



# A Study of the Impacts of Non-Patient Revenues on Operating Efficiencies of Medical Institutions

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## Abstract

**Objectives:** The purpose of this study was to examine the determinants of non-patient revenues in the Taiwan hospitals.

**Methods:** Using the 2012-2014 financial statements of hospitals in Taiwan as examples, the structure of hospital non-medical activity proceeds are analyzed using descriptive statistics. In addition, nonparametric statistics and regression model were used to investigate the impact of hospital non-medical activity proceeds.

**Results:** During the sampling period, the hospital non-medical activity proceeds accounted for 9.29% of the total hospital operating revenues, of which the major source is investment income accounting for 28.55% of the hospital non-medical activity proceeds. Among the hospital characteristics, medical centers and hospital non-medical activity proceeds show a positive correlation; medical activity income and loss show a positive correlation with rental income; public and private hospitals and donation and rental income show a negative impact.

**Conclusions:** Non-medical activity proceeds have growing importance in hospital financial performance. Other than hospital ownership and medical levels that are the main impact factors, non-metropolitan hospitals are also committed to increasing donation and rental income. Hospitals suffering medical losses have more incentives to engage in non-medical activities in order to lessen their financial strain.

**Keywords:** Non-patient revenues; Non-medical related activities, Donation; Rental; Investment

## Introduction

Since the implementation of the National Health Insurance (NHI) in Taiwan in 1995, hospital operating environments have undergone drastic changes. A hospital draws over 90% of its revenues from NHI. As a result, hospitals have become increasingly competitive, while the main hospital operating income has been severely impacted. On the other hand, medical services require extensive human resource inputs and continuous improvement on medical equipment inputs, failing to substantially reduce medical costs. In this case, if a hospital only relies on revenues from the NHI, they will be subject to financial pressures. If a hospital suffers financial losses, its investment in medical activities will decrease, which will lead to deteriorated medical quality in the long run, the public's negative perception of the hospital, or even hospital closedown [1,2]. In such a situation where management performance is continuously deteriorating the finances of hospital management; various strategies need to be established and implemented to increase the profitability of hospitals [3]. Therefore, how to seek different and stable sources of income is an important issue for hospitals.

Hospital income sources can be divided into two categories, namely, "operating income" and non-operating income". The former is the major source of medical income for hospital; the latter is income generated from activities outside medical services [4,5], which is also known as "non-medical activity proceeds [6]. Although non-medical activity proceeds are related to medical service activities, activities do not involve medical practices, such as research programs, governed subsidies, meals or parking, donations, interests, or financial investment income [2,4,6]. In order to enable hospitals to achieve sustainable management and steady growth and have surpluses to provide better and higher quality medical services, when medical income gradually decreases due to environmental change, if the hospital has sufficient non-medical activity proceeds, the hospital's financial pressures can be

lessened, medical losses can be offset. Therefore, non-medical activity proceeds have an important position in overall hospital revenues.

In the 1980s, hospitals in the United States began noting the importance of services provides and market diversity [7-9] and gradually increased hospital surpluses through diversified income, so as to increase investment funds intended for medical activities and promote hospital management and growth. Most studies on hospital finance discuss the overall financial performance, specifically targeting the income aspect and focusing on total hospital income or medical proceeds. Few scholars focus on non-medical activity proceeds related topics. The research of McKay and Gapenski is the first study on hospital non-medical activity proceeds. According to them, the non-medical activity proceeds of US hospitals have important weighting in the total revenues or profits [3]. Singh, Song, and Schuhmann subsequently found that medical activity losses in amounts and non-medical activity proceeds show a clear negative correlation [2,10]. Singh and Song pointed out in their study that hospitals that are able to use medical activity proceeds to offset medical activity losses are mostly non-profit hospitals that are larger in scale [2].

Affected by the medical competitive environment and NHI policy change, most of hospitals' income comes from NHI coverage. Although some hospitals have developed self-paid items, their founding purpose

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is “not seeking profit as the ultimate goal”. Therefore, self-paid item development has not achieved apparent results. Under such a limitation, how to achieve sustainable development without violating the hospital founding purpose has become a new issue for hospitals. This study adopted nonmedical activity proceeds as the main research body, hoping to contribute to hospital continuity through the research results and provide a reference for government agencies’ future policy setting.

