sample characteristics

Table 1 shows that 72.1, 92.8, and 91.8% of cesarean section, hernia operation, and hemorrhoidectomy cases, respectively, were transferred to outpatient treatment under the same hospital. NFP hospitals had the highest market share for all diagnoses, and public hospitals had the lowest market share. Hemorrhoids had the highest incidence of secondary diagnoses (69.7%) compared to cesarean section (47.7%), and 16% for the hernia operation group. The secondary diagnoses in the hemorrhoids group were mostly qualifying clauses about the hemorrhoid itself, rather than true complications with patho-physiological or LOS implications (39.7% thrombosed hemorrhoids, 20% with residual skin tags, 20% with both internal and external hemorrhoids, etc.) It is essential to bear this in mind when evaluating the study results.

3.2. Association between hospital ownership and patient transfer

Bivariate statistics show higher rates of patient transfer for hemorroidectomy and hernia operations

Table 1
Descriptive statistics of the three case payment diagnoses

DRG classification (DRG code)	Cesarean section (0371A), $n = 59{,}364$; n (%) or mean (S.D.)	Hernia operation (0163A), $n = 18{,}675$; n (%) or mean (S.D.)	Hemorrhoidectomy (0158A), $n = 22{,}691$; n (%) or mean (S.D.)
Discharge status			
Transfer to O-P	42,809 (72.1)	17,328 (92.8)	20,820 (91.8)
Recovered	16,555 (27.9)	1,343 (7.2)	1,871 (8.2)
Gender			
Male		16,176 (86.6)	13,507 (59.5)
Female		2,495 (13.4)	9,184 (40.5)
Hospital ownership			
Public	10,412 (17.5)	5,036 (27.0)	5,155 (22.7)
NFP	25,934 (43.7)	7,779 (41.7)	9,509 (41.9)
FP	23,018 (38.8)	5,856 (31.4)	8,027 (35.4)
Hospital location			
Northern	26,535 (44.7)	8,402 (45.0)	11,515 (50.7)
Central	11,943 (20.1)	4,688 (25.1)	4,364 (19.2)
Southern	19,831 (33.4)	5,035 (27.0)	6,557 (28.9)
Eastern	1,044 (1.8)	546 (2.9)	255 (1.1)
Hospital level			
Medical center	13,883 (23.4)	5,752 (30.8)	7,006 (30.9)
Regional hospital	20,172 (34.0)	6,926 (37.1)	8,146 (35.9)
District hospital	24,287 (40.9)	5,993 (32.1)	7,539 (33.2)
Clinic	1,022 (1.7)		
Teaching status			
Yes	40,862 (68.8)	14,400 (77.1)	17,172 (75.7)
No	18,502 (31.2)	4,271 (22.9)	5,519 (24.3)
Number of secondary diagnoses			
0	31,056 (52.3)	15,682 (84.0)	6,877 (30.3)
1	15,721 (26.5)	1,958 (10.5)	10,132 (44.7)
2	8,381 (14.1)	671 (3.6)	3,727 (16.4)
>3	4,206 (7.1)	360 (1.9)	1,955 (8.6)
Age (years)	30 (5)	46 (26)	44 (14)
LOS (days)			
Public	5.60 (1.36)	2.79 (1.56)	3.15 (2.06)
NFP	5.16 (1.32)	2.38 (1.32)	2.68 (1.75)
FP	5.16 (1.27)	2.19 (1.54)	2.59 (1.98)
Total	5.24 (1.32)	2.43 (1.48)	2.75 (1.92)

O-P: outpatient; LOS: length of stay; NFP: not-for-profit; FP: for-profit.

in FP hospitals compared to public hospitals. Patient transfer rates were similar in FP and NFP hospitals for hemorroidectomy (97.4% versus 97.8%, respectively), and for hernia operations (98.9% versus 97%). In case of cesarean section, transfer rates are highest in NFP hospitals followed by FP and public hospitals (Table 2). However, these crude rates need to be adjusted for clinical severity (operationalized as number of secondary diagnoses) to evaluate the association between patient transfer and hospital ownership.

