NUTB 238 -- *Economics for Food and Nutrition Policy*
Fall 2024

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Scheduling: Drop-in review sessions are 12:00-1:00 ET on Fridays
Residency workshop is Sept 30-Oct 2 (Mon-Weds), 8:30-12:15 in Jaharis 156
For other meetings, choose from open times at calendly.com/willmasters
 (Calendly will create a calendar entry for us, no need for separate emails)

Tufts Credit: 3 semester-hours (3 hours/week, over 13 weeks)
Prerequisites: Graduate standing, or permission of the instructor.

Course Description

This course equips students with the principles used in economics for food policy analysis. We use the graphical methods taught in standard, one-semester courses on the principles of economics, but our motivation, examples and applications are focused on food and nutrition problems in the United States and around the world.

Course Delivery

NUTB 238 is taught online through video lectures, conversations, presentations and exercises, with an intensive residency week of synchronous work together. The private, password-protected content of the class is on Canvas, and some course-related content is also be posted for public use at sites.tufts.edu/foodecon. Regular weekly office hours for individual and group conversation will be held online to share screens, and online meetings or phone calls can also be scheduled at other times.

Course Objectives

NUTB 238 helps students explain, predict and evaluate the social outcomes of individual choices using economics principles. Students gain familiarity with the data sources and analytical methods needed to: (1) explain and predict consumption, production and trade in agriculture and food markets; (2) evaluate the social welfare consequences of market failure, collective action and government policies including regulation, taxation and enforcement of property rights in agriculture and food markets; (3) measure poverty and inequality in income, wealth, nutrition and health, as influenced by changes in markets and policies; and (4) describe macroeconomic relationships, fluctuations and trends in incomes, employment, economic growth and development.

Texts and Materials

The course is supported by an open access textbook on *Food Economics: Agriculture, Nutrition and Health*. The book can be downloaded in PDF or ePub for convenient reading and annotation on any device (phone, tablet, e-reader or laptop), and can also be obtained in paperback form if you prefer. Related information is here: https://sites.tufts.edu/foodecon, but also day-to-day materials for this class will be distributed via canvas.tufts.edu. The Canvas site for NUTB 238 contains everything needed to complete the course successfully, but some students may want additional materials, such as examples of published research from Friedman School faculty using the concepts in this course listed at the end of this syllabus.

Assignments and Grading

For most students, this will be your first course in economics. Recorded lectures are designed to be watched once for the big picture, and then reviewed again as the semester proceeds. A series of 11 weekly assignments are designed to help you practice the skills needed for successful economic analysis of food and nutrition problems, while the course project applies those skills in depth to a particular question of interest to you. The first four assignments ask you write, use graphical methods and compute the nutritional consequences of real-life food choices. The next four assignments ask you to practice applying economic principles to news articles you find on the internet, and the last three ask you to collect and interpret real-life data to illustrate the issues discussed in class. Each of these assignments is graded out of 5 points, of which the lowest will be dropped for a total of 50 points. In addition, the course project has 40 points, and your comments on other students' assignments are worth 10 points for a total of 100.

Summary of Assignments	*Grading Weight*
Eleven weekly assignments (5 points each, one dropped)	50%
Course project (40 pts total)	40%
Comments on other students' assignments	10%

Penalties for late or incomplete assignments

The deadline for each assignment is shown on the syllabus. Students who are unable to complete an assignment on time for any reason should notify the instructor by email, text message or phone at any time prior to the deadline, with a brief explanation for why the extension is needed. Late work for which an extension has not been granted will not be graded. Of the 11 weekly assignments the one with the lowest score will be dropped, so you can miss one without penalty.

Academic Conduct
Education invites you to learn from the ideas of other people. Our school environment is built on diversity and inclusion, so that all students feel empowered to share their insights and learn from each other as well as from the scientific literature. Every student is responsible for upholding the highest standards of academic life, as specified in the Friedman School's *Policies and Procedures* manual (http://nutrition.tufts.edu/documents-and-forms/policies-and-procedures-handbook-students). The Tufts Health Sciences Library provides help with research and writing in ways that represent previous work while avoiding plagiarism. It is the responsibility of each student to understand and comply with these standards, as violations will be sanctioned by penalties ranging from failure on an assignment and the course to dismissal from the school.

