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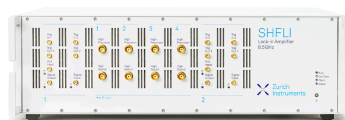
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# Do Competition among Physicians Control Physician Induced Demand: A Case Study in China

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**Abstract.** The Physician Induced Demand (PID) exists when the physician influences a patient's demand for care against the physician's interpretation of the best interests of the patient. In the sector of health economics, the problem related to the PID is a long-debated topic among the experts. In order to investigate whether the competition among physicians can control Physician Induced Demand (PID), this paper chooses two institutions in China located in Guangzhou and make a comparison between them. The internal and external conditions of two agencies are almost the same except the pressure of competition faced by physicians. As one of the institutions aims at serving high-end consumers, it has to compete with other hospitals in order to attract patients with enough ability to pay. Through the comparison of the average hospitalization costs (AHC), the strength of PID can be evaluated. According to the result, the AHC indicator in the institution with fierce competition is lower than that in another institution. That's to say physicians face to the pressure of competition can effectively control PID.

## INTRODUCTION

The concept of induced demand is first proposed by Evans in 1974. The precise definition is that Physician Induced Demand (PID) occurs when the physician influences a patient's demand for care against the physician's interpretation of the best interest of the patient. [1]. Physicians are often blamed for the high cost of healthcare in China. They are considered to dupe patients into consuming too much service. A great number of empirical and theoretical analyses has discussed the issue of PID. The reason is that PID threatens the basic market paradigm and severely undermines economic recommendations about market policy [2]. Generally speaking, under induced demand, a physician takes an action to shift the patient's demand curve in the direction of the physicians' own interest. Therefore, under the hypothesis referred to and the circumstances above, controlling PID is the common sense all over the world, no matter the nature of their medical system. According to traditional economy theory, in an ordinary market, as the number of suppliers increases, the market becomes more competitive and the price falls. That's to say the competition enable the suppliers provide better service. But there are different views in health economics. In the medical market, when Physician Induced Demand is prevalent, under the asymmetric information between physicians and patients, an increase in the number of physicians per capita raises the demand for medical services. But this theory is a long-debated topic in health economics, some believe that more competition will cause the higher medical fee because of the PID, some believe that more competition will cause decline of the fee, higher quality, constraining of the PID and so on.

Feldstein (1970) found that the number of physicians per capita are correlated positively with the payments they received, and he then pointed out that this positive correlation just contradicted the results shown by the competitive market. Because the number of physicians per capita can be considered as a signal of the degree of competition within the physician market, we could assume that physicians for services rendered will be higher than other regions in a more competitive region. Based on the theory of Feldstein, Fuchs (1978) believe there exist PID by providing a theoretical interpretation of the phenomenon described by Feldstein. According to him, the physicians will raise the

demand for their services through their influence on patients when they face a decline in income due to more competition. Based on this argument, he found that the number of operations rose 0.3% as the surgeon-population rate increased by 1%. Daniele Fabbri (2001) put forward a model in which some features are shared with a model of hospital nonprice competition developed by Pope (1989). Based on this study, in a fixed price environment, the PID is constrained by the competition between physician. While in 2006, Atsushi Yoshida and Akira Kawamura have carried out a study based on Japanese annual public expenditure for dental service, the number of dentists and dental fees from 1990 to 2000 in order to estimate whether the severer competition among physicians causes the higher medical fee because of the PID or it causes decline of the fee because of the competition. Focus on the relation between the dentist-to-population ratio and dentistry fee using the fixed-effects model, dynamic fixed-effects mode and instrumental variable method [1]. As a result, they found that the severer competition in dental service market has improved efficiency of dental service provision so as to reduce unnecessary service provisions. At the same time, there is also a large and growing number of empirical evidence that physicians' treatment decisions are influenced by factors beyond their patients' needs. For example, cardiac surgeons treat more intensively when their incomes are under the effect of fee reductions, and doctors in China prescribe more medication to 'uninformed' patients.

