Disclaimer: I don't know what will be on the exam.

1. List possible rationales for government intervention.

   - How are they related to the 1$^{\text{st}}$ and 2$^{\text{nd}}$ welfare theorems?
   - Some are directly related to the MVPF. How so?

2. Applying the MVPF.

   - What are two reasons why a policy with an MVPF numerator = 0 might be desirable given a utilitarian SWF?
   - Why are the MVPFs of a tax and subsidy on a good the same sign?
   - Sketch out the welfare effects of import tariffs from the perspective of the United States government using the MVPF.
   - Concretely sketch out out how you could generate a Pareto improvement after (1) calculating elasticities of taxable income across the income distribution and (2) the MVPF of a program with distributional effects.

3. Suppose the only revenue a long-term care facility receives is a payment for each day of the patient's stay.

   - Why is this a selection market?
   - What does an endogenous contract space mean in this context and why does it matter for adverse selection?

4. One of your friends heard you mention moral hazard and thinks it applies to people engaging in riskier behavior after getting a vaccine. In contrast to the problem set question, suppose that everyone is completely uninsured against health risk.

   - Sketch how this can be seen as a principal-agent problem with hidden action.

5. More-al hazard

   - Moral hazard sounds bad. Discuss why this is not necessarily the case. Hints:
     - (UI example based on the standard Baily-Chetty formula)
     - (UI example based on something left out of the (RHS of the) standard Baily-Chetty formula)
     - (Healthcare example based on lifetime budget sets)
   - When (and why) did some papers need to assume away moral hazard?
   - When (and why) were some papers able/unable to distinguish between adverse selection and moral hazard?
   - What is the distinction between ex ante and ex post moral hazard? How do you think they apply in insurance for:

   (a) palliative cancer care

      (b) lump-sum fire insurance

      (c) non-experience rated car insurance

      (d) annuities

6. Your friend just learned the term "liquidity constraints" and is really into it.

   - He wants to know if they're related to the value of unemployment insurance
   - He wants to know if they can explain the WTP for health insurance being everywhere below own costs
   - He wants to know if they mean he can't use the envelope theorem

7. A brief internet search suggests that almost half of marriages end in divorce, which can cost tens of thousands of dollars in legal fees.

   - Why is there not divorce insurance?
   - Why might you not trust "consumption-drop" based estimates for the value of divorce insurance?

8. AOC arguing for universal tuition-free public college[1]:

Alexandria Ocasio-Cortez @AOC · Nov 28, 2019

Replying to @AOC

1. Universal public systems are designed to benefit EVERYBODY! Everyone contributes & everyone enjoys. We don't ban the rich from public schools, firefighters, or libraries bc they are public goods.

2. Universal systems that benefit everyone are stronger bc everyone's invested!

  706   4.2K   28.3K

Alexandria Ocasio-Cortez @AOC · Nov 28, 2019

3. When you start carving people out & adding asterisks to who can benefit from goods that should be available to all, cracks in the system develop.

4. Many children of the elite want to go to private, Ivyesque schools anyway, which aren't covered by tuition-free public college!

  261   2.8K   25.4K

   - Use course topics to discuss one way the logic of part (1) could be correct and another way it could be incorrect.
   - Connect part (4) to course material.
   - Food for thought: Parts (2) and (3) didn't come up in the course

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[1]https://twitter.com/AOC/status/1200261372015194113

9. Finkelstein and McGarry (2006) was a paper we didn't cover this year but was covered in past years. It finds no positive correlation between long-term care insurance take-up and long-term care facility entry?

   - What test of private information is this related to? What do you think is the likeliest interpretation?
   - What does it have to do with the Akerlof model of insurance?
   - What implications could it have under the Rothschild-Stiglitz model of insurance?

10. We unified course material with Medicaid at the end.

   - What are four possible reasons that redistribution through Medicaid is preferable to redistribution through cash?
   - You might have written "price effects" above. Why might this not apply in the case of Medicaid?

11. Three models for publicly provided, universally available health insurance: voluntary top up, no top up allowed, and voucher. For each, how should we think about...

   - moral hazard?
   - market power?
   - choice frictions?