Multiple regression analysis that controls for clinical severity besides other variables, clarifies the relationship between patient transfer and ownership, as shown in Table 3. Patients admitted to FP hospitals had greatly increased odds of being transferred to the hospital's outpatient unit relative to public hospitals

Table 2
Bivariate associations between hospital ownership and patient transfer

Diagnosis	Discharge status			χ^2-test
	Recovery *n* (%)	Transfer to outpatient unit *n* (%)	Total	
Cesarean section (0371A)				2988[a]
Public hospital	4,509 (43.3)	5,903 (56.7)	10,412	
NFP hospital	4,467 (17.2)	21,467 (82.8)	25,934	
FP hospital	7,579 (32.9)	15,439 (67.1)	23,018	
Hernia operation (0163A)				1901[a]
Public hospital	1,042 (20.7)	3,994 (79.3)	5,036	
NFP hospital	236 (3.0)	7,543 (97.0)	7,779	
FP hospital	65 (1.1)	5,791 (98.9)	5,856	
Hemorrhoidectomy (0158A)				3493[a]
Public hospital	1,451 (28.1)	3,704 (71.9)	5,155	
NFP hospital	244 (2.6)	9,265 (97.4)	9,509	
FP hospital	176 (2.2)	7,851 (97.8)	8,027	

NFP: not-for-profit; FP: for-profit.
[a] $P < 0.001$.

(ORs = 5.11, 14.69, and 27.62, respectively, for cesarean, hernia, and hemorrhoidectomy operations). NFP hospitals also had higher odds of patient transfer compared to public hospitals (ORs = 3.29, 10.82, 23.26).

Geographic location was significantly associated with patient transfer, with central Taiwan showing the highest odds relative to northern Taiwan. The Herfindal index had odds ratios of about 1 (not a significant predictor) for all three diagnoses. Teaching hospitals were more likely to transfer cases compared to non-teaching hospitals. Patient transfer was not related to LOS (OR = 1), although LOS is often an indirect indicator of severity of illness. This is possibly because of collinearity with the other variable for severity of illness, the number of secondary diagnosis. Since the odds ratio for LOS was 1, we deleted LOS from the model.

The odds ratios for the number of secondary diagnoses represent a mixed bag. As discussed earlier, the predominance of trivial qualifications of the primary condition among the secondary diagnosis, particularly in respect of hemorrhoid cases clearly confounded our attempt to represent severity of illness through a count of the secondary diagnoses. Only the >3 secondary diagnoses group shows higher odds of patient transfer relative to the "no secondary diagnoses" group for cesarean section and hernia cases. For hemorrhoidectomy cases, the odds ratios show that the "no secondary diagnosis" group had higher odds of patient transfer relative to those with any additional diagnosis. These findings probably reflect the inadequacy of this conceptualization of severity of illness.

4. Discussion

This study supports the hypothesis that hospital ownership, particularly FP ownership, and to a lesser extent, NFP status significantly predicts patient transfer to a hospital's outpatient unit. In the hernia and hemorroidectomy groups, the effect size of ownership (magnitude of odds ratios) is the highest compared to any other institutional or demographic variable evaluated (as shown in Table 3), indicating that of all the variables, ownership is perhaps the strongest predictor of patient transfer in Taiwan. Even in respect of cesarean section, it is almost the leading predictor of patient transfer.

The way the PPS is presently designed, there are financial incentives to minimize inpatient care and use the route of patient transfer to cushion the effects of PPS on hospital profits. LOS statistics are also consistent with this explanation. While the average LOS for hernia operations was 2.43 days, it was 2.79, 2.38, and 2.19, respectively, for public, NFP, and FP hospitals; similarly, average LOS were 3.15, 2.68, and 2.59 days for hemorrhoidectomy cases, and 5.60, 5.16 and 5.16 days, respectively, for cesarean deliveries.