Accommodations of Disabilities
Tufts University is committed to providing equal access and support to all students through the provision of reasonable accommodations so that each student may access their curricula and achieve their personal and academic potential. If you have a disability that requires reasonable accommodations, please contact Matt Hast, the Friedman School Assistant Dean of Student Affairs (matthew.hast@tufts.edu) to arrange for appropriate accommodations. Please be aware that accommodations cannot be enacted retroactively, making timeliness a critical aspect for their provision.

Course Topics, Textbook Chapters and Assignment Schedule at a Glance

Week	Canvas module, topic and textbook chapter	Assignments, due Sundays at midnight
1.	Module 1. What is food economics? *Chapter 1*	1. Keeping up with AI (Sep 8)
2.	Module 2. Consumption and food demand *Chapter 2.1*	2. Food choice news analysis (Sep 15)
3.	Module 3. Production and food supply *Chapter 2.2*	3. Farm supply news analysis (Sep 22)
4.	Module 4. Market prices and quantities *Chapter 3* + residency workshop on least-cost diets	4. Food markets news analysis (Sep 29)
5.		5. Least-cost diets (*workshop activity*) (Oct 6)
6.	Module 5. Social welfare and externalities *Chapter 4*	6. Externalities news analysis (Oct 13)
7.	Module 6. Market structure and monopolies *Chapter 5*	7. Market power news analysis (Oct 20)
8.	Module 7. Government policies and programs *Chapter 6*	8. Govt. policy news analysis (Oct 27)
9.	Course project: draft problem statement, analytical methods & data sources (drafts due Nov. 3, then peer feedback due Nov 10)	
10.	Module 8. Poverty, safety nets and risk *Chapter 7*	9. Global poverty and nutrition data analysis (Nov 10)
11.	Module 9. Food, health and behavioral econ. *Chapter 8*	10. International dietary transition data analysis (Nov 17)
12.	Module 10. Food in the macroeconomy *Chapter 9*	11. U.S. poverty & nutrition data analysis (Nov 24)
13.	Module 11. Growth, trade and development *Chapters 10, 11 and 12*	No exercise due to Thanksgiving holiday; course project due the following weekend
14.	Course projects (reports and presentations) are due Sun., Dec. 8th. Course evaluations are due Mon. Dec. 9th, and peer feedback on other students' projects is due Sun. Dec. 15th.	

Course Topics, Assignment Schedule and Learning Objectives

Note: Schedule is subject to change. Learning objectives will be pursued in terms of their applicability to agriculture, food and nutrition, using examples from the U.S. and a wide variety of other countries. All assignments except presentations are due at midnight Eastern time on the Sunday at the end of the week shown, but students are encouraged to upload their work as soon as it is completed for comments and feedback it.

Week 1 -- *Food Economics* textbook Chapter 1: Introduction
Lecture module 1. *What is food economics?*
Assignment: Ex. 1. Keeping up with AI: Practice using Microsoft Copilot
Objectives: Upon completion of this week, students will be able to:
- Describe the principles used in economics to explain and predict social outcomes
- Describe the strengths and limitations of economics as a social science
- Describe the strengths and limitations of economics for everyday life

Week 2 – *Food Economics* textbook Chapter 2.1: Consumer Choices
Lecture module *2. Consumption and food demand*
Assignment: Ex. 2. Food choice news analysis
Objectives: Upon completion of this week, students will be able to:
- Use indifference curves and budget constraints to explain and predict food choice
- Distinguish between income, substitution (price) and preference effects in food choice
- Describe the strengths and limitations of optimization as an explanation for food consumption choices around the world

Week 3 – *Food Economics* textbook Chapter 2.2: Producer Choices
Lecture module *3. Production and food supply*
Assignment: Ex. 3. Farm supply news analysis
Objectives: Upon completion of this week, students will be able to:
- Use production possibilities, input response and prices to explain and predict production
- Identify how changes in the environment and new technologies alter food production
- Describe the strengths and limitations of optimization as an explanation for food production choices around the world

