

Association for Information Systems

AIS Electronic Library (AISeL)

ACIS 2023 Proceedings

Australasian (ACIS)

12-2-2023

Exploring the Relationships Between Physician's Free and Paid Services: An Empirical Study

Huaihui Cheng

The University of Melbourne, Australia, huaihuic@student.unimelb.edu.au

Libo Liu

The University of Melbourne, Australia, libo.liu@unimelb.edu.au

Tingru Cui

The University of Melbourne, Australia, tingru.cui@unimelb.edu.au

Follow this and additional works at: <https://aisel.aisnet.org/acis2023>

Recommended Citation

Cheng, Huaihui; Liu, Libo; and Cui, Tingru, "Exploring the Relationships Between Physician's Free and Paid Services: An Empirical Study" (2023). *ACIS 2023 Proceedings*. 97.

<https://aisel.aisnet.org/acis2023/97>

This material is brought to you by the Australasian (ACIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in ACIS 2023 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Exploring the Relationships Between Physician's Free and Paid Services: An Empirical Study

Research-in-progress

Huaihui Cheng

School of Computing and Information Systems
The University of Melbourne
Melbourne, Australia
Email: huaihuic@student.unimelb.edu.au

Libo Liu

School of Computing and Information Systems
The University of Melbourne
Melbourne, Australia
Email: libo.liu@unimelb.edu.au

Tingru Cui

School of Computing and Information Systems
The University of Melbourne
Melbourne, Australia
Email: tingru.cui@unimelb.edu.au

Abstract

In the evolving landscape of online healthcare platforms, understanding the interplay between physicians' free and paid services is essential. This balance impacts patient access, care quality, and platform sustainability. Our study investigates the dynamics of these two services, considering physicians' constraints and patient-driven incentives. Using a framework grounded in resource-based and social exchange theories, we posit that increased paid services might reduce physicians' inclination for free offerings. Conversely, free services can bolster physicians' online reputation, potentially influencing paid engagements. Empirical testing with time-series data from a real online healthcare platform, analyzed using the structural vector autoregression model, largely supports our hypotheses. Our findings underscore the significance of strategic service provision in online health platforms, offering insights crucial for platform managers and physicians.

Keywords: online health communities, free services, paid services, reputational returns

1 Introduction

In the digital age, online healthcare platforms have emerged as pivotal spaces for patient-physician interactions. A notable trend within these platforms is the increasing provision of free services by physicians, such as providing medical information or advice, educational webinars, and complimentary consultations (Hwang et al. 2022). According to a 2020 study (Pizzuti et al. 2020), approximately 87% of healthcare professionals used online platforms to share educational content and engage with and empower patients within their communities. Physicians' free services on online platforms play a pivotal role in democratizing access to healthcare knowledge, ensuring that essential information reaches a broader audience regardless of socioeconomic barriers. These complimentary offerings not only foster trust, as patients can gauge a physician's expertise before opting for paid consultations, but also position physicians as educational pillars, disseminating vital health insights and preventive measures to the public. In this digital age, such free services are reshaping the dynamics of patient-physician interactions, making them more inclusive and informative.

From the intrinsic standpoint of physicians, while offering free services can cultivate trust and foster a sense of altruism, the provision of free services is interlinked with paid services. Especially, in areas where healthcare professionals may not have high incomes, it's crucial to strike a balance between providing free and paid services. And the financial sustainability of online healthcare platforms primarily depends on the paid services as well. Therefore, offering paid services may be a significant factor impacting physicians' free services offering. On the other hand, external motivations, such as feedback from patients also play significant roles in influencing the balance between paid and free services (Cao et al. 2022; Guo et al. 2017; Ren and Ma 2021; Zhou 2020). The emotional bond and reputational return physicians get from patients not only represent patients' satisfaction and loyalty but also reinforce a physician's commitment to offering services. Despite the evident importance of providing free healthcare services and the intricate motivation mechanisms behind it, studies around free services seldom ventured into the healthcare domain.

To bridge the identified gaps, our study delves into the dynamics of physicians offering free services, taking into account both their intrinsic motivations and external incentives from patients. Building on prior research, we recognize the pivotal role of reputation in guiding such behaviors. Therefore, we focus on the reputational returns from patients as the outside driving force behind physicians' free services. With this backdrop, our research aims to address the following two research questions:

RQ1: How do the paid services offered by physicians interact with their provision of free services?