## Methods

### Research framework

This study adopted the research analysis of McKay and Gapenski [11] as the starting point, summarized domestic and foreign literatures of finance related research results, and discussed the structure and trends of medical activity proceeds generated by non-profit hospitals in Taiwan. At the same time, an insight is gained into what impacts hospital characteristics (hospital ownership, hospital accreditation level, geographic location, medical activity gain and loss) have on non-medical activity proceeds.

### Data source and sample selection

The research sample data is extracted from 2013-2014 financial statements in Taiwan. Of the 230 entries of hospital/annual data during the sampling period, after eliminating samples with incomplete financial data needed for research analyses (3 entries of hospital/annual data), the final valid samples are 114, a total of 227 entries of hospital/annual data.

### Data analysis and research model

This study adopted SPSS statistical software for data processing and analysis. First, descriptive statistical data was employed to analyze the structure and trends of non-medical activity proceeds. The nonparametric statistics was then adopted to carry out differential testing on the hospital characteristic factors.

**Structure and trends of hospital non-medical activity proceeds:** On the discussion of the structure and trends of non-medical activity proceeds, the percentages, means, standard deviations of different types of income and other descriptive statistical data were adopted. Non-operating income covers a wide range of accounting titles. Therefore, the important accounting titles were subdivided into five categories including “donation income”, “Rental income”, “Interest income”, “Investment income”, and “Other income” to calculate the percentages of the categories and major items in the non-medical activity proceeds and understand the source structure and trend changes over the years.

**Differential analysis of non-medical activity proceeds by hospital characteristics:** Targeting the hospital characteristics, including hospital ownership (public hospitals, corporate hospitals, and private hospitals), hospital accreditation level (medical center, regional hospitals and district hospitals), geographical location (metropolitan and non-metropolitan), and medical activity gain and loss status (net profit or loss), and other classifications, the non-medical activity proceeds of each category was tested to determine if there is a significant difference. Because the samples are not in normal distribution, nonparametric tests were adopted to carry out analyses, including Mann-Whitney U-test and Kruskal-Wallis H-Test.

**Impact factor analysis of non-medical activity proceeds:** Using the regression model, the correlation between hospital characteristics (including hospital ownership, hospital accreditation level, geographical location, and medical loss amounts) and non-medical activity proceeds

was tested. In order to enhance the correctness of results obtained, model fit and multicollinearity tests were also carried out.

## Results

### Structure and trend analysis of non-profit hospital non-medical proceeds

Table 1 and 2 shows the content weighting (structure) of non-medical activity proceeds. Based on the above-mentioned classifications, the ratios of accounting titles in the non-medical activity proceeds can be presented. It shows that during the sampling period, the non-medical activity proceeds takes up 9.29% of the medical income, while “other non-medical activity proceeds” comprise the majority among the accounting titles in “non-operating income”, accounting for 33.38% of the total non-medical activity proceeds, followed by “investment income (28.55%) and “donation income(12.09%). Based on the respective income ratios, it shows that “investment income” takes up a high ratio, thus indicating Taiwan hospital’s non-medical activity related financial operations are undergoing change.

### Differential analysis of sample characteristics on non-medical activity proceeds

The results in Table 3 show that corporate hospitals comprise the majority of hospital ownership in the sample data, accounting for 52.3% (145 entries), while private hospitals comprise the least of 17% (47 entries). As for the average non-medical activity proceeds, the corporate hospitals comprised the majority (NT\$472,016,000); in term of hospital accreditation level, regional hospitals have the highest number of entries, accounting for 62.1% (172 entries) of the total number of samples. However, their average non-medical activity proceeds (NT\$189,840,000) are smaller than that of the medical centers accounting for 15.9% (44 entries, NT\$1,269,419,000) of the total number of sample entries; as to geographical location, the hospitals whose main hospital is located in the metropolitan area account for 39% (108 entries) of the total number of samples. Their hospital non-medical activity proceeds (NT\$218,579,000) are lower compared to hospitals located in the non-metropolitan area (NT\$405,405,000). Furthermore, a discussion was carried out based on the hospital medical activity gains and losses. It was found that among the samples, those that suffered medical losses account for 30.3% (84 entries).