Week 4 – *Food Economics* textbook Chapter 3: Societal Outcomes
Lecture module 4. Market prices and quantities
Assignment: Ex. 4. Food markets news analysis
Objectives: Upon completion of this week, students will be able to:
- Use elasticities to characterize consumer and producer response to changes in income, prices and production possibilities
- Explain why supply is the marginal cost curve and demand is the marginal benefit curve
- Use supply and demand curves, with and without trade, to explain and predict prices and quantities

Week 5
Residency (no lecture module) -- cost and affordability of a nutrient-adequate diet
Assignment: Ex. 5. Least-cost diets for nutrient adequacy, done in person during residency
Objectives: Upon completion of this week, students will be able to:
- Use USDA data sources to compute the nutrient composition of a diet, relative to recommended daily intake of major nutrients
- Compare your first guess at the least-cost foods that would meet your nutrient needs to what world's poorest people actually eat, as estimated by food balance sheets and dietary recall surveys
- Describe differences in food quantities and nutrient adequacy between your guess and the actual diets of low-income people in Ethiopia and elsewhere.

Week 6 – *Food Economics* textbook Chapter 4: Social welfare
Lecture module 5. Societal wellbeing, economic surplus and externalities
Assignment: Ex. 6. Externalities news analysis
Objectives: Upon completion of this week, students will be able to:
- Use producer surplus between price received and the supply curve, consumer surplus between price paid and the demand curve, and other economic surplus in markets to evaluate the effects of government regulation and taxes on social welfare
- Identify the nonmarket side effects of production and consumption, adding those external costs and benefits to economic surplus to measure overall social welfare
- Describe the opportunities for collective action to provide public goods and the policy options to address externalities.

Week 7 – *Food Economics* textbook Chapter 5: Market power
Lecture module 6. Market structure and monopoly power
Assignment: Ex. 7. Market power news analysis
Objectives: Upon completion of this week, students will be able to:
- Use economics principles to identify the market conditions needed for firms to acquire monopoly power in markets for food, farm inputs and other sectors
- Describe the behavior of individuals and firms in monopolies and other market structures
- Describe current events in food markets in terms of market structure

Week 8 – *Food Economics* textbook Chapter 6: Government policies and programs
Lecture module 7. Market failure and collective action
Assignment: Ex. 8. Government policy news analysis
Objectives: Upon completion of this week, students will be able to:
- Describe the opportunities for collective action to provide public goods and regulation, taxation and property rights enforcement to remedy market failures
- Identify the net economic surplus change and income distribution consequences of changes in government policies and programs
- Describe current events in terms of market failure and collective action

Week 9
Course project stage 1 (no lecture module) – applying economic principles
Assignment: Upload project stage 1 as detailed in course project guidelines
Objectives: Upon completion of this week, students will be able to:

- Use economic principles to address an important food and nutrition policy question, identifying appropriate analytical diagrams and data sources.
- Communicate that economic analysis in writing, using constructive criticism of others' writing to help each other write more effectively.

Week 10 – *Food Economics* textbook Chapter 7: Poverty and risk
Lecture module 8. Poverty, inequality, risk, insurance and safety nets
Assignment: Ex. 9. Global poverty and malnutrition data analysis
Objectives: Upon completion of this week, students will be able to:

- Use economic principles to apply poverty lines and other thresholds for measuring welfare and targeting social programs
- Describe major influences on income distribution, inequality and social mobility
- Obtain and present current data on global poverty and malnutrition rates

Week 11 – *Food Economics* textbook Chapter 8: Food and health
Lecture module 9. Food choice, behavioral economics and response to intervention
Assignment: Ex. 10. International dietary transition data analysis
Objectives: Upon completion of this week, students will be able to:

- Describe recent findings in behavioral economics, incorporating psychology and marketing to explain non-optimizing (self-contradicting) aspects of food choice
- Obtain and present current data on retail food products for use at or away from home

Week 12 – *Food Economics* textbook Chapter 9: Food in the macroeconomy
Lecture module 10. Food in the macroeconomy
Assignment: Ex. 11. U.S. poverty & nutrition data analysis
Objectives: Upon completion of this week, students will be able to:

- Use economic principles to describe the circular flow of goods and services, value added in each sector, and the timing and extent of recessions, unemployment and inflation
- Describe the role of fiscal and monetary policy in managing cycles and growth
- Obtain and present current data on incomes, employment and inflation

