PUBP720: Managerial Economics and Policy Analysis

Spring 2007

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office hours: M 3:00 PM - 4:00PM.
course credit: 3
section: 002
location: Arlington Campus 332
meeting time: M 4:30 - 6:00PM
1st Day: August 27
course website: accessible via WebCT (login at <http://webct41.gmu.edu>)

Note: Students enrolled in PUBP720 are required to take math self-assessment test during the summer. Students whose scores are below an indicated threshold are required to enroll in PUBP555.

Description of the Course

OBJECTIVES

This course is an advanced survey of microeconomic theory. Its purpose is to provide a firm microeconomic foundation for the analysis of public policies by examining how individual choices relate to aggregate outcomes, and vice versa. Additionally, students develop the capability to understand and assess economic theories and empirical findings.

COURSE OUTLINE

This course is divided into three parts. The first section focuses on the theory of the consumer, with an ultimate aim of understanding how preferences and utility maximization lead to consumer demand for goods and services. The second part of the course examines the theory of production, leading toward the development of supply curves. Supply and demand are brought together in an analysis of competitive markets and an evaluation of economic welfare. The third part of the course then focuses on sources of market failure, including monopoly power, externalities, public goods and imperfect information. While the course will emphasize microeconomic theory, a number of case discussions and policy issues will be used to motivate the material.

AUDIENCE

PUBP720 is a core MPP course. It is also a "bridge course" into Ph.D. level microeconomics courses for students with little prior background in economic analysis, but who are, at minimum, comfortable with algebra.

EXPECTATIONS

Course requirements include regular attendance and participation in lectures (noticed but not an explicit component of the final graded), completion of Aplia™ online problem sets (10 percent) completion of three hand-written problem sets (best three of four worth 15 percent of grade), a mid-term examination (25 percent), and a 2.5-hour, cumulative final examination (50 percent). Problem sets are an essential part of this course. Problem sets will require students to go above and beyond the material presented in class, and to apply the economic concepts to situations we have not yet encountered in lectures.

At the start of the semester, I will assign you to a study team w/ 3-4 other individuals. Each student in each study team must independently submit problem set answers. Assignments to work teams will be based upon responses to a class survey administered in the first week of the course to gauge approximate levels of prior coursework in calculus and microeconomics.

Students are expected to devote no less than 1.5 hours to the efforts of the study team per problem set—either in person (preferable), or "virtually." Each problem set will be assigned a due date when issued. Because solutions are handed out on the due date, late problem sets lose 50% of the possible points. Problem sets that are more than 24 hours late are not accepted.

COMMUNICATIONS

You can access the class survey at

http://www.surveymonkey.com/s.aspx?sm=Hg9Qgifnv4RR1z7ynWve4Q_3d_3d

Please fill out the class survey ASAP, if you have not already done so.The course website will be accessible via your WebCT account (login at <http://webct41.gmu.edu/>).

If you have any difficulty accessing the course website or updating your contact information, please either send an email to me (auerswald@gmu.edu) or call me (cell: 571 594-1102).

The course website is the primary means of communication for this course outside of the classroom. If you cannot access the site, or if your contact information is not valid, you will miss important course information.

The best way to reach me is either by email (auerswald@gmu.edu) or cell phone (571-594-1102). If you email a question to me that may require more than a yes/no answer (in particular, any questions regarding assignments), please include in the message a phone number at which you can be reached during the day.

When submitting both problem sets and exams, please

- Label each page with the first 5 digits of your GMU ID number ONLY. Do not put your name on any materials submitted for a grade.
- Put page numbers on every page.
- If submitting material by email or the course website, please use a descriptive file name beginning with "PUBP720" (e.g. <PUBP720_assignment-3_task-1_myname.doc> rather than <problem-set.doc> or, worse yet, <ver3 finalFINALrevB.doc>).

COURSE MATERIALS

The text for the course is

Robert Pindyck and Daniel Rubinfeld, Microeconomics 6th edition, Prentice Hall. [ISBN #: 0-13-132067-X]

The text is available at the GMU bookstore (Arlington) and will be on reserve at the library (Arlington, Old Building). You are required to purchase a copy of the text.

Supplementary readings and cases will be available in three formats: in a course reading packet, from the library (via e-journals <http://library.gmu.edu/phpzone/ej.php>), or directly from me in PDF format. If you have not done so already, please familiarize yourself with the library's online resources, and make sure that you have access to Adobe Acrobat Reader.

