

Answers to “As-If” Homework Assignment # 3

1. (a) The Haig-Simons definition of income can be expressed as: income (during a period) = consumption (during that period) + change in wealth (over the same period). Using this formula, explain whether or not the following three behaviors — all related to an asset that has increased in value from \$10,000 to \$12,000 over the relevant period — effect Haig-Simons income in identical ways: (i) the owner of the asset continues to own it, (ii) at the end of the period, the owner sells the asset and reinvests the \$12,000 into some other asset, and (iii) the owner sells the asset, and uses the \$12,000 to (exactly) pay for a vacation to Europe.
- (b) For each of scenarios (i), (ii), and (iii), explain whether the (current) U.S. tax system imposes a tax liability on the asset owner. [Assume that any special retirement savings rules aren’t relevant.]
- (c) How does the (current) U.S. tax code affect a person’s desire to reallocate his or her investment holdings (as in situation (ii))?

Ans. to (a): In all three cases, the person’s power to consume increased by \$2,000. Here’s another way to explain this. In cases (i) and (ii), the person holds \$2,000 more in wealth at the end of the period than at the start. In case (iii), the person holds \$10,000 less in wealth at the end of the period, but also enjoyed \$12,000 more consumption — which means that $C + \Delta W = \$2,000$.

Ans. to (b): Under current U.S. tax rules, tax liability is created by the sale of the asset (i.e., by the realization of the capital gain). A tax is therefore due in cases (i) and (ii).

Ans. to (c): The rules of the tax code create a “lock-in” effect that encourages a person to hold onto an asset in order to defer realizing a capital gain (and thus to delay paying a tax on a capital gain).

2. Raphael is a painter. If he donates one of his paintings to a museum, he is permitted to claim a deduction on his taxes equal only to the value of the canvas he used, his paint, etc. If, however, Raphael sells the painting to Gates, and Gates in turn donates it to a museum, Gates may take as a deduction the full purchase price of the painting. Does this feature of the tax law make sense? Is it fair to the painter? [*Hint*: think about the situation in terms of the Haig-Simons definition of income.]

Ans.: Yes the rule makes sense and is fair. Raphael should not be allowed to deduct the value of the donation because he wasn’t required to count the creation of the painting’s value as taxable income. If the mere creation of the painting’s value as counted as income to Raphael income (as should be the case under the Haig-Simons rule), then — and only then — should donating the painting reduce his income.

3. Rosen and Gayer; chapter 17; question 5.

Ans.: A \$500 deduction reduces his tax payments by \$175. A \$500 credit reduces his tax payments by \$500.

4. Suppose that the current income-tax deduction for mortgage interest was converted to a tax credit set at 25% of family’s mortgage interest payments. How would a family who is paying mortgage interest be affected by this change if: (a) the family is currently employing the standard deduction, and (b) the family is itemizing, and is in the 33% marginal tax rate bracket? Also, (c) how might the market prices of very large, very expensive houses be affected (other things equal) by such a change?

Ans. to (a): The family would gain by the full amount of the credit (because they were getting no tax benefit based on mortgage interest before).

Ans. to (b): The family would lose. Before the change, every dollar in mortgage interest

reduces their tax liability by 33 cents; after the change, every dollar in mortgage interest only reduces their tax liability by 25 cents.

Ans. to (c): The current deductibility of mortgage interest payments has the effect of reducing the (after-tax) price of housing. A rule change like that described here would raise the effective price of housing for families in the highest tax brackets (assuming they originally itemize their deductions). By making such households less enthusiastic about spending on housing, we would expect the market price of houses frequently bought by such families to fall.

5. Suppose that a family faces a marginal tax rate of 28%, has one child, and currently has income that places it in the phase-out range of the child tax credit. If this family's income rises by \$200, how much of an increase is there in the tax it must pay the government?

Ans.: Consider first just the consequences of being in the 28% tax bracket. For such a family, each one dollar rise in income leads to a 28 cent rise in tax liability. A \$200 rise in income would thus raise tax liability by \$56. In addition, the child credit is phased out at a 5% rate. A \$200 rise in income therefore reduces the size of the credit by \$10. That increases the family's final tax payment by \$10. The \$200 rise in income thus causes the family's tax liability to rise by \$66. [In other words, the 5% phase-out rate is added to the 28% statutory marginal tax rate, which results in a 33% effective marginal tax rate.]

