

Econ 230B
Spring 2011

FINAL EXAM: Solution

Average grade on the final exam is 33.5/50. The distribution of final grades is A+, A, A, A-, B+, B+, B, B

Independent True/False Questions: 25 points

Answer 10 out of 12 questions (2.5 pts each). Explain your answer fully, since all the credit is based on the explanation.

1. This is true if the Atkinson-Stiglitz theorem assumptions are met: utility is separable between labor and consumption goods and everybody has the same sub-utility of consumption goods. This later assumption is unlikely to hold empirically as higher skilled individuals are likely to have higher tastes for savings (independent of their income). In that case, there should be a positive tax on savings even with optimal nonlinear labor income tax.

2. It is true that TRA 1986, which cut top tax rates from 50% to 28% did lead to a sharp increase in reported top incomes, and hence to an increase in taxes collected from the rich. However, a large fraction of that increase was due to a shift of income from the corporate sector to the individual sector. Thus, in net because of corporate tax losses, TRA '86 might not have produced a Laffer effect at the top income end.

3. True: Saez Restud '01 shows that the optimal top tax rate in the Mirrlees model is given by $\tau = 1/(1 + a \cdot e)$ where a is the Pareto parameter measuring the thinness of the earnings distribution (and e is the elasticity of income with respect to $1 - \tau$).

4. True: In the basic model, the government should condition taxes on any observable characteristic correlated with ability over and above earnings, especially when those characteristics are immutable (as is the case of height). This point was made by the tagging paper of Akerlof AER '78 and recently developed in the case of height by Mankiw and Weinzierl AEJ-EP'10. However, in practice, the public has horizontal equity concerns and probably would not tolerate difference in taxes based of height.

5. True: Saez QJE '02 shows that with extensive margin responses and if the government values redistribution to low skilled workers (their social marginal welfare weight is above 1), then

the optimal system subsidizes low skilled work with negative marginal tax rates at the bottom.

6. True that personal savings rates have come down a lot but this does not necessarily imply that IRAs and 401(k)s have not stimulated savings. It is possible that savings rate would have fallen even more without the introduction of IRAs and 401(k)s. This aggregate time series evidence is not fully conclusive. The empirical micro literature finds mixed results on the effects of IRAs and 401(k)s on savings.

7. It is true that Madrian and Shea (2001) and subsequent studies have shown that defaults have a large effect on 401(k) participation. However, it is still an open question whether those participation effects translate into more retirement savings or not (it is possible that workers offset 401(k) contributions with lower savings or higher debt).

8. Yes, write formulas $(1 - \tau) \cdot (1 + r(1 - \tau))^T$. The incentives might differ if marginal tax rates during retirement differ from marginal tax rates during working life.

9. False: It is true that benefits taxed away by the test are credited back in the form of higher benefits later on in an actuarially fair way. Therefore, somebody with average life expectancy should not respond to the test. However, in practice, Friedberg 2000 shows that there is a strong behavioral response in the form of bunching at the earnings test, showing that individuals may not understand that benefits are credited back, or they are myopic and credit constrained, or they have lower than average life expectancy.

10. True: Under the accidental model of bequests, taxing inheritances does not generate any behavioral response for donors, and it induces donees to work more through income effects. Therefore, if inheritances are received by well-off individuals, taxing them makes sense.

11. False: It is true that the current pay-as-you-go social security system delivers an average rate of return on contributions equal to wage and population growth. It is also true that a funded system delivers a rate of return equal to the market rate of return and that the market rate of return is higher on average than the rate of wage and population growth. However, funding the social security system requires a transition. The transition has to be financed by hurting the transitional generations. Funding the transition with government debt that is never repaid is a wash as what is gained in rate of return is lost in paying interest on this debt in perpetuity [at least in a basic model with a single market rate of return].

12. False: Saez AEJ 2010 shows that there is bunching of earnings around the 1st kink point

of the EITC but this bunching is solely due to self-employed. Wage earners do not bunch. This suggests that bunching is most likely due to reporting effects (tax manipulation) and not labor supply.

PROBLEM (25 pts):

(a) (2 pts) Standard plot.

(b) (2 pts) FOC individual maximization implies that $l = (w(1-\tau))^{1/k}$, hence $z = w^{1+1/k}(1-\tau)^{1/k}$. Thus, there are no income effects and the compensated and uncompensated elasticities are equal to $e = 1/k$ for both skills.

(c) (2 pts) Denote by T total tax revenue: $T = \tau(\lambda_1 z_1 + \lambda_2 z_2) = \tau(1-\tau)^e(\lambda_1 w_1^{1+e} + \lambda_2 w_2^{1+e})$. FOC in τ implies that $\tau^* = 1/(1+e)$.

