

Problem Set on Adverse Selection and an Individual Mandate

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This problem set is based on Hackmann, Kolstad, and Kowalski (2015) *Adverse Selection and an Individual Mandate: When Theory Meets Practice*, found in the *American Economic Review*, Vol. 105, No. 3, pp. 1030–64 or at: <http://dx.doi.org/10.1257/aer.20130758>. It is important to read this paper carefully, with special attention to sections II and V. The Online Appendix provides derivations of many of the paper's formulas and will therefore be useful to understanding them.

These questions are designed to test your understanding of the theoretical underpinnings of adverse selection and how the Massachusetts health reform's individual mandate sought to alleviate it in practice. There are no econometric questions, but careful understanding of the theoretical model and its attendant graphs is critical to successful completion of this problem set.

1. Conceptual Questions (50 points)

1.a. What does the average cost curve look like under adverse selection? How is it different under advantageous selection? Which types of individuals join the insurance pool first under each scenario?

[5 points]

1.b. How does community rating with guaranteed issue exacerbate adverse selection?

[4 points]

1.c. Why might the health reform have a larger impact on enrollment in the individual market than in the group market? How might it affect costs?

[4 points]

1.d. What are two potential sources of welfare gain from the health reform as outlined in the paper?

[4 points]

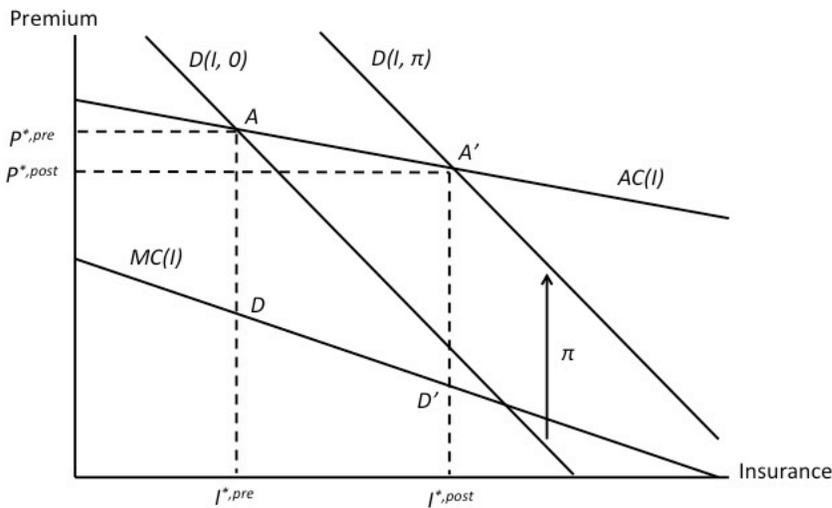
1.e. How does a penalty effectively lower the price of insurance?

[4 points]

1.f. Why does the tax penalty induce a shift in the demand curve but only a walk along the marginal cost curve?

[4 points]

Questions 1.g-j use Figure 2:



1.g. Which region of the graph indicates the pre-reform welfare cost of adverse selection? Why is it this region?

[4 points]

1.h. What range of insurance coverage levels corresponds to individuals who would buy insurance after the reform but not before? How does the individual mandate change their behavior?

[4 points]

1.i. Label the point where $P^{*,post}$ intersects the old demand curve. What is the difference between individuals to the left and to the right of this point? Who is better off after the mandate?

[4 points]

1.j. Why does the pre-reform equilibrium occur at point A? Why can't it occur at the intersection of the marginal cost curve and the demand curve?

[4 points]

1.k. What should the goal of the tax penalty be, in order to minimize welfare loss? (i.e. how do we know if the tax penalty is too big?)

[4 points]

1.l. If the data contained extra variables (age, sex, race, etc.) that the regression could potentially control for, would it be a good idea to control for them? Why or why not?

[5 points]

2. Understanding the model (30 points)

2.a. How does the model control for initial levels and trends between Massachusetts and other states? What are some likely reasons health care costs may differ between Massachusetts and other states?

[5 points]

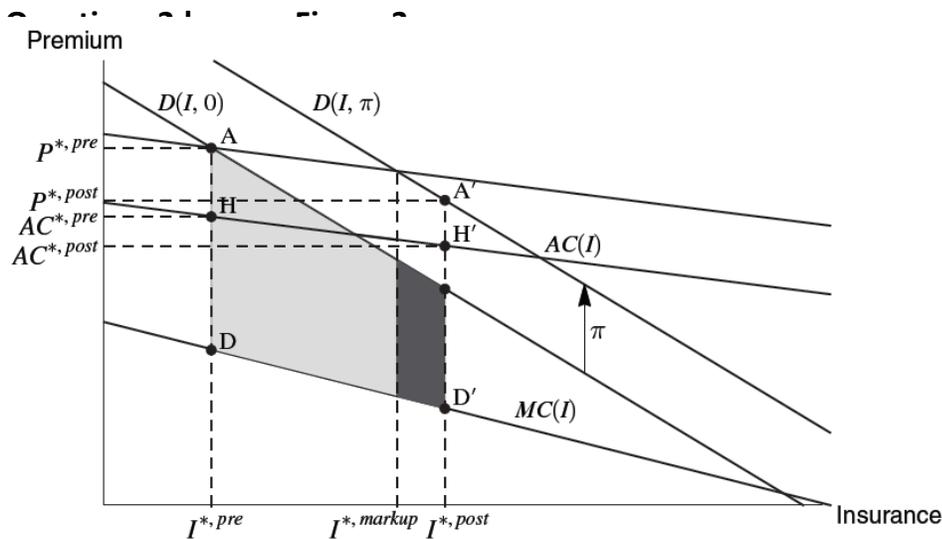


FIGURE 3. ADVERSE SELECTION AND THE MANDATE WITH MARKUPS

2.b. What do the light grey and dark grey regions indicate?

