

Econ 230B
Spring 2023

FINAL EXAM: Solutions

The average grade for the final exam is 57.2 (out of 70 points) The average grade (out of 100) including all assignments is 85.9. There are 3A+, 4A, 3A-, 4B+, 2B.

Questions: 40 points

Answer briefly all 10 true/false questions (4 pts each). Explain your answer fully, since all the credit is based on the explanation. For the answers, base your answers on the substance of what was discussed in class (over and above what you can find in the slides).

1. The generosity of disability insurance monthly cash benefits in the United States has a positive impact on the survival of disability insurance recipients.

Solution: TRUE based on the study by Gelber et al. 18 who analyze effects on mortality of DI benefits using the Regression Kink Design approach exploiting the fact that DI benefits are a kinked function of life-time average monthly earnings (prior to becoming disabled). They find that mortality (as a function of prior life-time average monthly earnings) also exhibit a kinked relationship which is pretty compelling evidence of a negative causal effect of DI benefits generosity on mortality. Quantitatively, at lower bend point, \$1K extra DI/year reduces annual mortality by .25 points (1 out of 400 lives saved)

2. The spike of retirement hazard at age 62 in the United States is driven by the US social security system.

Solution: TRUE: There is indeed a spike of retirement hazard at age 62 in the United States that is driven by the early retirement age for social security. We know it is a causal effect of social security for 2 reasons: (1) there is no other policy change at age 62. (2) the spike at age 62 did not exist when the early retirement age for social security was 65 (before 1970), and emerged shortly afterwards (see slides).

3. Social security privatization is desirable if the rate of return on savings r is larger than the economy's rate of growth g .

Solution: FALSE: r is the rate of return on contributions in a privatized system while g is the rate of return on contributions in a pay-as-you-go system like the current social

security system. If the basic OLG model, even with $r > g$, social security privatization cannot be a Pareto improvement as a transitional generation has to pay twice: pay for the current elderly as in the old pay-as-you go system and save for their own future benefits. So desirability of social security privatization is not obvious. Furthermore, in practice, a privatized system creates more risk for beneficiaries, especially given the imperfect financial literacy of the public.

4. Longer unemployment benefits lead to longer unemployment spells.

Solution: TRUE. There is very compellingly identified empirical evidence of positive effects of longer unemployment benefits on unemployment spells, as we saw in class. For duration, we saw the Card-Chetty-Weber (2007) study using a regression discontinuity in Austria where you get up to 30 weeks of benefits when you have been employed for 36+ months in last 5 years (instead of up to 20 weeks). There is a jump in duration of unemployment based on number of months previously employed precisely at the 36 threshold.

5. Larger unemployment benefits lead to longer unemployment spells.

Solution: TRUE. There is also very compellingly identified empirical evidence of positive effects of larger unemployment benefits on unemployment spells, as we saw in class. For benefits, we discussed the Difference-in-difference evidence from Meyer (1990) exploiting changes in the maximum benefit amount that affects the unemployed with high previous earnings but not the unemployed with lower previous earnings. We also discussed in more detail the RKD pioneering study by Card et al. (2015) that exploits the kinked shape of UI benefits by prior earnings and shows that spells duration inherit this kinked shape, generating a pretty large estimate.

6. The strong effects of auto-enrollment in 401(k) pension plans contradict the standard life-cycle model of savings.

Solution: TRUE. Madrian-Shea (2001) showed very strong increases in 401(k) enrollment when firms switched to the opt-out model (enrollment by default upon hire) instead of the opt-in model (no enrollment by default). This contradicts the standard model of rational choice (as the choice set is unchanged by auto-enrollment). Because 401(k) employer pensions are a big component of life-cycle savings for American workers, this strongly suggests a contradiction with the standard life-cycle model of savings where individuals rationally and voluntarily decide to save part of their earnings to support their retirement.

7. Progressive wealth taxes are inefficient because the rich move out to avoid the tax.

Solution: UNCERTAIN. True that there is evidence of mobility effects of wealth taxes as seen in the paper by Jacobsen et al. 2023 from Sweden discussed in class: the abolition of the wealth tax reduced emigration of the rich. However, wealth taxes could be designed to counter this effect by imposing taxes on expatriates for a number of years (extreme case: US taxes its citizens abroad forever and imposes big exit tax upon renouncing citizenship making it very difficult to avoid the tax by moving away).

8. The progressive wealth tax in France was unsuccessful at taxing significantly the ultra-rich. Therefore, Lawrence Summers was right to question rosy revenue estimates from the Elizabeth Warren wealth tax proposal.

Solution: UNCERTAIN. True that the recent study by Bach et al. (2023) shows that the wealth tax relative to true economic income becomes minuscule at the very top but this is driven by the design of the french wealth tax which exempts all business assets for managers/owners and also has limits based on reported individual income. As a result, most of the wealth of the ultra-rich is effectively exempted from the wealth tax. The Elizabeth Warren wealth tax proposal had a comprehensive tax base with no exemptions so that, if enacted as is and successfully enforced, it would have sharply increased the tax burden on the ultra-rich (Saez and Zucman Brookings 2019).

9. Disability insurance has negative effects on labor supply because applicants assigned to tough examiners are more likely to work than applicants assigned to lenient examiners.

Solution: TRUE as shown by the Maestas et al. AER'13 study that exploits random assignment to examiners of DI applicants. However, the negative labor supply effect is not very large as getting DI reduces LFP by about 25-30 points, confirming the earlier results by Bound AER'89 that most DI beneficiaries actually cannot work (because DI rejected applicants themselves are not able to work much).

10. The US time series of top 1% income shares estimated using income reported on tax returns since 1913 shows that top incomes are very sensitive to the top tax rate of the individual income tax.