RQ2: How do reputational returns from patients influence physicians' decisions regarding the balance between paid and free services?

To be consistent with the situation in real practice, we propose a framework with dynamic and bidirectional relationships among the constructs. We use the resource-based theory to formulate hypotheses for the direct interplay between free and paid services. We suggest that while physicians' free services will help increase their paid services via the signaling effect, paid services will cannibalize the free services due to physicians' time and energy limits. For the reputational returns from patients, we draw on commitment theory, suggesting that positive reputational feedback enhances physicians' affective and normative commitment to patients, thereby promoting both paid and free service offerings. Further, utilizing the social exchange theory (SET), we posit that patients, in order to maintain a balanced exchange, are inclined to offer reputational returns in response to both paid and free services they receive from physicians.

To solve the concern of endogeneity and reverse causality, we employ the structural vector autoregression model (SVAR) to empirically test the framework on the dataset collected from a real online healthcare platform. The IRF results of the SVAR model support most of our hypothesis. So, we can primitively conclude that: (1) Although physicians' free services may initially increase the opportunities for paid services, this increase will ultimately be curtailed by physicians' resource constraints. (2) Both free and paid services contribute to enhancing physicians' reputational returns, which in turn can further encourage physicians' engagement.

The study investigates the dynamics of physicians' engagement in online free services, contrasting it with traditional offline practices. We examine both the intrinsic motivations of physicians and the external incentives they receive from patients. With empirical tests, our research broadens the scope of studies on online healthcare, shedding light on the evolving behaviors of physicians in digital interactions with patients. Our research extends the body of prosocial research into the online healthcare area and enriches the existing studies of physician-patient interaction by exploring physicians' dynamic

behaviors. Our findings provide actionable insights for healthcare platform managers, guiding them in optimizing strategies for online platforms. Additionally, the insights help physicians strike a balance between paid services and free offerings. Ultimately, our research can foster enhanced social benefits and strengthen the bond between physicians and patients.

2 Literature Review

We conducted the literature review focusing on the concept of free services and physician-patient interaction in online healthcare communities.

Previous research has explored the motivations behind offering free services, often drawing parallels with traditional charitable activities, such as monetary donations (Ganguli et al. 2021; Zhang et al. 2017). These studies have delved into the factors that influence the provision of free services, highlighting motivations such as reputation enhancement and self-image concerns (Hossain and King King 2014; Wang and Murnighan 2017). The role of reputation, in particular, has been emphasized as a significant driver for physicians to offer free services on online platforms. Higher reputation may lead to a concentration of contributions towards the central tendency of others' contributions (Jones and Linardi 2014) and less susceptibility to the influence of public incentives (Exley 2018) which will impede the intention of providing free services. While other research shows that the reputational and emotional benefits that individuals derive from providing free services, such as the warm glow effect and social networking effect, can have a positive impact on promoting such behaviors, so far as these emotional rewards may even supersede the impact of monetary incentives in some cases (Brown et al. 2019; Sun et al. 2019). Besides, monetary incentives have also been studied as an important factor in promoting free services due to their complex influence. Despite the presence of the crowd-out effect and proven to be ineffective in the long term (Tonin and Vlassopoulos 2015), certain research suggests that monetary incentives can still have a positive impact by stimulating extrinsic motivations and as a result promoting free services, ultimately leading to an increase in income or reputation for individuals (Jing et al. 2019; Qiao et al. 2020). However, other researchers assert that monetary incentives may bring hidden costs by making norm enforcement less effective (Fuster and Meier 2010).

Prior research about physician-patient interaction on online healthcare communities can be classified into 3 strands based on the physician-patient interaction dual-cycle model proposed by Guo et al. (Guo et al. 2016). The first research stream intensively focuses on identifying the factors influencing patients' decision-making process from objective (Dang et al. 2020; Deng et al. 2019; Gong et al. 2021; Ouyang et al. 2022) and subjective perspectives (Lei et al. 2021; Qi et al. 2021; Yu et al. 2020). The second research stream concentrates on physicians' resource-sharing, physicians' returns or the whole physician-patient exchange process (Cao et al. 2022; Guo et al. 2017; Ren and Ma 2021; Zhou 2020). The last research stream mainly focuses on physicians' spontaneous balancing behaviors. Physicians' balancing behaviors covered in this kind of research contain physicians' privacy protection choices, physicians' decisions of providing certain services, and their time and energy allocation (Dang et al. 2020; Fan et al. 2020; Wang et al. 2020).

