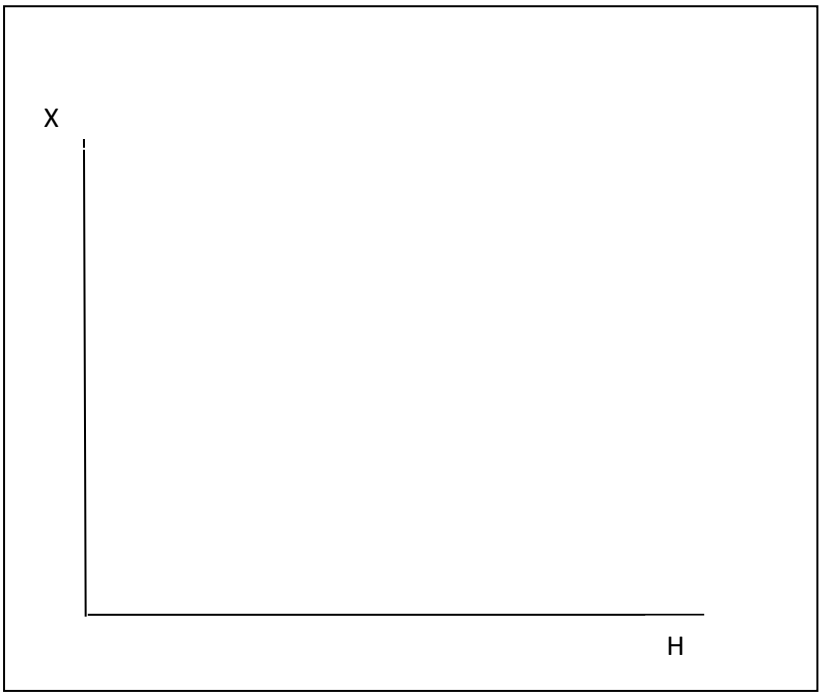
Public Policy 555: Microeconomics A
Fall 2023, Professor Kevin Stange
Budget Constraint Assignment
Handed out: September 14, 2023
Due: September 21, 2023 at 11:59pm

Instructions
Upload an electronic copy of the assignment to Canvas. You can type up your answers or write them by hand and upload a pdf containing photos of your work. If you go this route, please just upload a single pdf file and please make your writing is legible. If an answer is difficult to read, it will be difficult to grade!

Question 1. Health Care

1. Suppose individuals choose between two normal goods: health care visits (H) and a composite of all other goods (X). Initially the price of health care services is $P_H = \$2$ and the price of all other goods is normalized to $P_x = \$1$. Each person's income is \$100.
    a. On the graph below, draw the budget constraint, labeling the intercepts and slope. Healthcare is on the x-axis. Label this BC_0.



    b. Depict indifference curves representing the preferences over these two goods for a typical person. Indicate the utility-maximizing bundle given this budget constraint and label this point H_0 and X_0 on the graph.

c. Now suppose the State of Michigan implements a health care subsidy that lowers the price of health care from $2 to $0.50. Draw the new budget constraint on the same graph, labeling the intercepts and slope. Label this BC_1.

d. Indicate the utility-maximizing bundle given this new budget constraint and label this point H_1 and X_1 on the graph.

e. Which of the following statements are true? Circle all that apply.
   - The subsidy will always increase the number of health care services (H)
   - The subsidy will always decrease the number of health care services (H)
   - The subsidy will not impact the number of health care services (H)
   - The subsidy will always increase the consumption of other goods (X)
   - The subsidy will always decrease the consumption of other goods (X)
   - The subsidy will not impact the consumption of other goods (X)

f. Explain your answer to part (e) above in terms of income and substitution effects

g. If the policy goal was to increase the number of people that received at least one health care visit, do you think that a broad-based subsidy for all health care visits (like that described above) or simply making the first visit free for everyone would be more effective? Explain your reasoning using the indifference curve & budget constraint framework we've been using.

h. Describe one important influence on health care utilization that is not captured by this simple economic model.

Question 2: College Pricing

Cora is choosing between three different colleges that have very different pricing structures. She has $600 to spend on food (F), whose price is equal to $1, and college credits (C), whose price varies across colleges. Note that in the U.S., undergraduate students typically take 6 to 15 credits per semester. Taking 6 credits is considered half-time and 15 credits is typically needed to graduate on-time within four years.

1. For each college described below, draw a budget line to illustrate the budget constraint Cora would face. Illustrate your answers with a separate graph for each subpart. Your graphs should have F on the vertical axis and C on the horizontal axis. For each graph, label all intercepts, slopes, and "kink" points (if appropriate).
   a) College A: Flat price of $50 per credit (regardless of how many credits)

   b) College B: First 6 credits are free ($0), the next 6 are $50 each, any credits beyond 12 are $100 each.

c) College C: First 12 credits are $40 each. Any additional credits beyond 12 are $20 each.

2. At which college would you expect the most students would be attending at least half time (taking at least 6 credits). Explain with reference to the budget constraints.

3. At which college would you expect the most students would graduate early, by taking more than 15 credits per term? Explain with reference to the budget constraints.

[Aside: I have a paper on the effects of marginal tuition pricing at public Michigan universities if you are interested in the subject]

OPTIONAL CHALLENGE QUESTION: Savings

This question is challenging and will not count towards your grade, but will be useful for pushing your thinking a bit further. It is entirely optional. **Solutions will be provided.**

This question asks you to model savings decisions using the consumer choice framework. People have preferences for consumption in two different periods (C1 and C2). Think of these as two different "goods" just as we have been doing for Food and Housing in class. Also assume that both of these are normal goods. Think of period 1 as working age and period 2 as retirement age. In period 1, people have income equal to I. They choose how much to consume in period 1 (C1) and save any income not spent in period 1 , where savings S = I – C1. In period 2, they live on their savings but otherwise have no other income. Savings are invested and provide a return with a rate equal to r. So the income available for spending in period 2 is equal to S*r. The actual price of a unit of consumption is normalized to $1 in each period. The budget constraint is that total spending on consumption must equal total income:

Budget Constraint: C1 + C2 = I + S*r

a) Substitute the expression for savings into the budget constraint above and re-arrange it so that it looks like the budget constraints we have been dealing with in class. It should be of the form:

P1*C1 + P2*C2 = I

Where P1 is the "effective price" of consumption in the first period and P2 is the "effective price" of consumption in the second period. Note that you will have something in place of P1 and P2. Getting this budget constraint right is critical for the rest of the problem, so you should make sure you do before moving on! (i.e. talk with classmates or us)

b) What is the ratio between the "price" of consumption in period one to the "price" of consumption in period two? What is the key determinant of the relative "price" of consumption in each period?

c) Suppose I = 1000 and r = 0.10. Draw the budget line corresponding to this budget constraint. Your graph should have C1 on the horizontal axis and C2 and on the vertical

axis. Label both intercepts and the slope. Draw an indifference curve that has the properties we talked about in class and that corresponds to the chosen bundle for a typical individual.

d) Suppose the government makes retirement income tax free, effectively increasing the rate of return to savings from 0.10 to 0.20. Illustrate this change by drawing the new budget line on a new graph and draw the original budget constraint as a reference. Be sure to label all intercepts and slopes, on both the new and old budget lines. Note that income remains at its original level of 1000. Again assume that C1 and C2 are both normal "goods." How will C1 and C2 change, if at all, in response to the increase in the rate of return? Draw a new indifference curve to illustrate this point. Can you say unambiguously whether savings (S = I-C1) goes up, down, or is unchanged? Interpret this finding (explain in words what is going on).