12. Belief in the Hot Hand vs. the Law of Small Numbers: Evidence from that Hendren figure appearing on the past three final exams

   FIGURE IV: Impact of Unemployment on Consumption Growth
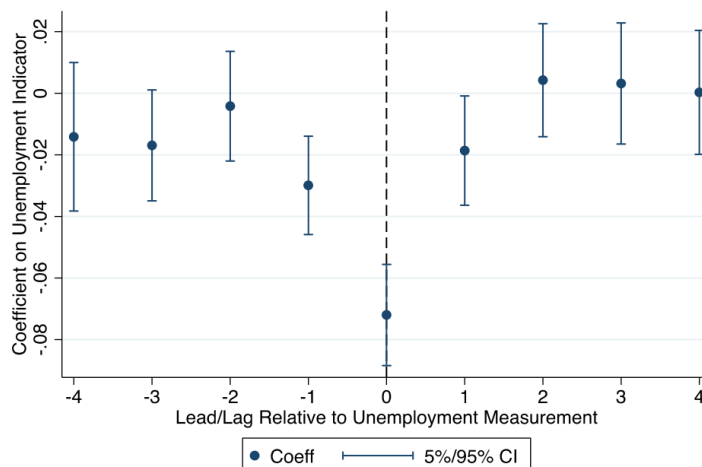
   - The y-axis is consumption **growth**. The negative values around unemployment onset and recovery to no consumption growth implies long-run consumption drops. But Hendren doesn't include these subsequent consumption values in his estimates. Why does this (not) matter?

13. You got access to SSA data and figure out that people with middle names that start with the letter Z tend to have much lower earning abilities. You propose using this as a tag for redistribution.

    - What's a reason from the course that this might not be a good idea?

    - What's a reason from being a normal person that this might not be a good idea?

14. We saw many ways of estimating the value of unemployment insurance.

    - How could we use the causal effect of job loss?

    - How could we use the difference in behaviors across different states?

    - How could we use the difference in behaviors within a given state?

    - What could we use the causal effect of changes in UI generosity?

15. The Affordable Care Act was often referred to as a "three-legged stool" whose components needed to be balanced with each other: (1) an individual mandate that imposed a financial penalty on consumers without insurance, (2) government subsidies for low to middle-income families health insurance, and (3) regulation on insurance contract coverage (e.g. coverage for pre-existing conditions, no annual benefit cap, minimum coverage quality, etc.). The mandate penalty was min(max($695, 2.5% of income)). To many economists surprise, the mandate's effective repeal in the 2017 TCJA did not seem to impact health insurance enrollment.

    - Describe two papers from the course that help rationalize this result.

16. The LHS of Baily-Chetty is a WTP and the RHS is a fiscal externality. This sounds a lot like the MVPF.

    - If Baily-Chetty says increase insurance if LHS>RHS, why does MVPF not necessarily say expand policy if MVPF>1?

17. Suppose you are interested in testing models of consumption-smoothing. You can get only durable or only nondurable consumption data.

    - For each tpye, what are the benefits/costs (if any) of getting only that one type? Does your answer depend on the type (broadly defined) of income shock your research design uses?

    - It seems like you can't distinguish liquidity constraints from impatient time preferences. In what context of predictable income changes do these have different predictions?

18. On an episode of the television show "Nathan for You"[2], a gas station offers customers a half-off rebate if they if they travel to a mountain, hike to the top, and solve a series of riddles.

- Why might Nichols-Zeckhauser say this would be a bad government policy?

19. Summers (1989) presents an incidence framework for mandated benefits tied to employment and financed by payroll taxes.

    - Why might a benefits-tax linkage be (un)desirable from an efficiency perspective?
    - Why might a benefits-tax linkage be (un)desirable from a redistribution perspective?

20. Biden's Build Back Better proposal includes "social infrastructure", such as subsidies that limit the share of income parents devote to childcare.

    - How is this related to Summers (1989)? Hendren and Sprung-Keyser (2020)? Hart, Shleifer, Vishny (1997)?
    - What would be examples of "top-up", "no top-up", and "voucher" in this context? How would you think about the MVPF of each?

21. Nathan Hendren and Johannes Spinnewijn had separate arguments for why the realized demand for insurance among the uninsured may not capture their "true" value of it.

    - What were their arguments?

22. Almost every market has asymmetric information in the sense that sellers don't know buyers' values. What makes asymmetric information in selection markets special?

23. There are calls for the government to promote COVID vaccine take-up and for the government to pass more economic stimulus. Former Democratic presidential primary candidate John Delaney proposed tying an additional $1,500 cash transfer to getting a COVID vaccine.[3] For simplicity, suppose that there are no supply constraints.

    - How would you think about welfare analysis of the bundled policy relative to an unbundled policy?

24. In the beginning of an episode of the podcast "The Pie"[4], Matt Notowidigdo mentioned that he, Richard Thaler, and other Chicago Booth economists were unable to figure out if some of their health insurance plans were financially dominated by other ones. Moreover, Kate Baicker mentioned that she put in a lot of work doing that one year and just sticks with that plan to avoid the hassle.

    - Connect these anecdotes to two papers from class.