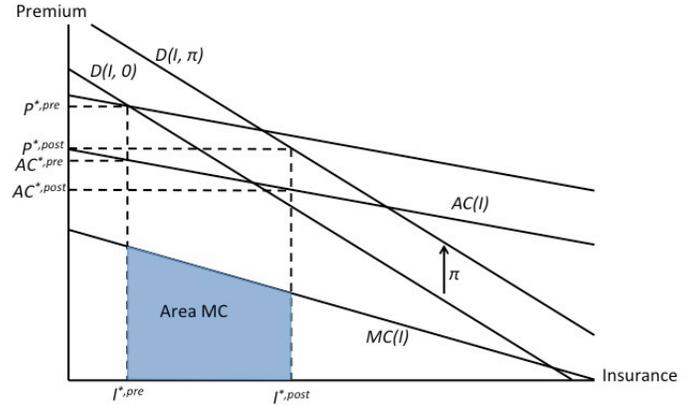
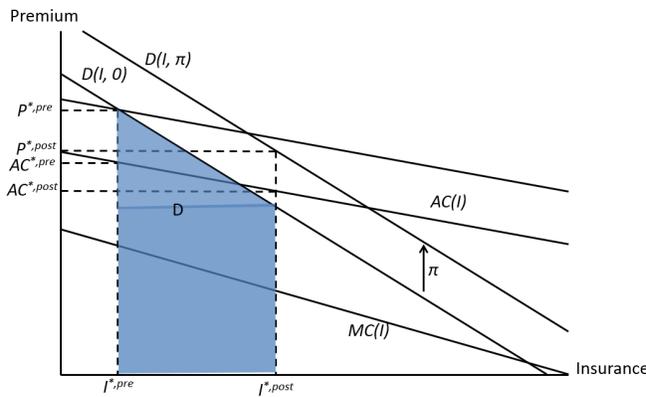
[5 points]

2.c. The total welfare effect is visible geometrically in the graph. What are the boundaries of the total welfare region? In other words, which curves form the upper and lower bounds, and what levels of insurance form the left and right bounds?

[5 points]

2.d. The total welfare is calculated by subtracting area MC from area D (shown below). Using the variables in the graph, give an equation for the area of D, the area of MC, and the equation resulting from subtracting the two areas. (Hints: Area D can be divided into a rectangle and a triangle. Area MC can be found with the help of the online appendix.)

[5 points]



2.e. How does the model separate the welfare effect of increased competition from the welfare effect of decreased adverse selection?

[5 points]

$$\begin{aligned}
 (2) \quad \Delta W_{full} &= (P^{*,pre} - AC^{*,pre}) \times (I^{*,post} - I^{*,pre}) \\
 &\quad - (AC^{*,post} - AC^{*,pre}) \times (I^{*,pre} + (I^{*,post} - I^{*,pre})) \\
 &\quad + \frac{1}{2} ((P^{*,post} - \pi) - P^{*,pre}) \times (I^{*,post} - I^{*,pre}).
 \end{aligned}$$

2.f. Equation 2 (above) separates the full welfare effect into three terms. Match each term to its intuitive meaning:

[5 points]

Terms

1. $(P^{*,pre} - AC^{*,pre}) \times (I^{*,post} - I^{*,pre})$
2. $(AC^{*,post} - AC^{*,pre}) \times (I^{*,pre} + (I^{*,post} - I^{*,pre}))$
3. $\frac{1}{2} \times ((P^{*,post} - \pi) - P^{*,pre}) \times (I^{*,post} - I^{*,pre})$

Meanings

- A. Role of changes in premiums for our welfare estimates
- B. The observed positive pre-reform markup
- C. The role of the downward sloping average cost curve

3. Empirical Questions (20 points)

3.a. Interpret the results presented in each column of the first row of Table 2.

[3 points]

3.b. What assumption can be made about the effect of the decreased post-reform markups on competitiveness? Why?

[3 points]

$$\begin{aligned} (2) \quad \Delta W_{full} &= (P^{*,pre} - AC^{*,pre}) \times (I^{*,post} - I^{*,pre}) \\ &\quad - (AC^{*,post} - AC^{*,pre}) \times (I^{*,pre} + (I^{*,post} - I^{*,pre})) \\ &\quad + \frac{1}{2} ((P^{*,post} - \pi) - P^{*,pre}) \times (I^{*,post} - I^{*,pre}). \end{aligned}$$

3.c. Using Equation 2 (above), explain how modifying π impacts the full and net welfare effects (assuming $I^{*,post}$ is less than optimal coverage). What happens as π increases? What happens as it decreases?

[3 points]

3.d. Calculate the optimal coverage level given a penalty of 24.9% by substituting the penalty level in equation 2. Show your work.

[3 points]

**3.e. Determine the optimal coverage level for a penalty of 21.3%. Show your work.
How is this different from your answer to 3.d?**

[3 points]

**3.f. Assuming that the answer to 3.d. is the optimal level of coverage, what does this
imply about the potential for the tax penalty to be too large?**

[5 points]