Table 3
Adjusted relationship between hospital ownership and patient transfer

Variable	Cesarean section OR (95% CI)	Hernia operation OR (95% CI)	Hemorrhoidectomy OR (95% CI)
Hospital ownership			
Public hospital (reference group)			
NFP	3.29 (3.11–3.47)	10.82 (9.18–12.75)	23.26 (17.74–30.51)
FP	5.11 (4.76–5.49)	14.69 (10.83–19.91)	27.62 (23.54–32.41)
Hospital location			
North (reference group)			
Center	2.08 (1.96–2.21)	4.09 (3.16–5.31)	6.98 (5.44–8.96)
South	1.49 (1.42–1.57)	1.86 (1.60–2.17)	3.78 (3.19–4.48)
East	0.91 (0.76–1.09)	0.58 (0.43–0.79)	0.38 (0.25–0.58)
Hospital level			
Medical center	2.05 (1.90–2.22)	0.15 (0.11–0.20)	0.09 (0.07–0.13)
Regional hospital	1.16 (1.09–1.24)	0.41 (0.31–0.54)	0.97 (0.74–1.28)
District hospital (reference group)			
Clinic	2.39 (2.09–2.75)		
Teaching status			
Yes	5.28 (4.94–5.64)	5.51 (4.11–7.38)	11.18 (8.19–15.26)
Number of secondary diagnosis			
0 (reference group)			
1	1.29 (1.23–1.35)	0.98 (0.81–1.17)	0.51 (0.43–0.59)
2	1.33 (1.25–1.42)	0.75 (0.58–0.96)	0.53 (0.44–0.63)
3	1.40 (1.28–1.53)	1.32 (1.11–1.82)	0.49 (0.39–0.63)
Gender			
Male		0.99 (0.81–1.22)	1.18 (1.05–1.34)
Female (reference group)			
HHI	1.00 (1.00–1.01)	0.99 (0.99–1.00)	0.99 (0.99–1.00)
Age	0.99 (0.99–1.00)	0.99 (0.99–1.00)	0.99 (0.99–0.99)
Constant	0.10	5.64	1.01
n	59,364	18,675	22,691
χ^2	8679[a]	2386[a]	5130[a]

OR: odds ratio; NFP: not-for-profit; FP: for-profit; HHI: Herfindal–Hirschman index.
[a] $P < 001$.

The index of hospital competitive environment, the Herfindal index, which is documented as a major predictor of institutional behavior, failed to show any significance in our study (OR = 1 for all three diagnoses). This could be due to two reasons. We controlled for geographic location, which itself serves as a proxy for density of hospital bed capacity. Therefore, the Herfindal index could have failed to show significance due to collinearity with region specification. Second, it could be that the Herfindal index is highly correlated with FP and NFP ownership. Reasonably, it could be expected that regions with high density of hospital bed capacity also have a high density of FP and NFP beds. With the ownership effect on patient transfer overshadowing all other institutional effects (highest magnitude of ORs), our finding of nil effect of competitive environment is reasonable.

Our findings on patient transfer in FP hospitals are consistent with the studies of Bellandi et al. [25], Younis et al. [26], and Shukla et al. [27], essentially providing empirical support for the property rights theory. The property rights theory suggests that FP hospitals have a greater financial motive to maximize profits than non-profit hospitals [14]. The fixed reimbursement rates for inpatient care without concomitant restrictions on outpatient care carries a built-in incentive to generate more outpatient visits to maximize revenues, a response that is more likely in the FP sector.