25. Rhinos are an endangered species, but poachers still hunt them because of the usage of their horns in Eastern medicine. Scientists recently developed synthetic rhino horns based on entirely different chemical compounds that appear similar.[5]

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[3]https://www.cnbc.com/2020/12/03/1500-stimulus-checks-for-covid-19-shots-how-one-plan-would-work.html

[4]https://bfi.uchicago.edu/podcast/pre/

[5]https://www.nytimes.com/2019/11/25/science/synthetic-rhino-horn.html

- Talk through how introducing synthetic rhino horn would affect social welfare.

26. Questions I am $> 99.99\%$ sure will not be on the exam.

   - Risk adjustment tries to combat adverse selection by compensating insurers for taking on riskier customers.
     - How does it backfire in Mahoney and Weyl (2017)? (hint: market power)
     - How does it backfire in Einav, Finkelstein, Kluender, and Schrimpf (2016)? (hint: selection on moral hazard and cream-skimming)
   - In the Einav, Finkelstein, and Schrimpf annuities paper, why was a functional form assumption on the death hazard necessary? Why was a functional form assumption over the distribution of preferences necessary?
   - 2SLS estimates an average treatment effect among instrument compliers. For what subgroup are Lee Bounds relevant?
   - What is the specification for a Cox proportional hazard model? Why is it called a "proportional hazard" model? Why is it sometimes referred to as a "semipara-metric" model?
   - What do the terms "heterogeneity in hazard rates" and "duration dependence" mean, why is it difficult to separately identify them, and what were some of the strategies to do so that we saw?
   - How are Poisson and exponential distributions used to model events?

Mathematical question: Optimal UI with Leisure

Disclaimer: I feel confident saying this is harder than any mathematical question that would appear on the exam. If you get stuck on the math, try working through the intuition before looking at the solutions.

Consider a version of the stylized Baily model discussed in class that includes disutility from labor:

- There is a single period, in which workers become unemployed with probability α

- Employed workers supply n hours of labor and earn $y = n - \tau$ (the hourly wage is normalized to 1, and τ is a tax)

- Unemployed workers exert search effort and find a new job with probability s

- Workers who do not find a job are paid an unemployment insurance benefit $y = b$

- Workers who find a job supply n hours of labor and earn $y = n$ dollars (tax free!)

Workers choose n and s according to the preferences $U(y, n, s) = u(y) - v(n) - \psi(s)$ with, as usual, $u_c, v_n, v_{nn}, \psi_n, \psi_{nn} > 0$, and $u_{cc} < 0$, and $\lim_{s \to 1} \psi(s) = \infty$.

1. Suppose the social planner can control workers' choices of n and s. What is the optimal insurance policy (b, τ) in this case, subject to a break-even budget constraint? How does this compare to your answer to Problem Set 1, Part 1, Question 1 (i.e. social planner choosing optimal insurance without any moral hazard, administrative loads, etc.)?

2. Suppose you implement the optimal policy in Question 1 above, and discover you can't actually control workers' choices of n (but you can control s). Does this change your answer? Why or why not?

3. How would your answer to Question 2 change if the tax τ were an ad valorem tax instead of a flat tax? Can you give an intuition in terms of a newly relevant externality, and/or the envelope theorem?

4. Now consider the case where you can't control either n or s. What is the second-best insurance policy (b, τ) in this case? How does this compare to your analysis of administrative loads in Problem Set 1, Part 1, Question 3?

(Solutions to mathematical question on next page)

Mathematical question solutions

1. Workers will consume all of their income in each state (because $u_c > 0$), so the social planner's problem is

$$\max_{b,\tau,n_e,n_r,s} (1-\alpha)\left[u(n_e - \tau) - v(n_e)\right] + \alpha s\left[u(n_r) - v(n_r) - \psi(s)\right]$$
$$+ \alpha(1-s)\left[u(b) - \psi(s)\right] + \lambda\left[(1-\alpha)\tau - \alpha(1-s)b\right]$$

where n_e and n_r denote labor supply in the employed and re-employed states. Taking FOCs and eliminating λ, we see:

$$u'(b) = u'(n_e - \tau) = v'(n_e)$$

$$u'(n_r) = v'(n_r)$$

$$\left[u(n_r) - v(n_r)\right] - \left[u(b)\right] = \psi'(s) - bu'(b)$$

$$\tau = \frac{\alpha}{1-\alpha}(1-s)b$$

a five-equation system that pins down the optimal (b, τ, n_e, n_r, s). Similar to Problem Set 1, Part 1, Question 1, we see that there is full insurance across the two states (e and u) between which the social planner is able to move resources, i.e.

$$u'(b) = u'(n_e - \tau)$$

2. No, we did not actually need to be able to control n. Once we set τ, employed workers choose n to solve
$$\max_n u(n_e - \tau) - v(n_e)$$
so we again have

$$u'(n_e - \tau) = v'(n_e)$$

whereas re-employed workers choose n to solve

$$\max_n u(n_r) - v(n_r) - \psi(s)$$

so we again have
$$u'(n_r) = v'(n_r)$$

Intuitively, workers internalize all the costs and benefits of n, so the planner and workers choose the same allocation.