(d) (3 pts)

$$T = \lambda_1 \tau_1 (1 - \tau_1)^e w_1^{1+e} + \lambda_2 \{ \tau_1 \bar{z} + \tau_2 [(1 - \tau_2)^e w_2^{1+e} - \bar{z}] \}$$

For (d), take the FOC wrt to τ_2 to get:

$$\tau_2 / (1 - \tau_2) = (1/e) \cdot [z_2 - \bar{z}] / z_2$$

(e) (4 pts) Take the FOC wrt to τ_1 to get:

$$\tau_1 / (1 - \tau_1) = (1/e) \cdot [1 + \lambda_2 \bar{z} / (\lambda_1 z_1)]$$

Explaining: $\tau_2^* < \tau^* < \tau_1^*$:

1) Increasing the flat tax rate τ creates a mechanical increase in revenue proportional to average earnings and creates a negative behavioral response proportional to average earnings as well.

2) Increasing the tax rate τ_2 in the top bracket creates a mechanical increase in revenue proportional to $(z_2 - \bar{z})$ but creates a negative behavioral response proportional to z_2 .

3) Increasing the tax rate τ_1 in the bottom bracket creates a mechanical increase in revenue proportional to z_1 and creates a negative behavioral response proportional to z_1 . However, the tax rate increase also raises more tax from high skilled worker with no negative behavioral response (inframarginal tax).

(f) (2 pts) The demogrant is higher under nonlinear tax because the nonlinear tax is a more powerful tool than linear tax (and hence will do at least as well).

A Rawlsian social welfare function will maximize tax revenue to redistribute to the disabled who are the worst off individuals in the economy with utility $u = R$.

(g) (3 pts) Putting no weight on high skilled workers does not affect τ_2 (which will remain at tax revenue maximizing level τ_2^*) but putting some weight on low skilled workers will put τ_1 below the tax revenue maximizing rate τ_1^* . As a result, the demogrant R will be lower.

(h) (3 pts) Disabled workers work iff utility when working is higher than utility when not working. Utility when not working is R . When working, $l = w_1^e(1 - \tau_1)^e$ and hence $u = R + w_1^{1+e}(1 - \tau_1)^{1+e}/(1 + e)$. Thus, a disabled person will work iff:

$$q \leq w_1^{1+e}(1 - \tau_1)^{1+e}/(1 + e) = \bar{q}.$$

Hence the fraction working is $P(\bar{q})$. Note that \bar{q} is decreasing in τ_1 and $dP/d\tau_1 = -P'(\bar{q})z_1$.

Under this scenario,

$$T = [\lambda_1 + \lambda_0 P(\bar{q})]\tau_1(1 - \tau_1)^e w_1^{1+e} + \lambda_2\{\tau_1 \bar{z} + \tau_2[(1 - \tau_2)^e w_2^{1+e} - \bar{z}]\}$$

Taking the FOC in τ_1 , one gets:

$$0 = dT/d\tau_1 = -\lambda_0 P'(\bar{q})z_1 \tau_1 z_1 + [\lambda_1 + \lambda_0 P(\bar{q})]z_1[1 - e\tau_1/(1 - \tau_1)] + \lambda_2 \bar{z}$$

$$e \cdot \tau_1/(1 - \tau_1) = 1 + \lambda_2 \bar{z}/(\lambda z_1) - z_1 \lambda_0 P' \cdot \tau_1 z_1/(\lambda \bar{z})$$

where $\lambda = \lambda_1 + \lambda_0 P(\bar{q})$.

There are two additional effects relative to (e):

1) There are more low skilled workers (relative to high skilled workers): $\lambda > \lambda_1$. This makes the tax τ_1 less desirable

2) There is another layer of response to τ_1 through \bar{q} which makes the behavioral response to τ_1 larger.

Those two effects will make the new optimal τ_1 smaller than τ_1^* .

(i) (4 pts) Tax reform analysis.

The basic idea is to start with a simple difference estimate: compare top incomes in period 1 vs period 0. In regression terms,

$$\log z_{it} = \alpha + e \cdot \log(1 - \tau_{it}) + \epsilon_{it}$$

This regression is run with OLS but limited to the sample of top $x\%$ earners in period 0 and top $x\%$ earners in period 1. \hat{e} estimated e without bias if absent the reform, top incomes would have stayed constant on average.

This assumption can be checked by running the same placebo regression on low income earners (subject to tax rate τ_1).

If low incomes increased, then one can do a DD estimate which is unbiased, if absent the reform, low incomes would have grown at the same rate as high incomes (parallel trend assumption). The DD regression estimate is:

$$\log z_{it} = \alpha_t + group_i + e \cdot \log(1 - \tau_{it}) + \epsilon_{it}$$

where $group_i$ is a dummy for belonging to the high income group and α_t is a set of period dummies.