Note that the ISBN given above for Pindyck and Rubinfeld (P&R) refers to package book that includes a free study guide. However, the study guide is for your use only, and is not required. You should feel free to purchase the 6th edition of (P&R) under a different ISBN, without the study guide, if you prefer.

The reading packet for the course will be available by the third week in January at the copy center at the Arlington campus, which is located inside the Law School Library (along the wall to the right, after you enter). The Law School is located across the parking lot from the School of Public Policy.

Finally, I recommend that you purchase.

Levitt, Steven D. and Stephen J. Dubner, 2005. *Freakonomics: A Rogue Economist Explains the Hidden Side of Everything*, New York: William Morrow. ISBN: 0-06-073132-X.

I will make occasional reference to this book. It provides numerous examples of the creative use of economic analysis in answering policy questions.

Additional information about Aplia™ is appended below.

Professional Ethics

HONOR CODE[1]

GMU shares in the tradition of an honor system that has existed in Virginia colleges since 1842. The Honor Code is an integral part of university life. Students are responsible for understanding the provisions of the code. In the spirit of the code, a student's word is a declaration of good faith acceptable as truth in all academic matters. Therefore, attempted cheating, plagiarism, lying, and stealing of academic work and related work constitute Honor Code violations. All work must be your own. Inappropriate use of the work of others without attribution is plagiarism and a George Mason University Honor Code violation punishable by expulsion from the University. All students should familiarize themselves with this honor code provision

(http://www.gmu.edu/facstaff/handbook/aD.html).

[1] Description thanks to Professor Steve Ruth.

POLICY ON PLAGIARISM

The profession of scholarship and the intellectual life of a university as well as the field of public policy inquiry depend fundamentally on a foundation of trust. Thus any act of plagiarism strikes at the heart of the meaning of the university and the purpose of the School of Public Policy. It constitutes a serious breach of professional ethics and it is unacceptable.

Plagiarism is the use of another's words or ideas presented as one's own. It includes, among other things, the use of specific words, ideas, or frameworks that are the product of another's work. Honesty and thoroughness in citing sources is essential to professional accountability and personal responsibility. Appropriate citation is necessary so that arguments, evidence, and claims can be critically examined.

Plagiarism is wrong because of the injustice it does to the person whose ideas are stolen. But it is also wrong because it constitutes lying to one's professional colleagues. From a prudential perspective, it is shortsighted and self-defeating, and it can ruin a professional career.

The faculty of the School of Public Policy takes plagiarism seriously and has adopted a zero tolerance policy. Any plagiarized assignment will receive an automatic grade of "F." This may lead to failure for the course, resulting in dismissal from the University. This dismissal will be noted on the student's transcript. For foreign students who are on a university-sponsored visa (eg. F-1, J-1 or J-2), dismissal also results in the revocation of their visa.

To help enforce the SPP policy on plagiarism, all written work submitted in partial fulfillment of course or degree requirements must be available in electronic form so that it can be compared with electronic databases, as well as submitted to commercial services to which the School subscribes. Faculty may at any time submit student's work without prior permission from the student. Individual instructors may require that written work be submitted in electronic as well as printed form. The SPP policy on plagiarism is supplementary to the George Mason University Honor Code; it is not intended to replace it or substitute for it.

Syllabus

PART I: THEORY OF THE CONSUMER

August 25 (Saturday), 9:00AM-5:00PM: Math workshop (Hazel Hall building [Law School], Room 225)

1. August 27: Overview of the course; consumer preferences, indifferences curves

2. September 10: Utility Functions, and Utility Maximization
P&R: Chapters 1-3
problem set #1 distributed

3. September 17: Utility maximization; income and substitution effects; assignment #1 grading
readings: Hicks (1933, chapter 1), Dasgupta (1995)
focus topic: Fertility choice.
Aplia assignments: Introductory Practice Problem Set; Introductory Graded Problem Set; Math and Graphs Tutorial; Pretest; Consumer Behavior I; Consumer Behavior II

4. September 24: Review of consumer theory, measures of consumer welfare
reading: Arrow et. al (1993)

problem set #1 due; problem set #2 distributed

PART II. THEORY OF PRODUCTION AND COMPETITIVE MARKETS

5. October 1: Property Rights, Contracting and Bargaining; Production and the Theory of the Firm
P&R Chapters 6 and 18 (pp. 641-662)
readings: Coase (1960), Chandler (1992), Barzel and Kochin (1992)
focus topic: Battle of the nature lovers
problem set #2 due

6. October 9 [TUESDAY]: Production, costs, and profits; Assignment #2 solution
P&R Chapters 7 and 8
reading: Argote and Epple (1990)
in-class exercise: learning-by-doing in the manufacture of books
Aplia assignments: Technology I; Technology II; The Cost of Production in the Short Run I; The Cost of Production in the Short Run II

7. October 15. MID-TERM EXAM (90 minutes, in class)

PART III. MARKET FAILURE

8. October 22: Review of the mid-term; Industry evolution
P&R: Chapters 2 and 8
focus topic: Boom and bust in rubber (automobile tires) and bits (dot.coms).