6. Rosen and Gayer; chapter 18; question 1.

Ans.: The reason why “many economists believe that a reduction in all statutory federal income tax rates in the United States would be unlikely to generate an increase in tax revenues” is because the elasticity of the relevant tax base likely isn't large enough to fully offset the smaller tax rate. In other words, a cut in a tax rate, while quite likely leading to growth in the size of the tax base, won't produce a large enough change in the tax base. If it's true that “a reduction in tax rates [might] be more likely to increase revenues at the city level than at the federal level” it must be because the elasticity of the appropriate tax base with respect to changes in the tax rate is larger at the city level than it is at the national level. Why might that be? Because some behaviors — for example, should a person start his or her business on this side of the border or on that side of the border — might be more easily adjusted in the case of a change in a city tax than in the case of a change in a national tax.

7. Mr. X could react to an *increase* in his hourly wage in two ways. (i) “Since an hour of work now offers a larger reward (put another way, staying away from work has a bigger cost), I'll increase my hours of work.” (ii) “Since my weekly earnings have increased, I feel I can now afford to decrease my hours of work.” If Mr. X reacts as described in (i), which “effect” (either the “income effect” or the “substitution effect”) has the stronger influence on his behavior? If, instead, Mr. X reacts as described in (ii), which “effect” has the stronger influence on his behavior?

Ans.: In case (i), the person is reacting to a change in relative prices — the tradeoff between an hour of time and the consumption produced by an hour of work has changed. This behavior therefore results from a substitution effect. In case (ii), the person is reacting to a change in his overall well-being — the higher wage make him better off, and in response he chooses to consume more “leisure”. This behavior therefore results from an income effect.

8. Bill took five yearly plane trips to visit his parents. Suppose that the price of a (round-trip) ticket for such a trip rises by \$100. Simultaneously (and for a completely unrelated reason), Bill's yearly income rises by \$500.
- (a) Could Bill continue to take the same number of trips without altering any of his other spending decisions?
- (b) If Bill decides to take four plane trips a year instead of five, which effect — income or substitution — must have influenced his behavior?

Ans. to (a): Yes. The point of this observation is that Bill feels no income effect — the change in his income has offset (or “compensated” him for) the rise in the price of the

airplane ticket.

Ans. to (b): Since we already know that Bill experiences no income effect, the change in his behavior must be the result of a substitution effect. That this is correct can be explained in the following way. Even though Bill could keep all his behaviors unchanged, the amount of other consumption he must give up to visit his parents has risen. If this change in relative prices leads Bill to alter his behavior, he must have been influenced by a substitution effect.

9. This is a modification of Rosen and Gayer; chapter 18; question 7.

Suppose that a person who is already saving for her retirement behaves in a way consistent with the following description: “to compensate for a reduction in interest rates, one should save more every month”. Would a person acting in such a way be most influenced by the income effect (caused by the fall in interest rates) or by the substitution effect (caused by the fall in interest rates)?

Ans.: A reduction in interest rates creates a substitution effect that decreases saving (the change in relative prices makes saving look less attractive), and an income effect that increases saving (a fall in interest rates makes a person (who is already saving) worse off, which leads her to reduce her consumption). The behavior described in the quote — a fall in the interest rate leads to more saving — is thus behavior that is dominated by the income effect.

Note: this above means that a person whose behavior demonstrates “target saving” — the person wants to save whatever is needed to accumulate a target level of wealth at a target date — is somebody who is acting in a way consistent with income-effect motivations.

10. This is a modification of Rosen and Gayer; chapter 21; question 8.

Amy and Shirley both live two periods (call the two periods the “present” and the “future”). Both have (pre-tax) earnings of 1,000 in the present and 0 in the future. The interest rate is 10 percent. Both people face an income tax rate (on all income) of 20%.

- (a) If Amy’s consumption in the present is 600, what will be her consumption in the future? What is her total lifetime tax payment (compute this by simply adding taxes paid in the present and taxes paid in the future (with no discounting))?
- (b) If Shirley’s consumption in the present is 400, what will be her consumption in the future? What is her total lifetime tax payment?
- (c) If tax was imposed on consumption rather than on income, but Amy still consumed more in the present than does Shirley, how would the present values of the lifetime tax payments of these two people compare? [These no need do numeric calculations to answer this question. If you decide to compute an answer, use a 25% consumption tax rate, and use a 10% discount rate when finding the present value of lifetime tax payments.]
- (d) Suppose that an (unexpected) switch from income taxation to consumption taxation is made between the “present” and the “future”. Now, how do Amy and Shirley’s lifetime tax payments compare?