Week 13 – *Food Economics* textbook Chapter 10: Development and Chapter 11: Trade
Lecture module 11. Growth, trade and development
Assignment: *None – Thanksgiving holiday and work towards completion of the course project*
Objectives: Upon completion of this week, students will be able to:

- Use economic principles to explain and predict economic growth and structural transformation between agriculture, industry and services
- Describe the experience of economic growth across countries and regions
- Obtain and present current data on economic growth and development

Week 14 – *Food Economics* textbook Chapter 12: The Future of food
Putting it all together – completing stage 2 of the course project
Assignment: Upload complete report as detailed in course project guidelines
Objectives: Upon completion of this week, students will be able to:
- Use economic principles to address an important food and nutrition policy question, drawing appropriate analytical diagrams and using available data to construct meaningful charts and tables.
- Present food and nutrition policy analyses verbally and in writing, through practice in presenting own results and providing feedback on others' presentations.

Assignments in brief
Activities undertaken in this course are adapted for online work, before and after the week 5 exercise which is done in-person during the residency period. The assignments aim primarily to build your skills explaining and predicting change through a series of "news analysis" exercises, and downloading data to visualize trends and variation in a series of "data analysis" exercises.

Our weekly exercises, together with the exams or course project, are designed to help you gradually build the skills needed to use economics in your professional life. Each exercise adds an additional skill by digging into a specific real thing, so as you practice economics, you'll also be learning amazing facts about agriculture, food and nutrition. Scores on each exercise count for 5 points and we drop the lowest, for a total of half the available points for the semester.

Ex. #1. Keeping up with AI: practice with Microsoft Copilot
NUTR 238 aims to build your skills at finding information about agriculture, food and nutrition, then explaining, predicting and evaluating change using the logical principles and factual knowledge accumulated through decades of economics research. The available software tools change quickly, so we start with a warm-up exercise using Microsoft Copilot to generate text, tables and figures that you can then critique and improve. *(One takeaway: AI gives you great powers which you can use well or badly; using tools well requires practice and experimentation.)*

News analysis exercises
The next set of exercises deepens your skill drawing analytical diagrams. These diagrams capture the logic of economics, just like writing H_2O in chemistry. To practice applying economic logic to everyday life, we'll do six "news analysis" exercises in which you'll find two media reports about that week's topic and use economics to explain current events.

Ex. #2. News analysis about food choice and consumption
Indifference curves and budget lines
Draw indifference-curve diagrams (and demand curves) to explain two recently reported changes in food demand, one change in income or purchasing power, and one change in habits or preferences. *(One takeaway: Food choice is driven by income and preferences, not just price.)*

Ex. #3. News analysis about farm supply and production
Production possibility frontiers and revenue lines
Draw production-possibility diagrams (and supply curves) to explain two recently reported changes in food supply, one change in natural conditions and one change in available technologies. *(One takeaway: Agriculture is driven by climate and technology, not just price.)*

Ex. #4. News analysis about food markets and trade
Supply, demand, and trade
Draw supply-demand diagrams to explain two recently reported changes in food supply, demand, and prices. One story should reflect food-related services that are not transported or traded over long distances; the second story should involve a food that is either imported or exported. *(One takeaway: Most farm products are traded, so local supply and demand have little effect on their price; it's local services whose prices are driven by local supply and demand.)*

Residency exercise – connecting food choice to nutrient needs
Ex. #5. Transforming data: foods, nutrients and the least-cost diet
Use real data on food prices, the nutrient composition of each food, and a typical person's nutrient requirements for a healthy and active life, in an Excel template to calculate the least expensive way to meet nutrient requirements, and then write in a Word template about how those results compare to data from the FAO and national statistical services on what very low-income people actually eat. *(One takeaway: Food choices are related to nutrient needs, but influenced by many other factors as well.)*

News analyses (continued)
Ex. #6. News analysis about externalities and social welfare
Economic surplus and non-market costs or benefits
Draw supply-demand diagrams to explain two recently reported stories involving food-related externalities. One should be related to production, and the other should be related to consumption. *(One takeaway: Food systems often have consequences well beyond the people who are actively participating in the marketplace.)*