9. October 29: Efficiency and the analysis of competitive markets part I; market equilibrium exercise
P&R: Chapter 9
problem set #3 distributed

10. November 5: Efficiency and the analysis of competitive markets II
P&R: Chapters 10 and 12
reading: Caves, Frankel, and Jones (2001, chapter 3)
focus topic: International trade and comparative advantage.
Aplia: Falling Oil Prices on the Eve of War with Iraq

11. November 12: Game theory, economic dynamics, monopoly and oligopoly; assignment #3 grading
P&R: Chapter 13
readings: Shubik (2000); Arthur (1990), U.S. vs. Microsoft, Findings of Fact (excerpts)
problem set #3 due, #4 distributed

12. November 19: Externalities, public goods; regulation; cost-benefit analysis
P&R: Chapter 18 (pp. 662-672)
reading: Arrow (1962)
focus topic: The economics of innovation.
Aplia: The Market (or Markets) for Music on the Internet; Indonesian President Prescribes a Bitter Pill

13. November 26: Risk and uncertainty; social welfare; review of assignment #4 grading; course review

readings: Friedman (1982, pp. 161-166), Sen (1999), Hahn and Stavins (1992)
focus topic: Trade in trash.
problem set #4 due

14. December 3: Course review

December 10: FINAL EXAM—2.5 HOURS, CUMULATIVE

References

L. Argote and D. Epple. Learning curves in manufacturing. *Science*, 247:920-924, 1990. [JSTOR]

K. J. Arrow. "Economic welfare and the allocation of resources from invention." In R. R. Nelson, editor, *The Rate and Direction of Inventive Activity: Economic and Social Factors. Princeton University Press*, 1962. [Reading packet]

K. J. Arrow, Robert Solow, Paul R. Portney, Edward E. Leamer, Roy Radner and Howard Schuman. Report of the NOAA Panel on Contingent Valuation. January 11, 1993 <www.darp.noaa.gov/library/pdf/cvblue.pdf > [last accessed on 2/16/05]

W. B. Arthur. Positive Feedbacks in the Economy. Scientific American, Vol. 80 (December): 92-99, 1990. [PDF from PA]

Y. Barzel and L. Kochin, 1992. "Ronald Coase on the Nature of Social Cost as a Key to the Problem of the Firm," Scandinavian Journal of Economics, 94:19-31. [Reading packet]

Caves, Frankel, and Jones, 2001. World Trade. New York: Peason. <http://wps.aw.com/aw_cavesfrajo_worldtrade_9/>[PDF from PA]

A. D. Chandler, 1992. "Organizational Capabilities and the Economic History of the Industrial Enterprise." *Journal of Economic Perspectives*, 6(3): 79-100, Summer 1992. [JSTOR]

R. Coase. "The problem of social cost." *Journal of Law and Economics*, 3:1-44, 1960. [Reading packet.]

P. Dasgupta. "The population problem: Theory and evidence." *Journal of Economic Literature*, XXXIII:1879-1902, December 1995. [JSTOR]

M. Friedman. *Capitalism and Freedom.* University of Chicago Press, 1982. [Reading packet.]

R. W. Hahn and R. N. Stavins. "Economic incentives for environmental protection: Integrating theory and practice." *American Economic Review*, 82(2):464-468, May 1992. [JSTOR]

Hicks, J. R. Value and Capital, *Oxford University Press*, 1933. [Reading packet]

A. Sen. "The Possibility of Social Choice." *American Economic Review*, 89(3): 349-378, June 1999. [JSTOR]

T. C. Schelling. "Some economics of global warming." *American Economic Review*, 82(1):1-14, March 1992. [JSTOR]

M. Shubik. "Game Theory: Some Observations." *Yale School of Management Working Paper* #132, 2000. [PDF from PA]

U.S. vs. Microsoft, Findings of Fact [PDF from PA].

Student Registration and Payment Instructions

Course Name: PUBP720 Managerial Economics--Fall 2007
Start Date: 08/27/2007
Professor: Philip E Auerswald
Course Key: 92TP-M5NH-3S7L

You can begin working on your homework as soon as you register!