Based on the literature review discussed above, we identified 3 research gaps: (1) There is a scarcity of studies on free services in the healthcare domain. (2) The conclusions about outside incentives' impact on individuals' providing free services are not consistent. (3) Physicians' balancing behaviors which are partially regulated by self-oriented constraints are under-researched.

To fill the research gaps, we propose this study to explore the physicians' dynamic interaction between offering free and paid services and examine the reciprocal effects of this interaction on the reputational returns from patients.

3 Theoretical Foundation and Hypothesis Development

3.1 The direct interplay between paid services and free services

There are both cannibalizing and complementing effects between physicians' offering paid and free services. On one hand, offering free services can be perceived as a prevalent tactic to address information asymmetry and stimulate sales by reducing users' uncertainty about service quality free of charge (Reza et al. 2021; Yan et al. 2022). It also has conspicuous signalling and networking effect which manifest physicians' altruism and attract more patients (Ellingsen and Johannesson 2009; Ellingsen and Johannesson 2011). On the other hand, prior studies have verified offering free services may cannibalize the sales of paid services, especially in the software industry. In this situation, users may treat the free services as a substitution for paid services. However, compared to more limited valence and more

general health-related information provided by physicians' free services, paid services are more personalized and have more quality assurance, resulting in patients hard to view the free services as a plausible substitution. Thus, for online healthcare services, the complementary effect overshadows the cannibalization effect. Drawn on this, we propose:

H1a: Physicians' offering more free services will promote their paid services.

Furthermore, because medical services are costly and time-consuming, it's reasonable to expect that providing more personalized and high-quality paid services is physicians' main effort on online healthcare platforms. Based on the resource-based theory (Butler 2001), physicians are constrained by the time and energy needed to provide their paid services, which are their primary work, and this will constrain them from offering free services. Accordingly, we posit:

H1b: Physicians' offering more paid services will hinder their free services.

3.2 Interaction with Reputational Returns

In physician-patient interactions, physicians hold structured power and professional capital over the patients, whereby the former have the discretionary power to decide which kind of healthcare services (paid or free) to provide and whether to provide them (Batifoulier and Da Silva 2014). We apply the commitment theory to demonstrate physicians' behaviors. Commitment refers to an individual's attachment or dedication to a particular object, goal, or relationship. The notion of commitment was first proposed by Becker and gradually became a general framework for understanding commitment in a variety of domains, including organizations (Becker 1960). Commitment as a psychological state is separated into three components: affective commitment, continuance commitment, and normative commitment (Meyer and Allen 1991). Affective commitment refers to one's emotional attachment to, identification with and involvement in a social relationship (Jin et al. 2010). Continuance commitment is "an awareness of the costs associated with leaving" a social group (Meyer and Allen 1991), which shows the extent to which an individual feels committed due to their own economics. Normative commitment is an obligation-based commitment, which refers to the feelings of the obligation of individuals based on perceived relational bonds (Al-Jabari and Ghazzawi 2019). When patients give reputational returns in the form of positive feedback or referring the physician to their acquaintance, the emotional connection and social ties between patients and physicians are strengthened. All things equal, the physicians will achieve a higher affective commitment towards the patients. Besides, drawn on prior literature, a higher reputation will result in more identity and self-image concerns (Exley 2018; Gneezy et al. 2012), when they may feel obligated to give benefits to patients thereby enhancing their normative commitment. Therefore, we posit:

H2: Reputational returns from patients will promote physicians' offering both paid and free services.

To elucidate the mechanisms driving patients' continued engagement with online healthcare platforms, we employ social exchange theory (SET) as a framework for explaining the reciprocal nature of interactions between patients and physicians. SET posits that social interactions are characterized by a process of exchange, in which individuals aim to achieve an equilibrium between the benefits they receive and the costs they incur. When physicians offer paid or free services, they provide social support (informational support or emotional support) to empower patients. To keep the reciprocal balance in physician-patient exchanges, patients will show their gratitude by giving reputational returns such as writing more positive reviews, giving small virtual gifts, or making referrals to their acquaintances. Thus, we hypothesize:

H3: Physicians' offering paid and free services will promote reputational returns from patients.

