HACKING FOOD & NUTRITION

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This project exploits our work on demand for food and is focused on evaluating what kinds of **policies** might be effective at improving nutritional outcomes for particular populations. Our earlier work addressed the question of how demand for different kinds of food depends on prices, budgets, and household characteristics, taking as given prices, budgets, and so on.

One of the take-aways from our earlier project is that the food people *choose* to eat may be quite different from the foods that people *should* eat, from a nutritional perspective.

But if dietary choices respond to prices and budgets, it may be possible to manipulate nutritional outcomes by changing either prices or budgets. We can assess the costs of this kind of manipulation (e.g., the deadweight cost of a tax or subsidy); where these costs are large we can also think about the value of innovation in either the desirability or nutritional content of food.

1. Deliverables

This project should result in some or all of the following sorts of deliverables.

A: These deliverables are *required*. Note that other deliverables may rely on completion of A deliverables.
B: These deliverables are *very desirable*.
C: These deliverables would be *nice to have*.

1.1. #A Replicability & Documentation.

Create a public repository on `github.com` to contain all your code and data, also with documentation which is good enough to allow other students outside your group to replicate your findings.

1.1.1. *Create a `README.md` file on your `github.com` repo.*

This should give enough information to allow a visitor to your repo to understand what the project is about, and how to use your code.

Date: April 11, 2024.

1.2. #A **Document Goals.** Create a post on `edstem.org` for your group describing your ideas for how you'll tackle each of the goals described below. What tasks need to be accomplished, and who will accomplish them?

Update this post as the project proceeds.

1.3. #A **Unit tests.** Unit tests are a great tool for designing and testing code you produce as a team.

The idea: for any function your team plans to write, think of some tests you'd expect the function to pass *even before* the function is written. Using the `python assert` keyword can be very useful. (there are also more powerful and complex approaches, including the `unittest` module). Isolate your unit tests into a separate file, and

1.4. #A **Choice of a dataset.** You are free (indeed, encouraged) to use one of the datasets we used in Project 3 to estimate demand systems, and an FCT that can be used to map estimated demands into nutrients.

1.5. #A **Estimate Demand System.** Estimate (or use an already estimated) a system of demands for different kinds of food, obtaining estimates of parameters than can then be used to describe demands as function of prices, budgets, and household characteristics.

1.6. #A **Construct Nutrient System.** If you can describe quantities demanded as function of prices, budgets, and household characteristics, and map quantities into nutrients, then you can also describe a system of *nutrients* as a function of the same variables.

1.7. #A **Nutritional challenges & Policy Goal.** Compare predicted nutrition to recommended nutrition. Establish some criteria for deciding what the biggest nutritional challenges are for this population. For example, what share of households is Calorie deficient? Protein deficient? Vitamin A deficient?

Note that different criteria are possible, and there is no one "right" criterion.

Characterize the nutritional challenges you observe in your data, and construct a policy goal to address some of these challenges (e.g., reduce proportion of households that are protein deficient by half).

1.8. #B **Policy Options.** Design two or more policies which achieve your policy goal. For example, targeted income transfers to increase households' food budgets, or subsidies or taxes to change the relative price of foods. Use simulation to show that the proposed policies achieve the policy goal.

1.9. #C **Policy Cost.** Your proposed policy will have some cost. A tax or subsidy will involve a dead-weight loss. Without knowing the supply-side we won't be able to measure this, but what if supply is perfectly elastic? What can you say about the costs of the different policy options?

1.10. #C **Value of Technical Innovation.** We're not necessarily stuck with a particular mapping from food to nutrients; perhaps foods can be engineered or designed to deliver different nutritional outcomes. Identify particular foods that might be engineered in particular ways to address your policy goal (compare the example of "golden rice", which engineered rice to increase the amount of vitamin A). What would the value of these innovations be? How might this information be used to guide investments in research and development of improved sorts of food?

1.11. #A **Presentation.** Each team will be responsible for giving a 15 minute presentation of the work they've accomplished during the sprint. Be creative! Think of awesome new ways to help others visualize what you've learned.

1.12. #A **Replication & Discussion.** Your project and git repository will be shared with some randomly chosen other teams, and your team will be randomly chosen to have materials from some other teams shared with it.

Attempt to replicate the other teams' main results, using the data and code shared with you. Document your attempt, identifying any problems you encountered, your thoughts on overcoming these problems, and describing strengths and weaknesses of the other team's analysis.