

14.41 Fall 2004 PS #5 Answers

1.

- a) Draw non-linear BC with slope of -25 from 0 to 400 hours, slope of $-.8*25$ from 400 to 1200 hours, and slope of $-.7*25$ from 1200 to 2000 hours (intercept at income = \$40,000). Non-taxed BC is line with slope of -25 and intercept at income of \$50,000.
- b) Marginal tax rate = 30%. Average tax rate = $(0%*10,000) + (20%*(30,000-10,000)) + (30%*(37,500-30,000)) / 37,500 = 16.67%$. Average is less than marginal because most of your income is taxed at a lower rate than your marginal rate.
- c) Two theoretical effects, net effect is ambiguous.
Substitution effect: higher taxes mean leisure is relatively cheaper, choose more leisure.
Income effect: higher taxes mean you are poorer, choose less leisure.
For men, the empirical research shows that taxes have little net effect; the two effects offset.
Empirical research shows that women are much more likely to decrease labor supply because there's a large substitution effect (presumably, women have more outside options). Key is that non-market labor, which women are more likely to engage in, is not taxed, so women are more likely choose to work at home.
- d) The new BC has a slope of -25 ; the income at 2000 hours is \$40,000 and the income at 0 hours is $-\$10,000$. This tax is good on efficiency grounds, because there is no DWL; you have to pay the tax regardless of how much you work, so it can't distort your decision to work. On the other hand, this system is regressive; now the poor pay a much larger percentage of their income in taxes than the rich.
- e) The new BC has a slope of $-.75*25$; the income at 2000 hours is \$42,500 ($\$5,000$ plus $2000 * .75 * 25$) and the income at 0 hours is \$5,000. This tax may distort labor supply and generate DWL relative to the lump-sum tax, since workers keep only 75 cents of every dollar they earn and because of the income effect of the \$5,000 guarantee. However, this system is preferable on equity grounds to the lump-sum tax; the tax rate is flat, so it's neither a progressive or regressive system, while the lump-sum tax was regressive. The first tax was more progressive than this tax, but this tax provides a safety net for the very needy, so relative to the first tax the equity effects are ambiguous. Relative to the first tax, this tax has a broader base, but it's not clear how many people have lower rates and how many have higher rates, so the efficiency effects are also ambiguous.

2.

- a) Rewrite $C2 = (1+r)*S = (1.1)*(100-C1)$
Lagrangian: $\max \log C1 + \log (1.1*(100-C1))$
FOC: $1/C1 - 1.1/(1.1*(100-C1)) = 0$, so $C1=100-C1$
 $C1=50, S=50, C2=55$

- b) same as a, except income = $100*(1-t) = 100*(1-.2) = 80$
 Lagrangian: $\max \log C1 + \log (1.1*(80-C1))$
 FOC: $1/C1 - 1.1/(1.1*(80-C1)) = 0$, so $C1=80-C1$
 $C1=40$, $S=40$, $C2=44$
 Income effect: you are poorer, so you consume less in both periods; you still divide income evenly between $C1$ and S as in part a.
- c) same as a, except after-tax interest rate = $1+r*(1-t) = 1+.10*(1-.2) = 1.08$
 Lagrangian: $\max \log C1 + \log (1.08*(100-C1))$
 FOC: $1/C1 - 1.08/(1.08*(100-C1)) = 0$, so $C1=100-C1$
 $C1=50$, $S=50$, $C2=54$
 Same as a! Why?
 Income effect: drop in interest rate has made you poorer; must save more to have same amount of consumption next year, so S increases.
 Substitution effect: consumption in period 2 has become relatively more expensive, so shift towards more $C1$ and less $C2$; S decreases.
 Net effect is ambiguous; with log utility, two effects exactly offset, so net effect on S is zero.
- d) Part c showed that a decrease in r does not affect the optimal S .
 The same is true if government increases r by subsidizing savings.
 So $S=50$, as in part a.
 Again there are income and substitution effects which offset exactly.
 Income effect: rise in interest rate has made you richer; must save less to have same amount of consumption next year, so S decreases.
 Substitution effect: consumption in period 2 has become relatively less expensive, so shift towards less $C1$ and more $C2$; S increases.
- 3.
- a) False. The first statement is true: a cut in the capital gains tax rate should promote new entrepreneurial activity by increasing the return to risk taking. However, this would not provide good “bang for the buck.” The tax cut would benefit all capital, including capital already in place, where the risks have already been taken, so it would be a windfall for owners of old capital. A better idea would be to give the tax cut only to new investments. It is also worth noting that a cut in the capital gains tax rate would mostly benefit the rich.
- b) Uncertain. We know from optimal commodity taxation that the tax rate on each good should be proportional to one over the elasticity of demand, so we should tax inelastic goods more. Food is a fairly inelastic good, so it is a good candidate for taxation from an efficiency perspective. On the other hand, a tax on food will hurt the poor more because food is a larger percentage of their consumption, so it should be exempted from an equity perspective.
- c) Uncertain. It depends on whether employees value the insurance. If they do, their wages may fall to fully offset the cost (or even fall by more than the cost, if there was