The results of the nonparametric differential test show that the classifications of hospital ownership ( $p < 0.001$ ), hospital accreditation level ( $p < 0.001$ ), and whether suffering medical losses ( $p < 0.001$ ) reach significant differences in terms of non-medical activity proceeds.

Classification	2012 (n=64)	2013 (n=108)	2014 (n=105)	Mean (n=227)
Non-medical activity proceeds / Total hospital operating revenues	10.40%	7.88%	10.12%	9.29%
Non-operating revenues / Non-medical activity proceeds	18.28%	21.09%	16.03%	18.33%
Donation income / Non-medical activity proceeds	14.35%	12.54%	9.34%	12.09%
Rental income / Non-medical activity proceeds	4.38%	5.68%	3.73%	4.54%
Interest income / Non-medical activity proceeds	1.81%	4.42%	3.34%	3.11%
Investment income / Non-medical activity proceeds	39.75%	10.60%	32.26%	28.55%
Other income / Non-medical activity proceeds	21.43%	45.67%	35.31%	33.38%

Table 1: Non-Patient Revenues.

Classification	Other operating revenues	Non-operating revenues				
Definition	Referring to income from medical related activities but not involving medical practices.	Referring to income from non-medical related activities.				
Items included	Income from research program, meals, parking, etc.	Donation	Rental	Interest	Investment	Other
		Income from non-restricted, temporarily restricted, permanently restricted donations.	Rental	Interest	Investment	Income from fixed asset disposal, miscellaneous income, short-term investment, etc.

Table 2: X Definition and Content Items.

Characteristics	Sampling		Non-Patient Revenues (NT: Thousand)			p-value	Scheffe	
	n	%	Mean	Median	SD			
<b>Hospital Ownership</b>								
Public hospitals	85	30.7	201,996	52,646	460,791	<0.001	①>②>③	
Corporate hospitals	145	52.3	472,016	96,177	1,190,092			
Private hospitals	47	17.0	138,465	15,734	229,734			
<b>Hospital accreditation level</b>								
Medical center①	44	15.9	1,269,419	713,748	1,985,312	<0.001		
Regional hospitals②	172	62.1	189,840	76,407	276,956			
District hospitals③	61	22.0	59,231	23,098	127,391			
<b>Geographical location</b>								
Metropolitan	108	39.0	218,579	56,114	351,104	0.959		
Non-metropolitan	169	61.0	405,405	80,196	1,130,641			
<b>Medical activity gain and loss status</b>								
Net loss	84	30.3	300,534	106,549	373,209	<0.009		
Net profit	193	69.7	346,503	54,509	1,066,948			

Table 3: Descriptive statistic results of hospital characteristics.

Moreover, the hospital-level post hoc test results show that medical center's non-medical activity proceeds are significantly higher than those of regional hospitals and community hospitals.

### Impact factor analysis of non-medical activity proceeds

According to Table 4 regression estimation equation, the overall explanatory power reached the significant standard of 5%, thus indicating excellent model fit. The F statistical volume of the differential test results for the other operating revenues regression model is 12.500 ( $p < 0.001$ ). The F statistical volume of the differential test results for the other non-medical income regression model is 16.074 ( $p < 0.001$ ). The F statistical volume of the differential test results for the donation income regression model is 7.306 ( $p < 0.001$ ). The F statistical volume of the differential test results for the rental income regression model is 19.866 ( $p < 0.001$ ). The F statistical volume of the differential test results for the interest income regression model is 17.577 ( $p < 0.001$ ). The F statistical volume of the differential test results for the interest investment regression model is 5.010 ( $p < 0.001$ ). The F statistical volume of the differential test results for the other income regression model is 28.610 ( $p < 0.001$ ).

As for factors affecting non-medical activity proceeds, the hospital level reached the significant standard ( $p < 0.001$ ). Factors affecting other operating incomes include hospital ownership and hospital accreditation level, reaching the statistically significant standard ( $p < 0.01$ ). Factors affecting donation incomes include hospital ownership, hospital accreditation level and geographical location, reaching the statistically significant standard ( $p < 0.01$ ). Factors affecting rental incomes include hospital ownership, hospital accreditation level, geographical location and medical activity gain and loss status,

reaching the statistically significant standard ( $p < 0.01$ ). Factors affecting interest incomes include hospital ownership and hospital accreditation level, reaching the statistically significant standard ( $p < 0.01$ ). Factors affecting investment incomes include hospital ownership and hospital accreditation level, reaching the statistically significant standard ( $p < 0.01$ ). Factors affecting other incomes, the hospital accreditation level reached the significant standard ( $p < 0.001$ ).