Our study shows that FP hospitals have very high odds of patient transfer relative to public hospitals. But the NFPs are not far behind. This can be explained by the hospital ownership situation and physician compensation system in Taiwan. Public hospitals are owned and financed by either the Department of Health of Taiwan, or by the county and city governments. After realizing the NHI reimbursement, any residual budget deficit is made up by the government. Physicians are compensated with a base salary, with some supplementation from volume-driven NHI revenues accruing to the hospital. The bonus is not directly proportional to the patient revenue generated by each physician. By law, FP hospitals can be owned only by physicians. There are no corporate hospitals in Taiwan. Of total 637 hospitals in Taiwan, 419 are physician-owned FP hospitals. In these hospitals, profits and physician income are solely driven by reimbursements realized from NHI and from out-of-pocket payments by patients. NFPs are affiliated with non-profit religious organizations or other non-profit institutions. They are exempt from taxes, receive donations from philanthropists, and often, lump sum grants from government to continue to serve in under-served areas. Most NFPs compensate their physicians in proportion to the volume-driven revenues generated by each physician. Our findings of highest odds of patient transfer by FP hospitals, followed closely by NFPs is in line with the ownership and physician compensation system, assuming the dynamics of the property rights theory. Although the NFP hospital managements have no incentive to maximize profits, physicians have an incentive (allied with the assumptions of the property rights theory) to transfer patients. Our finding of slightly lower odds in NFP hospitals compared to FP hospitals may be reflecting the higher percentage of revenues paid to physicians compared to the NFP sector, a stance that is possible due to their relative financial advantages, such as direct financial support from the government, and exemption from property and institutional income taxes. On the contrary, physicians in public hospitals, mostly compensated with high base salaries, have little individual incentive to provide the additional clinical effort to provide outpatient care.

Apart from financial factors, another factor in patient transfers could be the increasing anxiety about malpractice litigation in Taiwan. Physician uncertainty about health status at discharge following a short LOS (which is also significantly shorter in FP hospitals) may also be contributing to patient transfer. The number of malpractice lawsuits increased by 58.5% since 1995 when National Health Insurance was initiated (Department of Health, 2002).

Although past studies have documented patient transfers from inpatient to outpatient units as one institutional response to the implementation of a PPS [9,12], the differences in magnitude of the phenomenon by ownership have not been explored. Our study shows that over 97% of patients undergoing a hernia operation or hemorrhoidectomy in FP and NFP hospitals were transferred to outpatient care. The disproportionate transfer rate at FP and NFP hospitals is similar to DRG creep, a phenomenon documented by several authors in the United States [28,29]. DRG creep is an administrative syndrome where hospitals manipulate the diagnostic information in order to classify patients into DRGs that are associated with higher rates and thereby obtain higher revenue [30]. We are not aware of the existence of DRG creep in Taiwan, but the data show the existence of patient transfer as one institutional response to the revenue-restricting effects of the case payment system.

Currently, it is not possible to assess the dollar value of the cost impact, as this would require patient care costs to be tracked through all levels of care. The NHIRD does not release patient identifier information on grounds of patient confidentiality issues, nor does it provide comprehensive, linked data on patients over time and across claims databases. Outpatient care, inpatient care, and other levels of care are documented in unlinked databases.

Despite the above limitations, our study findings have important policy and research implications. The magnitude of patient transfer, our earlier documentation about costs per discharge, and documentation by other authors emphasize the need for the NHIRD to move towards providing patient-level data linked across databases to researchers. Until then, past studies showing cost reduction for case payment items may be causing a false sense of complacence that case payment is the panacea to the problem of surging healthcare costs. From a policy perspective, our study suggests that case payment diagnoses patients treated in the FP and NFP sectors are possibly incurring greater healthcare costs than in the public sector. However, our study does not take into account the

budget supplementation by governments to the public hospitals, and the costs of foregone taxes on account of tax exemptions to the NFP sector. Considering the sums of money involved, the government should sponsor detailed costing studies to establish the real costs and efficiencies of patient care in the FP, public, and NFP sector, taking into account all inputs (such as public sector salaries and tax exemptions). Pending that, it is difficult for us to recommend any long-term policy initiatives to address the question of patient transfer in the private healthcare sector.

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