Ex. #7. News analysis about market structure and monopoly power
Market power and the role of competition in social welfare
Draw supply-demand diagrams with marginal revenue or expenditure curves to explain two recently reported changes in agribusiness or the food industry, where one company may (or may not) come to have monopoly power. *(One takeaway: Prices depend on how people and companies interact, which we call the <u>structure</u> of the market between them.)*

Ex. #8. News analysis about government policy choices
Political economy and social choice to improve outcomes
Draw supply-demand diagrams, one with and one without trade, to explain two recently reported changes in government policy. *(One takeaway: Policies can improve outcomes, but often have big unintended side effects.)*

Data analysis exercises

The final set of exercises (9-12) build your quant skills for working with numbers. We won't do statistics to estimate functions or test hypotheses, and won't run simulation models, but we will practice the more fundamental task of transforming data to see it through the language of charts and tables. To practice visualizing numerical things, we'll do four "data analysis" exercises in which you'll download what's available, use Excel to transform it into a useful form, and create a chart or table that allows you to describe the world. For help with Excel, please reach out to the TAs or consult the many resources available online.

Ex. #9. Global poverty and nutritional outcomes

Create tables that compare income levels and poverty, food consumption and nutritional status around the world using data from the World Bank. *(One takeaway: Most things are never measured, so we need to look hard for data, read carefully about it, and use it creatively.)*

Ex. #10. Dietary transition around the world

Create scatter plots that reveal cross-country patterns in obesity and consumption of packaged foods, using Euromonitor data on branded foods and beverages, and World Health Organization (WHO) data on obesity rates. *(One takeaway: The transition to packaged and restaurant food is closely tied to rising obesity rates, with wide variation across countries.)*

Ex. #11. US macroeconomic conditions, diet quality and nutrition assistance

Create line graphs that trace economic fluctuations and changes in food expenditure as well as the Supplemental Nutrition Assistance Program (SNAP), using US national data. *(One takeaway: Economic collapse during COVID differs from previous recessions in many ways, but has notable similarities: people with money stop spending it, so the government can step in to smooth economic activity and prevent mass unemployment.)*

Published research

Research-minded students will know that exciting new work appears every year on all the topics we address in this class. To keep up, you might want to do occasional google scholar searches, and use the Tufts VPN for easy access to Tufts library subscriptions.

IMHO the best single source on current research is the detailed *Handbook* chapter here:
Masters, W.A., Finaret, A.B. and Block, S.A., 2022. The economics of malnutrition: Dietary transition and food system transformation. *Handbook of Agricultural Economics*, vol. 6, edited by C.B. Barrett and D.R. Just. Amsterdam: Elsevier. https://arxiv.org/abs/2202.02579

For individual studies by Tufts faculty, here's a list of at least one source for each week. Where we have not recently published something on the topic, I chose something else of interest:

Week 1: What is economics, and what can least-cost diets reveal about food policy?
Finaret, A.B. and Masters, W.A., 2019. Beyond calories: The new economics of nutrition. *Annual Review of Resource Economics*, 11, pp.237-259. https://doi.org/10.1146/annurev-resource-100518-094053

Bai, Y., Alemu, R., Block, S.A., Headey, D. and Masters, W.A., 2020. Cost and affordability of nutritious diets at retail prices: Evidence from 177 countries. *Food Policy*, p.101983. https://doi.org/10.1016/j.foodpol.2020.101983

Week 2: Consumer behavior and food demand
Hartmann, Monika, Sean B. Cash, Ching-Hua Yeh, Stefanie C. Landwehr, and Anna R. McAlister, 2017. "Children's purchase behavior in the snack market: Can branding or lower prices motivate healthier choices?" *Appetite* 117: 247-254. https://doi.org/10.1016/j.appet.2017.06.014

Choudhury, S., Headey, D.D. and Masters, W.A., 2019. First foods: Diet quality among infants aged 6–23 months in 42 countries. *Food Policy*, 88, p.101762. https://doi.org/10.1016/j.foodpol.2019.101762