Solution: TRUE: First part of the statement is true. As we saw in class, there is a strong negative correlation between top income shares and top tax rates which is true in the big picture and also along specific tax reform episodes most notably the tax reform act of

1986.

PROBLEM (30 points):

Let us consider a simple model of tax evasion with risk-neutral taxpayers. Assume that there is a linear tax with uniform rate t . Let us denote by z real income and by y reported income, so that under-reporting is $z - y$. Let us always assume that $z \geq 0$ and $y \geq 0$ and also that $z - y \geq 0$ (i.e., no over-reporting is allowed). Assume that if the taxpayer is caught cheating, the government can force the individual to repay evaded taxes with a surcharge at rate $\theta > 0$ per dollar of evaded tax. We denote by p the probability of being caught cheating.

a. (3 pts) Show that each individual chooses y to maximize $z \cdot (1 - p \cdot (1 + \theta)t) + t \cdot y \cdot (p \cdot (1 + \theta) - 1)$.

Solution: The individual chooses y to maximize $(1 - p)(z - ty) + p(z - ty - p(1 + \theta)(z - y)) = z \cdot (1 - p \cdot (1 + \theta)t) + t \cdot y \cdot (p \cdot (1 + \theta) - 1)$.

b. (5 points) Assume that the probability of being caught is given by a fixed parameter p with $0 < p < 1$ independent of reported income y . How much does the individual report in income y ? Express this as a function of p and θ . Based on your findings, why have many studies concluded that individuals evade too little relative to the standard rational model of tax evasion?

Solution: From a., the individual fully reports income (i.e. $y = z$) if $p \cdot (1 + \theta) > 1$ and fully evades (i.e. $y = 0$) if $p \cdot (1 + \theta) < 1$. Empirically θ is modest (maybe 20%) and audit rates are small $p \ll 1$ so that $p(1 + \theta) < 1$ empirically so that we should expect much more evasion than we see in reality.

c. (5 points) Assume now that the probability of being caught is a decreasing function of y , $p(y)$ with $p'(y) < 0$. Solve for the reporting level y chosen by the individual in that case [Note: you cannot get a closed form solution in this case, only an implicit formula.] Show that this solution can be expressed in the form $1 = p \cdot (1 + \theta) \cdot (1 + \varepsilon)$ where ε is the elasticity of the probability of being caught with respect to under-reported income $z - y$. In practice, do we expect ε to be positive or negative? Explain why.

Solution: The first order condition in y takes the form

$$-p'(y)z(1 + \theta)t + ty(1 + \theta)p'(y) + t(p(1 + \theta) - 1) = 0$$

$$[p - p'(y) \cdot (z - y)](1 + \theta) = 1$$

which can be rewritten as $1 = p \cdot (1 + \theta) \cdot (1 + \varepsilon)$ with $\varepsilon = -(z - y)p'(y)/p$ the elasticity of p with respect to under-reported income $z - y$ (as z is fixed). In practice, we expect $p'(y)$ to be negative as evading more increases the chances of being caught cheating so that $\varepsilon > 0$.

d. (4 points) Assume further that income $z = z_T + z_S$ where z_T is income that is third-party reported to the government by the payer (e.g., wage earnings from a formal employer), while z_S is income that is not third-party reported (e.g., earnings from informal self-employment). What do we know from empirical studies about the evasion rates for z_T vs. z_S income?

Solution: The evasion rate for z_T is very small (a couple percent) and the evasion rate for z_S is high (like 50%). We know this from the IRS studies in the US and also from the Danish tax experiment (Kleven et al. 2011).

e. (4 points) Explain what shape for $p(y)$ we should expect (as a function of y) given the decomposition of z into z_S and z_T from question d. What is then the best reporting strategy for the individual?

Solution: The shape for $p(y)$ is expected to a step function with $p(y) = 1$ for $y < z_T$ and $p(y)$ very low for $y > z_T$. As a result we expect the individual to report z_T but evade z_S .

f. (5 points) Suppose the government takes seriously the lesson from d. and e. and wants to improve enforcement by expanding third-party reporting for self-employed workers and implements the following reform: Before 2022, gig-work platforms (such as Uber or Lyft) were required to send third-party 1099 forms to their (self-employed) workers and to the IRS only when aggregate annual payments to the worker exceeded \$20,000. Thanks to the American Rescue Plan Act of 2021 and starting in 2022, this threshold is lowered down \$600. Explain how you could use micro-tax data before and after the reform to analyze whether the reform is effective in improving tax compliance with gig workers. Be sure to state clearly what are the identification assumptions you would need and what are the potential threats to identification.

Solution: This reform should lead to much less evasion of small self-employment gig-related income. To analyze this, the simplest is to plot the density distribution of reported self-employment income before the reform in 2021 and after reform in 2022. After the reform, we should see a much higher density of reported self-employment income in the range \$600 and

\$20,000. Threat to identification is the possibility that the density would change for non-reform reasons such as COVID. However, if the density has a clear discontinuity at \$20,000 that is present in all the pre-reform years, then that would be very compelling evidence.

g. (4 points) (Continuing from f.) Actually, before 2022, some states (such as Maryland, Massachusetts, New Jersey, or Vermont) had already imposed 1099-K filing requirements much lower than \$20,000. For simplicity, let's assume that a group of states (denoted by C) had already in place the \$600 filing requirement for 1099s before 2022 while other states (denoted by T) just followed the federal government threshold. Explain how you could use this to improve your empirical analysis of the 2021 federal reform in f.

Solution: One can repeat the strategy in f. in T states and C states. In principle, there should be no change in C states from 2021 to 2022 while there should be the change described in f. for T states