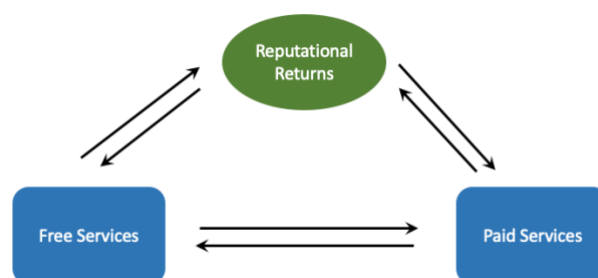


Figure 1. Conceptual Framework

4 Empirical Testing and Preliminary Results

4.1 Variable Measurement and Data Analysis

To empirically test the hypotheses in our proposed research model, we set our experiment context on a leading physician-patient healthcare platform in China. On this website, physicians can provide paid consultations to patients (paid services), and they can also share free medical information on their home pages (free services) at their discretion. To show their gratitude, patients can leave anonymous thank-you notes on physicians' homepages (reputational returns). We collect time-series data from 3,203 physicians on their number of paid consultations, the number of free medical articles and the number of thank-you notes to measure paid services, free services and reputational returns respectively. The observation period lasted for 23 weeks from October 2022. Table 1 reports the definition and descriptive statistics of the dataset.

Variable	Definition	Mean	SD	Min	Max
PS	The total number of paid consultations each week	5861.3	277.2	3603.0	8050.0
FS	The total number of free medical articles posted each week	266.4	30.6	78.0	670.0
RT	The total number of thank-you notes each week	2738.1	114.9	1308.0	3539.0

Table 1. Variable Definition and Descriptive Statistics of Data

In our framework, physicians' and patients' behaviors are highly endogenous and interdependent. To model such a complex system, we employ the SVAR model. Traditional models might fail to capture the simultaneous feedback loops present in our system. The SVAR model, with its capability to account for reverse causality, and endogeneity and dissect the simultaneous effects, ensures a more comprehensive understanding of these intricate relationships. There are three reasons for choosing this model: (1). SVAR is designed to analyze the dynamics of multiple time series (Enders 2015). (2). SVAR can account for reverse causality and variable endogeneity which allows capturing feedback loops in the system (Luo et al. 2017). (3). It can capture potential simultaneous effects among variables.

We construct a three-equation, three-variable SVAR model for our conceptual framework, which is specified as:

$$A \begin{bmatrix} PS_t \\ FS_t \\ RT_t \end{bmatrix} = \sum_{j=1}^M B_j \begin{bmatrix} PS_{t-j} \\ FS_{t-j} \\ RT_{t-j} \end{bmatrix} + \begin{bmatrix} c_{1t} \\ c_{2t} \\ c_{3t} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \quad (1)$$

where t is time period; j is the time lag measured by weeks; M is the total number of time lags; the matrix A captures the contemporaneous relationships in the systems; the matrix B captures the lagged effects of all variables; c_{it} ($i = 1,2,3$) constitute the constant vector; ε_{it} ($i = 1,2,3$) the error vector.

According to the modelling procedure of SVAR (Enders 2015), we conducted the following steps: (1) unit-root test for examining the stationarity of variables, (2) lag order selection. Both methods play important roles in time series analysis, specifically ensuring the robustness and validity of the results. Firstly, we did the log transformation to the variables and performed the Elliot, Rothenberg, and Stock Unit Root Test (ERS test) to check the stationarity of the variables. By the unit root test, we can ensure that the relationships the model identifies are genuine and not a by-product of non-stationary data. The results suggest rejecting the null hypothesis for all three variables, which means after log transformation the variables are stationary. Secondly, we select a lag length M based on the final prediction error (FPE), the Akaike information criterion (AIC), and the Hannan and Quinn information criterion (HQIC). An optimal lag ensures that your model captures just the right amount of historical information to make predictions or inferences without overfitting the data. As shown in Table 2, the optimal lag length is 1.

Lag	1	2	3	4	5
FPE	0.0001	0.0003	0.0002	0.0006	0.0058
AIC	-8.9371	-8.1693	-8.6564	-8.5500	-4.5146*e+01
HQIC	-8.7324	-8.0261	-8.5745	-8.2840	-4.4819*e+01

Table 2. Lag Selection Criteria

* The best lags are in bold.