These arguments lasted more than thirty years, but there are few perfect empirical analyses to solve it because most of models only made a simple comparison through time series, but not time section. For example, the raise of medical cost may be affected not only by PID but also by other internal or external factors such as economy development, medical system reform, or market circumstances' change when comparing by time series. Moreover, it is difficult to find two suitable institutions whose internal and external conditions are almost the same except the pressure of competition faced by physicians within the field. But there is a case in China fit for this situation perfectly.

## CASE

In this paper, comparison between two medical institutions situated in Guangzhou has been drawn in order to analyze the Physician Induced Demand: Nanfang Hospital of Southern Medical University(NF)and The Huiqiao department(HQ). In fact, The Huiqiao department(HQ), since the foundation, is a subordinate unit of the Nanfang Hospital of Southern Medical University(NF). They share some same resources such as the expert's team and the equipment. However, the competition circumstance to which these two institutions face are totally different as their target patients have essential differences.

To begin with, Nanfang Hospital of Southern Medical University (NF) was founded in 1941 with 2225 beds, more than 700 doctors and 1600 nurses in 2011. The hospital is a government-own general hospital on missions to "contribute to the treatment of severe patients, medical research, education and training". The governmental background determines a superiority of the hospital: in the local market (Guangzhou market), it belongs to oligopoly with low competition pressure from market. Moreover, the hospital itself does not have great enthusiasm to actively expand the market because most of the price determined by government are lower than the cost. In other words, the essential duty of this hospital has nothing to do with making profits. Generally, the decision made by the physician during the treatment should not be motivated by economic elements. Therefore, the doctors are not confronted actively with the competition from market within the physicians as they benefit from stable incomes.

The Huiqiao department (HQ) was established in 1979. It is one of the first medical institutions in China that specialized in providing medical service to high-end consumers. After the establishment, it has got through a rapid growth. Now it's equipped with 176 beds, 38 doctors and 88 nurses. HQ is the subordinate unit of NF and its doctors was rotary between NF and HQ, but the income of doctors in HQ is totally related with the profit of HQ. Because HQ has to take advantage of price and quality of service so as to earn more customers from market and make profit. Considering that the department faces a much more fierce competition, the doctors of HQ have more motivation to participate in market competition and to gain competitive advantage.

To do so, the authors turn to the Average Hospitalization Costs (AHC), defined by all operating and non-operating expenses. In practice, the AHC is determined by the health care that the patients themselves have chosen.

Based on the comparison of two units, we can know that the factors including physicians, facilities, equipment, medical skills and internal management of them are basically the same expect the competition pressure faced by the doctors. Therefore, comparing the AHC of two institutions can find out whether the pressure of competition can control PID.

## RESEARCH DESIGN

The first step: Carry out an on-the-spot investigation of the two institutions in order to find out the internal and external situations. This step will help us separate the other elements that may have influence on doctors' behavior.

The second step: Conduct a questionnaire survey among the doctors and managers so as to find out their feeling concerns competition. This step is the key point as the doctors' attitude in response to the competition determines their actions while they are confronted with it.

The third step: Track two institutions over the past eight years for the average hospitalization costs (AHC) so as to compare the PID by comparing the AHC. In this step, through the graphical view of the data, the PID can be demonstrated directly.

## RESULTS

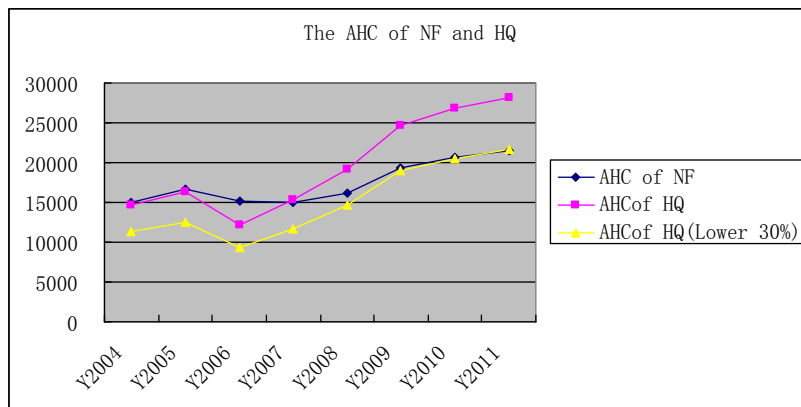
As shown in Table 1, the internal environment of the NF and HQ are the same, but the market competition environments (external) of them are bit different.