Ans. to (a): Amy’s pre-tax earning of 1000 are taxed at a 20% rate. After she pays 200 in tax, her her after-tax earnings equal 800. If she consumes 600 in the present, she must have saved 200. On that saving, Amy earns interest equal to $(200 \times 10\% =) 20$. Under an income tax, the interest income (and only the interest income) is subject to (20%) tax, so Amy’s after-tax interest earnings are 16. Her second period consumption is thus 216. Amy’s total lifetime tax payments (without making any present-value adjustments) are thus 200 (in the present) + 4 (in the future) = 204.

Ans. to (b): Shirley again pays 200 in tax in the present. If she consumes 400 in the present, she must save 400, thus earning (before-tax) 40 in interest income. After paying 20% tax on the interest income, Shirley is able to consume 432 in the future. Shirley’s total lifetime tax payments (again with no present-value adjustments) are thus 200 (in the present) + 8 (in the future) = 208.

Comparing the answers to (a) and (b) shows that an income-tax system imposes a larger tax burden on people who are “savers” than on people who are “spenders”.

Ans. to (c): The simple answer is to say that a consumption tax — by definition — removes the bias against saving that exists under an income tax. Under a consumption tax, and holding constant the rate of return on savings, a person's lifetime tax payments (in present value terms) are independent of saving decisions.

To work out the numbers in this specific case, first consider Amy. If she enjoys 600 worth of consumption in the present, she'll actually spend 750 (after adding on the 25% consumption tax), paying 150 in tax. That means Amy saves 250, which becomes 275 after earning 10% interest. Spending that 275 results in 220 worth of consumption and 55 worth of tax payments (again applying the 25% consumption tax). Amy's lifetime tax payments making the present-value adjustment) equal $150 + 55/1.1 = 150 + 50 = 200$.

For Shirley, spending 500 in the present means she enjoys 400 worth of consumption and pays 100 in consumption taxes. The 500 she saves turns into 550, which provides 440 worth of consumption and 110 in tax payments. Shirley's lifetime tax payments in present-value terms equal $100 + 110/1.1 = 100 + 100 = 200$. As we already knew, under a consumption tax (with a common rate of return), a person's lifetime tax payments (in present-value terms) are unaffected by saving decisions.

Ans. to (d): Using the Amy and Shirley example, if both pay an income tax in the present, both pay the same amount in tax in the present. With a switch to consumption taxation during their lifetimes, all of the wealth a person holds in the future (not just her investment income) is — if used to fund consumption — subject to tax. Such a tax switch imposes a one-time tax on accumulated assets. Since Shirley saved more, she is hit harder by the tax change, and her lifetime tax payments will be larger than are Amy's.

Numerically (using all the numbers presented above), Amy saves 200, which turns into 220; when spent that amount results in 44 paid in consumption tax. Shirley saves 400, which turns into 440, of which 88 will be paid in tax.

11. Consider two families, each of which has family income of \$80,000. In a given year, one family has \$20,000 of out-of-pocket medical expenses; the other family has no such expenses.
- Does the current U.S. Tax Code impose the same tax burden on these two families. If not, how does the tax code differentiate between them?
 - Would a pure Flat Tax system impose the same tax burden on these two families?
 - In your opinion, are the different outcomes under the two tax systems equally desirable? If not, which (in your opinion) is preferable?

Ans. to (a): The current tax code allows a taxpayer to deduct large (as a fraction of income) medical expenses. The family with the medical costs would thus pay less in tax than would the healthy family.

Ans. to (b): A pure flat tax allows no deductions, and so would impose the same tax burden on both families.

Ans. to (c): This question calls for a value judgement, so everybody might not answer in the same way. In my opinion, in this situation, the treatment in the current tax code is more desirable. I feel the family with the medical expenses has a reduced "ability to pay", and should not be required to pay as much in tax as is the other family. Note first: the same conclusion does not apply to all current deductions. Note second: this issue is one of the reasons why I think it is very unlikely that the pure Flat Tax would ever be adopted.

12. Rosen and Gayer; chapter 22; question 2. *[Note that legislation has been introduced in the Georgia legislature that would change the property tax rules throughout Georgia to be similar to those described in the question.]*

Ans.: Again, this question involves a bit of a value judgement, but my answer would be that the assessment rule does violate the principle of horizontal equity. Under the tax rule, two households could be living next to each other in essentially identical houses and experiencing the same level of government services, but one might well (if property values have risen dramatically) be paying two or three times as much in taxes as does the other. In my opinion, those two households are essentially in equal situations, and should be treated roughly equally by the tax system. The people who wrote the assessment rule were obviously influenced by other concerns.

13. Rosen and Gayer; chapter 22; question 7.

Ans.: This question refers to the “three views” of the property tax, which we didn’t cover in class. No questions on that particular topic will appear on the exam. Just to be complete, the answer is the “benefit view”.