Week 3: Farm production and food trade
Tichenor, Nicole E., Hannah HE van Zanten, Imke JM de Boer, Christian J. Peters, Ashley C. McCarthy, and Timothy S. Griffin, 2017. "Land use efficiency of beef systems in the Northeastern USA from a food supply perspective." *Agricultural Systems* 156: 34-42. https://doi.org/10.1016/j.agsy.2017.05.011

Masters, W.A. and N.Z. Rosenblum, 2017. Senegal groundnut value chain: Competitiveness and prospects for development. Washington, DC: The World Bank. http://documents.worldbank.org/curated/en/523961498623774515

Weeks 4-5: Food markets and prices
 Masters, William A., 2016. "Economic causes of malnutrition", chapter 2.2 in M.
 Eggersdofer, ed., *Good Nutrition: Perspectives for the 21st Century*. Basel, Karger.
 https://www.karger.com/Article/Pdf/452378

 Bai, Yan, Elena N. Naumova, and William A. Masters, 2020. "Seasonality of diet costs reveals
 food system performance in East Africa." *Science Advances* 6(49): eabc2162.
 https://advances.sciencemag.org/content/6/49/eabc2162.abstract

Week 6: Environmental externalities
 Reinhardt, Sarah L., Rebecca Boehm, Nicole Tichenor Blackstone, Naglaa H. El-Abbadi, Joy S.
 McNally Brandow, Salima F. Taylor, and Marcia S. DeLonge, 2020. "Systematic review of
 dietary patterns and sustainability in the United States." *Advances in Nutrition* 11(4): 1016-
 1031 https://doi.org/10.1093/advances/nmaa026

Week 7: Market structure and monopoly power
 MacDonald, James M., 2017. "Consolidation, concentration, and competition in the food
 system." Economic Review of the Kansas City Federal Reserve Bank, SI17: 85-105.
 https://www.kansascityfed.org/~/media/files/publicat/econrev/econrevarchive/2017/si17macdonald.pdf

Week 8: Government policies and programs
 Pomeranz, Jennifer L., Parke Wilde, Yue Huang, Renata Micha, and Dariush Mozaffarian,
 2018. "Legal and administrative feasibility of a federal junk food and sugar-sweetened
 beverage tax to improve diet." *American Journal of Public Health* 108(2): 203-209.
 http://www.doi.org/10.2105/ajph.2017.304159

Week 9: Poverty, safety nets and risk
 Flores-Lagunes, Alfonso, Hugo B. Jales, Judith Liu, and Norbert L. Wilson (2018). "The
 Differential Incidence and Severity of Food Insecurity by Racial, Ethnic, and Immigrant
 Groups over the Great Recession in the United States." *American Economic Association
 Papers and Proceedings* 108, pp. 379-83.
 https://www.aeaweb.org/articles?id=10.1257/pandp.20181106

Week 10: Behavioral economics in the food system
 Finaret, Amelia B. and William A. Masters, 2019. "Beyond calories: The new economics of
 nutrition." *Annual Review of Resource Economics,* forthcoming.
 https://doi.org/10.1146/annurev-resource-100518-094053

Week 11: Recessions, unemployment and inflation
 Hoynes, Hilary, Diane W. Schanzenbach, and Douglas Almond, 2016. "Long-run impacts of
 childhood access to the safety net." *American Economic Review* 106(4): 903-34.
 http://doi.org/10.1257/aer.20130375

Week 12: Agricultural transformation and the dietary transition

Masters, W.A., N.Z. Rosenblum, and R.G. Alemu, 2018. "Agricultural transformation, nutrition transition and food policy in Africa: Preston curves reveal new stylised facts." *Journal of Development Studies* 54(5): 788-802. https://doi.org/10.1080/00220388.2018.1430768

Week 13: International trade and the food system

Lividini, K. and Masters, W.A., 2022. Tracing global flows of bioactive compounds from farm to fork in nutrient balance sheets can help guide intervention towards healthier food supplies. *Nature Food*, 3(9), pp.703-715. https://doi.org/10.1038/s43016-022-00585-w

Bell, W., Lividini, K. and Masters, W.A., 2021. Global dietary convergence from 1970 to 2010 altered inequality in agriculture, nutrition, and health. *Nature Food* 2(3), pp.156-165. https://doi.org/10.1038/s43016-021-00241-9