The purpose of the paper is to integrate and apply the mathematical tools and concepts developed during the semester. Grades will be based upon the originality and quality of the economic analysis conducted in the paper. Style counts—insofar as good reasoning is best revealed by clear, well-organized prose. A sophisticated mathematical analysis is not necessarily complicated, but is designed to shed new penetrating light on a question of interest. The paper should be 8-10 pages long, including any references and diagrams. It should be emailed to me by midnight on December 9, 2026. Your paper files should have a name such as EC701-Paper-last_name. Word or pdf files are both acceptable.

All papers should be typed double or triple spaced. I will read through papers that are a bit longer, but not if they are more than 12 pages long. Complete bibliographical information should appear at the end of the paper for all materials used or referred to in the paper. No use of any of the AI bots is permitted. The work should be your own original analysis rather than a survey or rehash of someone else's work.

One thing to keep in mind when doing your own "model building" is to start simple. Initially you should focus on the smallest number of variables that can be used to model the problem of interest. **zz** Then once you've understood how those variables "fit together," then think of ways that the model can be extended to include other variables of interest. Always start simple—the world is complex, and one of the main purposes of models is to identify the key variables that account for most of the phenomena that you are attempting to understand.

The list of topics below is mostly to start you thinking about paper ideas. Nonetheless, any paper written on one of these topics should work for the purposes of this class. In your modeling efforts, be sure to define all terms and to at least briefly discuss the mathematical steps taken. Devote most of your words in the first part of the paper to explaining the "fact base" for the choice setting being examined, and how your

model captures that choice setting. After the model is worked out and its properties derived, then discuss the implications of your model(s) for real world instances of this type of choice setting. Do not write a survey of the literature paper, although it is OK to write a brief summary of other papers that are similar to or relevant for the paper that you are writing.

(1) The Mathematics and Effects of Entrepreneurship

(A) Israel Kirzner is well known for his model of entrepreneurship in which he argues that entrepreneurship is a kind of market-oriented "alertness." He argues that what he means by alertness cannot be analyzed using neoclassical tools. Nonetheless, it is possible to model alertness of a sort using an information/search model.

Show how one can analyze entrepreneurship as investment in information about market opportunities. Consider (some of) the effects of expected returns, varying skills at detection, learning, and simple luck on the realized return from such "entrepreneurial" efforts. Can talented searchers "crowd out" less talented ones?

(B) Joseph Schumpeter argues that entrepreneurial activities are innovative and fundamentally disruptive. Discuss the sense in which this is true in the neoclassical context, then model an example of a disruptive innovation that significantly changes some preexisting market. Then discuss and analyze the extent to which the original innovator and his/her/its new market is likely to attract entry (copying) by other firms. Show how this tends to diminish the originator's long run profits. (Rather than do this in the abstract, this paper is probably best written about a particular innovation or industry.)

(2) **The Nature of Goods and Purposes of Consumption**

(A) Kelvin Lancaster developed an extension of the theory of demand in which he argued that what we normally call "goods" like automobiles are really clusters of attributes (reliable transportation, economical, horsepower, aesthetic character,

color, shape, power, sex appeal...). These attributes may be varied by manufacturers to produce new goods. In fact, most product innovations are simply variations on existing products with a "new" cluster of already well known attributes. (To make your analysis tractable assume that there are just two attributes of interest for consumers.)

(B) Analyze a monopoly model of the production of a two-attribute good where the monopolist faces a downward sloping demand curve for each of the two attributes. [That is, a demand function something like, $Q^d(P, A1, A2, Y)$, where A1 and A2 are the two attributes that can be varied]. Consider how firms will design their products given an individual's desire for those attributes. Discuss how competition among sellers tends to alter the nature of products as consumer demands for particular attributes change through time (as for example, seems to be true of the trade-offs between acceleration, gas mileage, and safety for automobiles).

zz This sort of paper is also probably best written about a specific goods market about which you already know something about. In some cases, the results will be sharper with a concrete functional model than an abstract model.

(3) **Crime and Economic Development**

(A) Analyze a particular type of crime that tends to reduce the extent of markets by making profits more risky or uncertain. Determine whether the crime of interest affects the demand side or supply side or both sides of the market. Model the effect of changes in the crime rate on the number of firms and/or consumers in the market of interest. Discuss how law enforcement might extend markets in such cases—assuming that law enforcement is honestly and diligently undertaken. (Again, a specific instance rather than a general model would work best for such a paper.)

(B) Analyze the effect of corruption on the extent of law enforcement on a particular class of economically relevant crime. Model the decisions of law enforcers in cases in which shirking is possible and/or in cases in which income from bribes is possible. Model the effects of the two types of corruption on crime rates in the community of interest and on the extent of markets in those communities. Discuss or model the effects of changes in norms on the extent of such kinds of enforcement decisions.

(4) **The Economics of Lotteries**

(A) The overwhelming majority of states now run state lotteries where about half the revenues generated by them are returned to persons who purchase lottery tickets and the other half is used to fund state services and pay for administering the lottery game(s). Construct a rational choice model that explains why a risk-averse or risk neutral person might play such a lottery game even if their expected financial returns are less than zero.

(B) During the last few years of the Vietnam War, the US government used a lottery system to "draft" persons for the Army. Analyze the government's use of a lottery-based draft as opposed to some other procedure (say raising salaries) for increasing troop size. Determine why a government (dictator/median voter) might prefer a lottery draft system to a volunteer (salary-based) system. (Keep in mind the median voter is often a person of median age and income.) Determine also whether the economic cost of a draft system is higher or lower than a salary system. (Hint: there are several ways to do the last part. One could assume that there are two kinds of "draftees" high civilian marginal product and low civilian marginal product who have the same military marginal product or a homogeneous labor pool which for some reason has different military marginal products—possibly because of market irrelevant differences in risk aversion or strength or quickness.)

