

HECON4220- Paying Providers of Health Care. Exam 10 June 2024:

GUIDE TO EVALUATION

This exam has three parts. The three parts are given equal weight when grading the exams.

Study setting

Study setting and model set up in this exam builds on the book chapter by Iversen (2016).

Assumptions about the providers

We study the market for primary care physicians (PCPs). We use q to denote the quantity of health services, and q^{*DM} denotes the physician's optimal q . A PCP's cost of supplying health services depends on q and is specified in Equation A.

Market participation is voluntary. PCPs require non-negative profit in order to participate in the market. A professional norm exists. The professional norm means that q^{*DM} must be in the interval $1 \leq q \leq 10$ for participating PCPs. An expression for the physician's utility function is given in Equation E. The physicians care about profit denoted by $\pi(q)$, and about patient health benefit denoted by $H(q)$. Profit is defined in Equation D. There are two patient types, but we assume each PCP only treat one type of patient.

Assumptions about the patients

We assume that patients have full insurance coverage, so patients do not need to pay for health services. Each patient's health benefit is a function of q denoted $H(q)$. There are two patient types. Equation B1 and B2 specifies the health benefit function for the two patient types. Equation C1 and C2 specifies the marginal health benefit function for the two patient types.

Assumptions about the regulator

We assume that there is one single payer and regulator responsible for choosing the payment system and paying the PCPs. The regulator chooses a payment system that maximizes welfare in the society. We denote the welfare-maximizing quantity by $q^{*Society}$. For each patient type, we assume that marginal health benefit equals marginal cost when $q = q^{*Society}$: $h'(q^{*Society}) = C'(q^{*Society})$.

Equations

Equation A (Cost function): $C(q) = 3q$.

Equation B1 (Health benefit function patient type 1): $H(q) = b \ln(q)$, with $b=9$.

Equation B2 (Health benefit function patient type 2): $H(q) = b \ln(q)$, with $b=15$.

Equation C1 (Marginal health benefit function patient type 1): $H'(q) = b/q$, with $b=9$.

Equation C2 (Marginal health benefit function patient type 2): $H'(q) = b/q$, with $b=15$.

Equation D (PCP profit): $\pi(q) = PS - C(q)$, where PS denotes the payment system chosen by the regulator.

Equation E (PCP utility): $V(q) = [1-\alpha] \pi(q) + \alpha H(q)$, $0 \leq \alpha \leq 1$.

The physician's altruistic motivation is represented by the parameter α .

Part 1. (Weight 1/3)

- a) Give an expression for the utility function, $V(q)$, for a PCP who wants to maximize profit. Set $\alpha=0$
- b) Give an expression for the utility function, $V(q)$, for a PCP who wants to maximize health benefits. Just set $\alpha=1$
- c) Give an expression for the profit $\pi(q)$, of a PCP who is paid a yearly practice allowance, A , combined with fee-for-service payment, F . $\pi(q) = A + Fq - C(q)$
- d) Assume the PCP in c) receives $A=10$ and $F=4$. Which value of q can we expect the physician to choose in this case? Here the marginal payment is set higher than marginal cost. Marginal profit and marginal health benefit are both positive. Provider would like to provide infinitely large q , but is constrained by the professional norm. As a result provider will choose $q=10$.
- e) What is $q^{*Society}$ for type 1 patients?
Answer: $H'(q)=C'(q)$ for type 1 patients becomes $\frac{9}{q} = 3$, and $q^{*Society} = 3$.
- f) What is $q^{*Society}$ for type 2 patients?
Answer: $H'(q)=C'(q)$ for type 2 patients becomes $\frac{15}{q} = 3$, and $q^{*Society} = 5$.
- g) Why is there a substantial difference between a payment system with $F>3$ and a payment system with $F<3$ in this study setting? Answer: Because the marginal cost is 3. Marginal payment above 3 will encourage overprovision of care. Marginal payment less than 3 will imply supply-side cost sharing.
- h) Give an example of a payment system with supply-side cost sharing in this study setting. Answer: All payment systems where $F<3$ combined with $A>0$ or per capita payment $R>0$.

Part 2. (Weight 1/3)

Assume all PCPs have $\alpha=0.5$, only treat type 1 patients, is paid a yearly practice allowance, A , combined with fee-for-service payment, F .

- a) With $A=10$, $F=1$, what is the resulting profit if a PCP chooses $q=1$? Answer: $\pi(1)=8$.
- b) With $A=10$, $F=1$, should we expect a PCP to choose $q < q^{*Society}$? (Please answer yes or no) Answer: NO With $A=10$, $F=1$, should we expect a PCP to choose $q > q^{*Society}$? (Please answer yes or no) Answer: YES. Reason: As we saw in seminar exercises, providers with $\alpha=0.5$ will choose $q = q^{*Society}$ with $F=0$. This means that the provider will overprovide, $q > q^{*Society}$, if $F>0$
- c) With $A=10$, $F=1$, which value of q can we expect a PCP to choose? Answer: $q = \frac{9}{2}$
- d) With $A=10$, $F=0$, what is the resulting profit if a PCP chooses $q=1$? Answer: 7
- e) With $A=10$, $F=0$, should we expect a PCP to choose $q < q^{*Society}$? (Please answer yes or no) Answer: NO.
- f) With $A=10$, $F=0$, should we expect a PCP to choose $q > q^{*Society}$? (Please answer yes or no) Answer: NO.
- g) With $A=10$, $F=0$, which value of q can we expect a PCP to choose? Answer: providers with $\alpha=0.5$ will choose $q = 3 = q^{*Society}$ with $F=0$. This means that the provider will overprovide, $q > q^{*Society}$, if $F>0$

Part 3. (Weight 1/3)

PCPs in a primary care sector are responsible for a specific list of patients. PCPs in the sector receive a yearly practice allowance (A) in addition to fee-for-service payment (F). This sector is characterized by poor access to PCPs patient lists. Most PCPs do not accept any new patients and most patient lists are full. The patients who are listed with a PCP receive many consultations. Many patients do not have a designated PCP and are not included on any patient list.

The regulator wants to improve patients' access to PCPs patient lists. The policy goal is that all patients get to be on the patient list of a PCP.

- a) Suggest changes to the payment system that will improve patients' access to PCP lists. Explain how and why the new payment system will improve patients' access to PCP lists. **Answer:**
Suggestion 1: Introduce capitation payment R per listed patient. PCPs are not rewarded for enrolling additional patients under status quo. This can explain the observation of high activity for patient who are enrolled, but difficulty of getting enrolled.
Suggestion 2: fee for service payment and can be lowered to adjust for income rise of GPs who have now started to receive capitation payment. After 1 and 2, the regulator might want new income level to be higher if the aim is to encourage more physicians to work in this sector. A rise in the number of PCPs and each PCP enrolling more patients will likely contribute to improved access.
- b) Suggest changes to the payment system that is likely to be unsuccessful in improving patients' access to PCP lists. Explain why this particular policy is likely to be unsuccessful.
Answer: There are many alternatives here. Introducing payment changes to that encourage existing GPs to have shorter lists will likely result in worsening of access. Replacing the mixed payment system with a system of salaried GPs likely to be unsuccessful in improving access.