4.2 Results

The estimation of parameters in SVAR models may not offer comprehensive insights into the relationships between variables, due to the complex underlying dynamics. A common approach to analyzing SVAR models is the use of impulse response functions (IRFs). By examining the system's reactions to impulses/shocks, IRF analysis can effectively account for reverse causality. There are 6 IRFs for the estimated SVAR which is shown in Figure 2. Each plot depicts the evolution of the respective response variable over time, in response to a one-unit shock applied to the impulse variable at time zero. We set the confidence interval as 90% and the forecasting steps as 15 weeks. To illustrate, Figure 2(a) shows how the paid services will respond to a unit shock from free services given at time zero for 15 weeks afterwards. The blackline is above and gradually approaching the zero line which means that a unit of free services shock will have a positive impact on paid services at first and the positive impact will trend to zero gradually.

Based on the IRF results in Figure 2 (a), (b), (e) and (f), H1a, H1b and H3 are supported. The H2 is partially supported by the IRF result in Figure 2 (c) and (d). We can conclude that although physicians' offering free services may expand their potential for paid services, their free services will be constrained by the increased paid services due to their resource limitation. Besides, both free and paid services can enhance physicians' reputational returns from patients, which in return encourages their prosocial behavior.

5 Discussion

5.1 Limitations and Future Steps

Our study has certain limitations. Firstly, while our choice of reputational returns is informed by prior research on free services, future studies might delve into the impact of other incentives, such as economic returns, on physicians' inclination to offer free services. Second, our exploration of physicians' free services is centred on a single platform. Even though this platform is well-established and widely used, future research might consider other online channels, like social media platforms, to gain a broader understanding of physicians' free service offerings. Third, our sample is confined to approximately 3,000 physicians. Expanding the sample size and extending the observation duration in subsequent studies could yield more comprehensive results. Fourth, our empirical analyses could benefit from further robustness checks. Upcoming research might enhance the framework by integrating qualitative methods or experimenting with alternative econometric models. Fifth, our empirical testing only partially supports H2. This might stem from the design of our empirical testing. Future endeavours could employ the methods to re-evaluate the hypothesis and potentially uncover alternative explanations or mechanisms. Sixth, employing IRFs to explain the results presents limitations. These include assumptions of linearity in relationships that might be inherently non-linear, potential misinterpretation due to the intricate feedback loops of physician-patient dynamics and so on.

5.2 Contributions

Before the advent of advanced technologies, physicians traditionally faced challenges in offering free services through offline channels. Our research delves into the emerging trend where physicians are increasingly offering free services via online platforms.

From a theoretical standpoint, our study broadens the understanding of physicians' inclination to provide free services on online healthcare platforms. We approach this from two angles: the physicians' self-regulation and the incentives they receive from patients. By empirically testing the dynamic bidirectional relationships we have proposed, our research pioneers the exploration of free services in the online healthcare domain. This not only extends the body of research on free service provision but

also enriches existing studies on physician-patient interactions by shedding light on physicians' evolving online behaviors.

From a practical viewpoint, our findings hold significance for both healthcare platform managers and the physicians themselves. For platform managers, understanding these dynamics can guide strategy adjustments to not only maximize the benefits of physicians' free services but also contribute to a more equitable and accessible healthcare environment. Policies could be crafted to offer more support to physicians to alleviate resource constraints or foster a culture where patient feedback is encouraged and valued. For physicians, the insights from this study can help strike a balance between paid and free services online. Moreover, they can appreciate the importance of cultivating relationships with patients from a refreshed perspective. In real-world applications, our research aims to foster greater social benefits and fortify physician-patient relationships.