(C) It can be argued that a better way of staffing the representative portion of a democratic government is through lotteries. That is to say, instead of elections,

one should randomly select persons from the population at large to form a representative sample—and let them make choices. Construct a model that would allow you to characterize the advantages and disadvantages of such a system over an electoral system that always elected a "faithful" representative of the median voter.

(5) **The Economics of Christmas**

(A) Very few of the characteristics of the American-style Christmas holiday season have been carefully analyzed. Consider the gift giving tradition. If this is entirely motivated by altruism, why should it be so concentrated during one day of the year? If it is a religious holiday, why do atheists give gifts? Analyze one of these puzzles using the tools developed in class.
(B) One of the consequences of Christmas gift giving is that many industries have a strong peak in demand during the month before Christmas. Analyze the malinvestments that result (if any) as a result of the American Christmas tradition of large scale gift giving. In order to demonstrate a malinvestment you'll have to show how a superior result could be obtained. (Alternatively, you might attempt to show that some implications of the cyclic demand for gift giving look suboptimal but is really optimal once properly analyzed.)

(6) Agency Problems and Hiring for Ethical Dispositions

(A) Suppose that there is a team production process in which one worker's effort can be observed but the other cannot, yet each affects the marginal product of the other. Model and explain why screening for ethical dispositions as well as job-related skills may be the best way to assemble such a team. How would breakthroughs in the screening process affect the firm's output and/or the market equilibrium?

(B) There is a famous Stigler-Becker paper (De gustibus non est disputandum) which argues that tastes emerge from experience from a basically similar set of human dispositions. Can ethics be such a taste? If so, in what cases does it make economic sense for an individual to develop a taste for ethical behavior? Are there particular types of jobs that such a person might be hired for or ineligible for? Model production processes either using calculus or game theory to illustrate your reasoning. Are scholars of ethics aware of these tradeoffs or not?

(7) **Package Theft and the Extent of Online Markets**

(A) Package theft from porches and apartment lobbies ("porch piracy") has become a common crime as more and more consumer purchases are made online and delivered to homes. Model a consumer's choice between purchasing a good online and purchasing it at a local store when there is a positive probability that a delivered package will be stolen. Show how changes in the probability of theft affect the demand for online purchases and the extent of online markets. (To keep the analysis simple, initially assume that a stolen package is simply lost, rather than replaced by the seller.)

(B) Consumers and sellers can reduce the risk of theft by investing in package lockers, doorbell cameras, signature-required delivery, or pick-up points. Model such private protective investments and determine whether they are likely to be over- or under-provided relative to the Pareto efficient level. (Hint: does a camera that deters thieves protect a whole neighborhood, or does it simply move thieves to the next street?) Discuss the extent to which law enforcement and private protection are substitutes or complements in this case. (A specific city or neighborhood would work best for such a paper.)

(8) **Tip Creep and the Ethics of Tipping**

(A) Tipping was once confined to a handful of services—restaurant meals, taxis, haircuts—where the norm was well established. In recent years requests for tips have spread to coffee shops, take-out counters, and even self-checkout kiosks, often via a tablet screen turned toward the customer. Develop a model of a consumer who has internalized a tipping norm, so that failing to tip at the "expected" rate generates guilt (or tipping generates a sense of virtue). Show how the presence of a tip request and the suggested tip percentages on the screen affect the consumer's total payment and his or her demand for the product.
(B) Analyze the seller's decision to request tips rather than simply raising prices. Under what circumstances does a tip request increase profits? Is there a limit to the extent to which sellers can exploit consumer norms in this manner, and might widespread tip requests gradually weaken the tipping norm itself? Discuss or model the effects of such changes in norms on the extent of markets for "tip-eligible" services. (Again, a specific type of business would work best for such a paper.)

(9) **Artificial Intelligence, Rational Ignorance, and Human Capital**

(A) AI programs can now produce answers to many questions—including homework questions—at very low cost. Develop a model of a student's decision to invest time in learning a skill (mathematics, writing, programming, or a foreign language) when an AI tool can substitute for some of that skill. Show how improvements in AI tools affect the student's investment in human capital, and whether the student becomes rationally ignorant of the skill. Under what circumstances does AI complement rather than substitute for human capital?
(B) Extend your model to a career choice setting in which training requires a fixed investment of time and the probability of earning a high wage in a particular specialty depends on the extent to which AI tools can perform the tasks of that

specialty. Show how changes in the capabilities of AI tools affect the pattern of specialization in the labor market and the returns to different degrees of specialization. (Keep in mind that such forecasts are made under Knightian uncertainty, rather than mere risk.)

(10) **Your choice**

(A) You may also choose a topic of your interest, but you have to obtain my permission first. **To do this, simply tell me briefly what you want to work on after class, via e-mail, or in the office.**
(B) The requirement of "permission" is mostly to ensure that it is an area where you may be able to make some useful progress using the mathematical approaches developed in class in the time left—and one that is not just rehashing existing work. That is to say, I will try to determine whether (i) the topic will "work" for the purposes of this class (showing your command of the tool bag as an engine of economic analysis), (ii) whether "you" can manage the topic in the time available, and (iii) whether it is an area where there is not much formal research.