previously an insurance market failure and employees value the insurance at more than its cost). If they value the insurance at less than its cost, there will be deadweight loss and the firm and its shareholders will probably bear some of the cost.

- d) Uncertain. The Laffer curve says that a decrease in tax rates can increase or decrease tax revenues, depending on the initial tax rate, t . A tax rate of 0% or of 100% raises no revenue. There is a rate t^* between 0 and 100% that raises the most revenue. If t is above t^* , lowering t raises the revenue collected; if t is below t^* , lowering t lowers revenue. So it depends whether t^* is above or below 39.6%.

Another key point: if we lower t , people may shift their compensation from non-taxed forms (like company cars) to regular taxable income. This would lead to an increase in tax revenue.

4.

- a) The misstatement is “employers shoulder half the burden of the [payroll] tax.” While employers *remit* half of the payroll tax to the government, in fact evidence suggests that wages decrease 1-for-1 with an increase in the employer contribution, so employees actually bear the full burden of the tax.
- b)
- a. Cutting the payroll tax:
 - i. Equity: The payroll tax is regressive: it is a flat tax up to \$87,900 in earnings, and above that is 0, so that average tax rates fall with income. Therefore cutting the tax would be attractive from an equity perspective. However, the payroll tax also funds (at least in theory) the Social Security Trust Fund; since Social Security payouts are somewhat progressive, decreasing Social Security’s financing might ultimately be regressive. Note that the author does not explain how the loss to Social Security would be made up.
 - ii. Efficiency: We have evidence from the EITC that poor workers do significantly respond to tax rates in making labor force participation decisions—that is, their labor supply is relatively elastic—so decreasing the payroll tax (the largest component of taxes that low-skilled workers face) may improve efficiency. However, (in theory at least) payroll taxes currently generate a surplus that increases national saving. If we think national saving is currently below its optimal level, and that cutting payroll taxes would increase consumption rather than savings (because people are myopic/have self-control problems), then it may decrease efficiency.
 - b. Replacing most of the income tax with a consumption tax:
 - i. Equity: Consumption taxes (of which a value-added tax is one type) are much more regressive than income taxes, since they are flat-rate while income taxes are progressive. In addition, the new income tax rate on families earning more than \$100,000 a year would, at 25%, be dramatically lower. In general, this proposal

shifts much of the burden of financing government from the better-off to the worse-off.

- ii. Efficiency: Consumption taxes are more efficient than income taxes: they don't distort savings and are "broad base, low rate." Allowing deductions from the income tax for deductions for charitable contributions, home mortgages, medical expenses, and state and local taxes, however, narrows the income tax base and makes it less efficient than an income tax without deductions.
- c) Answers will vary.