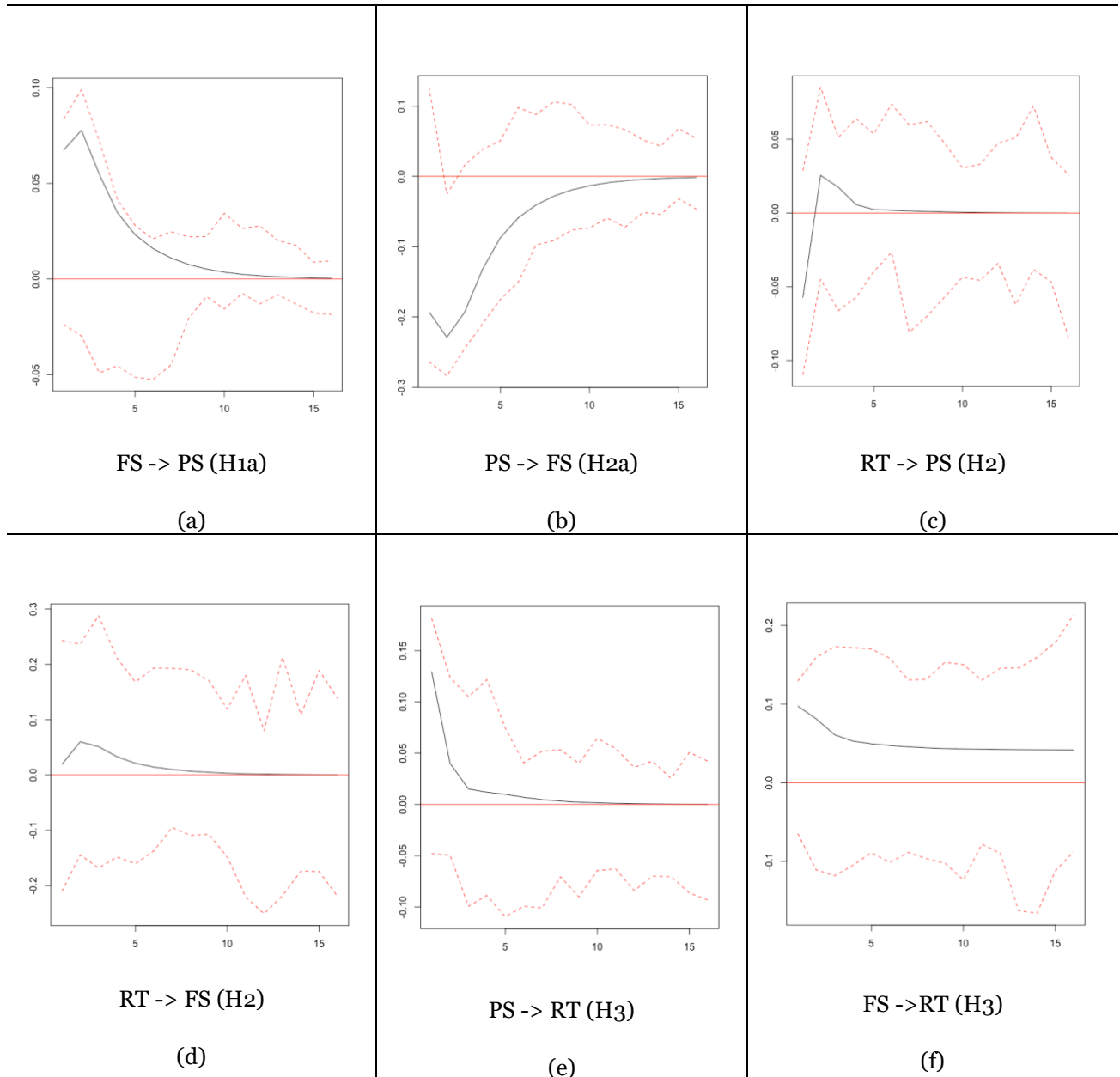


Figure 2. IRF Results

6 References

- Al-Jabari, B., and Ghazzawi, I. 2019. "Organizational Commitment: A Review of the Conceptual and Empirical Literature and a Research Agenda," *International Leadership Journal* (11), pp. 78-119.
- Batifoulier, P., and Da Silva, N. 2014. "Medical Altruism in Mainstream Health Economics: Theoretical and Political Paradoxes," *Review of Social Economy* (72:3), pp. 261-279.
- Becker, H. S. 1960. "Notes on the Concept of Commitment," in: *American Journal of Sociology*. pp. 32-40.
- Brown, A. L., Meer, J., and Williams, J. F. 2019. "Why Do People Volunteer? An Experimental Analysis of Preferences for Time Donations," *Management Science* (65:4), pp. 1455-1468.
- Butler, B. S. 2001. "Membership Size, Communication Activity, and Sustainability: A Resource-Based Model of Online Social Structures," *Information Systems Research* (12:4), pp. 346-362.
- Cao, B., Huang, W., Chao, N., Yang, G., and Luo, N. 2022. "Patient Activeness During Online Medical Consultation in China: Multilevel Analysis," *J Med Internet Res* (24:5), p. e35557.
- Dang, Y., Guo, S., Guo, X., and Vogel, D. 2020. "Privacy Protection in Online Health Communities: Natural Experimental Empirical Study," in: *Journal of Medical Internet Research*. JMIR Publications, pp. e16246-e16246.
- Deng, Z., Hong, Z., Zhang, W., Evans, R., and Chen, Y. 2019. "The Effect of Online Effort and Reputation of Physicians on Patients' Choice: 3-Wave Data Analysis of China's Good Doctor Website," *Journal of Medical Internet Research* (21:3), pp. N.PAG-N.PAG.
- Ellingsen, T., and Johannesson, M. 2009. "Time Is Not Money," *JOURNAL OF ECONOMIC BEHAVIOR & ORGANIZATION* (72:1), pp. 96-102.
- Ellingsen, T., and Johannesson, M. 2011. "Conspicuous Generosity," *Journal of Public Economics* (95:9/10), pp. 1131-1143.