3. If τ were instead an ad valorem tax, workers would no longer internalize all the costs and benefits of n. There would be an externality on the government budget constraint.

4. To fix notation, let $n_e^* = n_e(b, \tau)$, $n_r^* = n_r(b, \tau)$, and $s^* = s(b, \tau)$ be the workers' choices given a policy (b, τ), and let $V(b, \tau)$ be the workers' expected utility achieved by following those choices,

$$V(b, \tau) = (1-\alpha)\left[u(n_e^* - \tau) - v(n_e^*)\right] + \alpha s^*\left[u(n_r^*) - v(n_r^*) - \psi(s^*)\right] + \alpha(1-s^*)\left[u(b) - \psi(s^*)\right]$$

Then the social planner's problem is

$$\max_{b,\tau} V(b, \tau) + \lambda\mathrm{BC}(b, \tau)$$

where we define $\mathrm{BC}(b, \tau) = (1 - \alpha)\tau - \alpha(1 - s)b$

Then the planners' two FOCs are

$$0 = \frac{dV}{db} = \underbrace{\frac{\partial V}{\partial n_e^*}\frac{\partial n_e^*}{\partial b}}_{=0} + \underbrace{\frac{\partial V}{\partial n_r^*}\frac{\partial n_r^*}{\partial b}}_{=0} + \underbrace{\frac{\partial V}{\partial s^*}\frac{\partial s^*}{\partial b}}_{=0} + \frac{\partial V}{\partial b} + \lambda\frac{\partial\mathrm{BC}}{\partial b}$$

$$0 = \frac{dV}{d\tau} = \underbrace{\frac{\partial V}{\partial n_e^*}\frac{\partial n_e^*}{\partial \tau}}_{=0} + \underbrace{\frac{\partial V}{\partial n_r^*}\frac{\partial n_r^*}{\partial \tau}}_{=0} + \underbrace{\frac{\partial V}{\partial s^*}\frac{\partial s^*}{\partial \tau}}_{=0} + \frac{\partial V}{\partial \tau} + \lambda\frac{\partial\mathrm{BC}}{\partial \tau}$$

where the under-bracketed terms are zero by the envelope theorem. (Intuitively, each of these terms is one of the workers' FOCs, and so these terms are zero by definition of n_e^*, n_r^*, and s^*.) Rearranging to eliminate λ, we have

$$\frac{\partial V}{\partial b}\frac{\partial\mathrm{BC}}{\partial \tau} = \frac{\partial V}{\partial \tau}\frac{\partial\mathrm{BC}}{\partial b}$$

At this point we can simply evaluate each of these four terms. For example, we have

$$\frac{\partial V}{\partial \tau} = -(1 - \alpha)\left[u'(n_e - \tau)\right]$$

$$\frac{\partial\mathrm{BC}}{\partial b} = -\alpha(1 - s) - \alpha\left(-\frac{ds}{db}\right)b$$

Substituting, we then have

$$\alpha(1 - s)u'(b)(1 - \alpha) = -(1 - \alpha)\left[u'(n_e - \tau)\right]\left[\alpha(1 - s) + \alpha\left(-\frac{ds}{db}\right)b\right]$$

So after cancelling $\alpha(1 - \alpha)$ on both sides and rearranging,

$$\frac{u'(b) - u'(n_e - \tau)}{u'(n_e - \tau)} = -\frac{ds}{db}\frac{b}{1-s} \equiv \eta_{1-s,b}$$

We rederive the Baily formula despite the fact that, unlike in the original Baily setup, here unemployed workers enjoy leisure when unemployed. Note, however, that we no longer achieve full insurance as in Question 1. This is comparable to the analysis of insurance loads in Problem Set 1, Part 1, Question 3, since the budget externality from workers' seach behavior acts like a load: we can no longer move resource from the employed state to the unemployed state at a 1:1 rate.

Intuition takeaway: I went through all the algebra to be clear, but this is the same machinery as the original Baily-Chetty derivation. The envelope theorem zeros out the only modification (i.e. leisure) because the worker internalizes the benefit and there's not a fiscal externality (due to the lump-sum tax).