### Conclusion

Most contemporary domestic and foreign medical finance related studies focus on discussions of medical proceeds or overall financial performance. However, research topics targeting incomes generated from outside medical activities (i.e. non-medical activity proceeds) remain scarce. Research results show that the non-medical activity proceeds account for 9.29% of the overall hospital income, the importance and impact on medical finance must not be underestimated. In non-operating income, "other and investment revenues" are the most major sources, accounting for 61.93%. This means investment revenues from the hospital's involvement in non-medical service operations or financial activities take up a considerable ratio. This finding differs from the research results of Chen et al., [12]. Between 2006 and 2012, non-patient revenues accounted for 5.72%~8.25% of the total revenues; on average, donations accounted for 46.46% of non-patient revenues and 3.23% of total revenues. All sources of non-patient revenues declined during the years of financial crisis.

In terms of non-medical activity proceeds and non-operating income, the medical centers show a significantly positive correlation, possibly because of Taiwan's closed medical system and patients' freedom to choose medical institutions. As a result, the higher the

Predictor	Non-operating revenues						
	Non-patient revenues	Other operating revenues	Donation	Rental	Interest	Investment	Other
Public hospitals	-1.885	-2.568**	-3.076**	-6.024***	1.147	-2.261**	1.730
Private hospitals	-1.761	0.209	-2.076**	-5.004***	-2.638**	-1.699	-0.981
Medical center	7.678***	8.240***	3.540***	7.594***	8.447***	4.600***	11.900***
District hospitals	-0.366	-1.016	-1.165	-0.066	-1.681	0.654	-1.546
Metropolitan	-0.316	0.452	-2.977***	-2.628**	-0.709	-0.257	-0.571
Net profit	0.721	1.639	-1.748	2.445**	-1.947	1.239	0.936
$R^2$	0.217	0.263	0.140	0.306	0.281	0.100	0.389
Adj. $R^2$	0.200	0.247	0.121	0.291	0.265	0.080	0.375
F Value	12.500	16.074	7.306	19.866	17.577	5.010	28.610
P Value	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***

Table 4: Regression analysis on non-patient revenues.

hospital level, the greater the number of patients and the better the overall financial performance. This finding coincides with that of Li et al., (2010) [13]. Secondly, since medical centers are equipped with a research department, thus the higher research capacity compared to hospitals under other levels. These medical centers are better able to obtain research funds from the government or other agencies, thus the higher operating income. The reason medical centers' investment income is considerably higher is likely because medical centers are generally business-type hospitals. Secondly, with the implementation of the NHI, large hospitals with more adequate resources tend to have more sound structure and competitiveness. Therefore, they seek expansion one after another. Small regional hospitals are relatively disadvantaged in terms of scale and resources. Therefore, over 100 regional hospitals terminated operations following the NHI system implementation [14].

As to geographic location, worth noting is that contrary to what previous scholars' misconception of "hospitals situated in the metropolitan area has better financial performance", the study results show that hospitals located in the metropolitan area show negatively significant differences compared to non-metropolitan hospitals. This is an indication that the Taiwanese people prioritize remote hospital when donating to no-profit hospitals. On the other hand, due to the higher land prices in the metropolitan, the rental income is likely higher as well. Note that medical activity gains and losses have a positive correlation with rental income. It has been confirmed that when the hospital's medical activity operating status is poor, it will actively seek non-medical activity proceeds in order to offset or reduce the pressures of decreased medical activity proceeds or losses.

The research results are summarized into two management implications below:

1. In the situation where patient revenues of hospitals are decreasing, this study is expected to be used as objective data for hospitals to diversify profit structures through increasing non-patient revenues as a way to improve management performance of hospitals.
2. After the competent authority gains a deeper insight into the sources of hospital income, from the standpoint of hospital guidance, it is recommended that the hospital engage in non-medical activities in order to enhance the hospital's adaptability towards environment change.

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