**TABLE 1.** The internal and external environments of NF and HQ

Items	Compare between NF and HQ
The doctors	Bidirectional flow between them
The Facilities	Share between them
The location	The same
The equipment	Share between them
The management	The same
The ability of medical care	The same
The owner	The same
The price	Fixed price which was determined by government in NF, flexible price which was determined by market in HQ
The competitors	NF was one of the oligopoly competitors, HQ faces fierce public and private Competition in market.

The result of survey was as following: 92% of respondents said that they face greater competitive pressure when they work in the HQ because they should consider more on the brand, the competitors, the reputation and customers in order to gain a high long-term stability benefits while facing the competition among other public or private hospitals. Generally speaking, during the time when doctors work in HQ, they take a more positive attitude towards competition.

By tracking and comparing nearly eight years of AHC in NF and HQ, as shown in figure 1 below, the following conclusions can be drawn:



**FIGURE 1.** The compare of AHC between NF and HQ

Evidence 1:

Most of the years, the AHC of HQ is slightly higher than that of NF since the price of HQ is 30% higher than that of NF. Besides, the variation trend of NF and HQ is the similar. This indicates that doctors in these two institutions share the same actions towards the external circumstances.

Evidence 2:

We eliminated the influence of price by reducing 30% of AHC of HQ, then we found that it is lower than that of NF who faces to lower competition. Whatever the external situation is, the AHC of patients in NF always keep ahead of that in HQ even though the patients in HQ have more ability to pay the service. By this way, the analysis shows that there exists kind of correlation between the degree of competition and the average cost of patients. Unlike the general conclusions made by other experts, physicians in HQ, who work in a more competitive situation are able to control the PID.

## CONCLUSION

PID is a contentious issue in health economics. The reason is that PID threatens the basic market. Although a great deal of empirical and theoretical work has been drawn in order to testify its existence, it still remains a long-debated topic in the medical economics field. By means of an analysis between two similar institutions in terms of internal situation, this paper demonstrates the counterevidence of the PID through the comparison of AHC. As we have been seen, in most of time, because of the price, the AHC of NF is lower that of HQ. If the difference of service price in this two institutions has also been considered, according to the graph, the AHC of HQ is always below that of NF. As a result, we can determine that the PID of NF is greater than that of HQ after we compared their AHC. Moreover, the competition faced by the doctors of HQ is greater than that of NF. As a result, the case can induce the conclusion that the competition among physicians can control PID. Also, in this paper, a variety of other factors influencing the PID has not been discussed, such as the medical market characteristics, doctor and patient objectives, institutional and regulatory environment.

## ACKNOWLEDGMENTS

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## REFERENCES

1. E. M. Johnson, "Physician Induced Demand", in *Encyclopedia of Health Economics*, edited by Anthony J. Culyer (Elsevier, Amsterdam, 2014), pp.77-82.
2. Y. Atsushi and K. Akira, "Competition and Physician Induced Demand: Evidence from Dental Service Market in Japan", *The Commemoration Enterprise of the 75th Anniversary of Japan Statistical Society*.
3. D. Brown and M. Feldstein and H. Lapan, "The Raising Price of Physicians' Services: A clarification", *The Review of Economics and Statistics*, **52**, 121–133 (1974).
4. V.R. Fuchs, "The Supply of Surgeons and the Demand for Operations", *Journal of Human Resources*, **13**, 121–133 (1978).
5. T.G. McGuire, "Physician Agency", in *Handbook of Health Economics*, edited by A.J. Culyer and J.P. Newhouse (Elsevier, Amsterdam, 2000), pp. 461-536.