- Enders, W. 2015. *Applied Econometric Time Series Fourth Edition*, New York (US): University of Alabama).
- Exley, C. 2018. "Incentives for Prosocial Behavior: The Role of Reputations," *Management Science* (64:5), pp. 2460-2471.
- Fan, W., Zhou, Q., and Kumar, S. 2020. "Should Doctors Open Online Consultation? An Empirical Investigation of How It Impacts the Number of Offline Appointments," *An Empirical Investigation of How It Impacts the Number of Offline Appointments* (June 9, 2020). Fox School of Business Research Paper Forthcoming).
- Fuster, A., and Meier, S. 2010. "Another Hidden Cost of Incentives: The Detrimental Effect on Norm Enforcement," *Management Science* (56:1), pp. 57-70.
- Ganguli, I., Huysentruyt, M., and Le Coq, C. 2021. "How Do Nascent Social Entrepreneurs Respond to Rewards? A Field Experiment on Motivations in a Grant Competition," *Management Science* (67:10), pp. 6294-6316.
- Gneezy, A., Imas, A., Brown, A., Nelson, L. D., and Norton, M. I. 2012. "Paying to Be Nice: Consistency and Costly Prosocial Behavior," *Management Science* (58:1), pp. 179-187.
- Gong, Y., Wang, H., Xia, Q., Zheng, L., and Shi, Y. 2021. "Factors That Determine a Patient's Willingness to Physician Selection in Online Healthcare Communities: A Trust Theory Perspective," *Technology in Society* (64), p. 101510.
- Guo, S., Guo, X., Fang, Y., and Vogel, D. 2017. "How Doctors Gain Social and Economic Returns in Online Health-Care Communities: A Professional Capital Perspective," *Journal of Management Information Systems* (34:2), pp. 487-519.
- Guo, X., Guo, S., Vogel, D., and Li, Y. 2016. "Online Healthcare Community Interaction Dynamics," *Journal of Management Science and Engineering* (1:1), pp. 58-74.
- Hossain, T., and King King, L. 2014. "Crowding out in the Labor Market: A Prosocial Setting Is Necessary," *Management Science* (60:5), pp. 1148-1160.

- Hwang, E. H., Guo, X., Tan, Y., and Dang, Y. 2022. "Delivering Healthcare through Teleconsultations: Implications for Offline Healthcare Disparity," *Information Systems Research*).
- Jin, B., Park, J. Y., and Kim, H.-S. 2010. "What Makes Online Community Members Commit? A Social Exchange Perspective," *Behaviour & Information Technology* (29:6), pp. 587-599.
- Jing, D., Jin, Y., and Liu, J. 2019. "The Impact of Monetary Incentives on Physician Prosocial Behavior in Online Medical Consulting Platforms: Evidence from China," *J Med Internet Res* (21:7), p. e14685.
- Jones, D., and Linardi, S. 2014. "Wallflowers: Experimental Evidence of an Aversion to Standing Out," *Management Science* (60:7), pp. 1757-1771.
- Lei, P., Zheng, J., Li, Y., Li, Z., Gao, F., and Li, X. 2021. "Factors Influencing Online Orthopedic Doctor-Patient Consultations," *BMC Medical Informatics & Decision Making* (21:1), pp. 1-9.
- Luo, X., Gu, B., Zhang, J., and Phang, C. W. 2017. "Expert Blogs and Consumer Perceptions of Competing Brands," *MIS quarterly* (41:2), pp. 371-396.
- Meyer, J. P., and Allen, N. J. 1991. "A Three-Component Conceptualization of Organizational Commitment," *Human Resource Management Review* (1:1), p. 61.
- Ouyang, P., Wang, J.-J., and Jasmine Chang, A.-C. 2022. "Patients Need Emotional Support: Managing Physician Disclosure Information to Attract More Patients," *International Journal of Medical Informatics* (158), p. 104674.
- Pizzuti, A. G., Patel, K. H., McCreary, E. K., Heil, E., Bland, C. M., Chinaeke, E., Love, B. L., and Bookstaver, P. B. 2020. "Healthcare Practitioners' Views of Social Media as an Educational Resource," *PLoS One* (15:2), p. e0228372.
- Qi, M., Cui, J., Li, X., and Han, Y. 2021. "Perceived Factors Influencing the Public Intention to Use E-Consultation: Analysis of Web-Based Survey Data," *J Med Internet Res* (23:1), p. e21834.
- Qiao, D., Lee, S.-Y., Whinston, A. B., and Wei, Q. 2020. "Financial Incentives Dampen Altruism in Online Prosocial Contributions: A Study of Online Reviews," *Information Systems Research* (31:4), pp. 1361-1375.
- Ren, D., and Ma, B. 2021. "Effectiveness of Interactive Tools in Online Health Care Communities: Social Exchange Theory Perspective," in: *Journal of Medical Internet Research. JMIR Publications*, pp. e21892-e21892.
- Reza, S., Ho, H., Ling, R., and Shi, H. 2021. "Experience Effect in the Impact of Free Trial Promotions," *MANAGEMENT SCIENCE* (67:3).
- Sun, T., Gao, G., and Jin, G. Z. 2019. "Mobile Messaging for Offline Group Formation in Prosocial Activities: A Large Field Experiment," *Management Science* (65:6), pp. 2717-2736.
- Tonin, M., and Vlassopoulos, M. 2015. "Corporate Philanthropy and Productivity: Evidence from an Online Real Effort Experiment," *Management Science* (61:8), pp. 1795-1811.
- Wang, L., and Murnighan, J. K. 2017. "How Much Does Honesty Cost? Small Bonuses Can Motivate Ethical Behavior," *Management Science* (63:9), pp. 2903-2914.
- Wang, L., Yan, L., Zhou, T., Guo, X., and Heim, G. R. 2020. "Understanding Physicians' Online-Offline Behavior Dynamics: An Empirical Study," *Information Systems Research* (31:2), pp. 537-555.
- Wei, Z., Zhaohua, D., Ziyang, H., Evans, R., Jingdong, M., Hui, Z., Zhang, W., Deng, Z., Hong, Z., Ma, J., and Zhang, H. 2018. "Unhappy Patients Are Not Alike: Content Analysis of the Negative Comments from China's Good Doctor Website," *Journal of Medical Internet Research* (20:1), pp. 29-29.
- Wu, Q. L., and Tang, L. 2021. "What Satisfies Parents of Pediatric Patients in China: A Grounded Theory Building Analysis of Online Physician Reviews," *Health Communication*), pp. 1-8.
- Yan, Z., Kuang, L., and Qiu, L. 2022. "Prosocial Behaviors and Economic Performance: Evidence from an Online Mental Healthcare Platform," *Production & Operations Management* (31:10), pp. 3859-3876.
- Yu, H., Wang, Y., Wang, J.-N., Chiu, Y.-L., Qiu, H., and Gao, M. 2020. "Causal Effect of Honorary Titles on Physicians' Service Volumes in Online Health Communities: Retrospective Study," *J Med Internet Res* (22:7), p. e18527.

Zhang, X., Liu, S., Deng, Z., and Chen, X. 2017. "Knowledge Sharing Motivations in Online Health Communities: A Comparative Study of Health Professionals and Normal Users," *Computers in Human Behavior* (75), pp. 797-810.

Zhou, T. 2020. "Understanding Users' Participation in Online Health Communities: A Social Capital Perspective," *Information Development* (36:3), pp. 403-413.

Copyright © 2023 Huaihui Cheng, Libo Liu, Tingru Cui. This is an open-access article licensed under a Creative Commons Attribution-Non-Commercial 3.0 Australia License, which permits non-commercial use, distribution, and reproduction in any medium, provided the original author and ACIS are credited.