- In this course, you will use a textbook and Aplia's website.

Registration

Registration Instructions

1. Connect to http://www.aplia.com.
2. Click the **System Configuration Test** link below the **Sign In** and **Register** sections to make sure you can access all of the features on Aplia's website. This takes just a few seconds and tells you how to update your browser settings if necessary.
3. Return to http://www.aplia.com.
   - If you have never used Aplia before, click the **New Student** button and enter your Course Key: **92TP-M5NH-3S7L**. Continue following the instructions to complete your registration.
   - If you have used Aplia before, sign in with your usual e-mail address and password and enter your Course Key when prompted: **92TP-M5NH-3S7L**. If you are not prompted for a new Course Key, click the **Enter Course Key** button to enroll in a new Aplia course. Enter your Course Key when you are prompted.
4. If you understand your payment options, pay now. Otherwise, postpone your purchase decision by choosing the option to pay later. Your payment grace period ends at the end of the day on 09/16/2007.

Payment

Pay Aplia Directly

- Purchase access to your course directly from Aplia on our website for $35.00 USD.
  - The website includes content that has been customized for your textbook and course.

PUBP720: Managerial Economics **Prof. Philip Auerswald**

Problem Set 1

1 Math review

1.1 First-order Derivatives - One variable

Find the first-order derivatives of the following equations:

1. $y = 5x^{-4} + 17x$

2. $y = 3x^3 + 2x^2$

3. $y = ax^{-b} + cx^d$

1.2 First-order Partial Derivatives - 2 variables

Find the first-order partial derivatives (first with respect to x_1, then with respect to x_2) of the equations

1. $y = 3x_1^2 + x_1x_2 + 4x_2^2$

2. $y = 2x_1^3 - 11x_1^2x_2 + 3x_2^2$

3. $y = 7x_1 + 5x_1x_2^2 - 9x_2^3$

1.3 Three equations for three unknowns

Given that

$$2\blacksquare - \bigstar - \blacktriangle = 6$$
$$3\blacksquare + \bigstar - \blacktriangle = 20$$
$$\blacksquare - \bigstar - \blacktriangle = 0$$

Solve for ■, ★,and ▲.

1.4 Constrained Maximization and Shadow Price

Solve the following maximization problem.

1.

$$Max \qquad z = xy$$

$s.t. \qquad x + y = 6$

Step 1: The Lagrangian function is set as:

Step 2: Take the first order partial derivatives of the Lagrangian and set them to 0 (corresponding to the maximum point)

What does the value of λ^* tell you?

2.

Let's generalize the problem and solve again.

$Max \qquad z = xy$
$s.t. \qquad x + y = Q$

Step 1: The Lagrangian function is set as:

Step 2: Take the first order partial derivatives of the Lagrangian and set them to 0 (corresponding to the maximum point)

What does the value of λ^* tell you?

2 Consumer Demand

Gilbert Grape gets enjoyment only from consuming Bordeaux wines and organic yogurt. Gilbert's preference are represented by the following utility function

$$U(x, y) = x^{\frac{2}{3}} y^{\frac{1}{3}}$$

where x is the consumption of Bordeaux and y is the consumption of yogurt.

a) Use the power function rule for taking a derivative (i.e. finding a slope!*) to confirm that*

$$\text{Utility gain from small } \Uparrow \text{ in } x = \text{marginal utility of } x = \frac{\partial U}{\partial x} = U_x = \frac{2}{3} x^{-\frac{1}{3}} y^{\frac{1}{3}} \qquad (1)$$

$$\text{Utility gain from small } \Uparrow \text{ in } y = \text{marginal utility in } y = \frac{\partial U}{\partial y} = U_y = \frac{1}{3} x^{\frac{2}{3}} y^{-\frac{2}{3}} \qquad (2)$$

b) Combine equations 1 and 2 to arrive at a general expression for the marignal rate of subtiution, that is

$$MRS = 0 - \frac{\frac{\partial U}{\partial x}}{\frac{\partial U}{\partial y}} = \_\_\_\_$$

Gilbert's income $M = \$300$. The prices of x and y are as follows:

$p_x = \$20$/bottle

$p_y = \$4$/container

c) What is the slope of the budget line? Does the slope of the budget line depend on consumer preferences? Why or why not?

d) Using your expression for the marginal rate of substitution, find the combination of x *and* y *for which*

- *the slope of the indifference curve equals the slope of budget line and*
- *Gilbert spends his entire budget on* x *and* y*, that is*

$$20x + 4y = 300$$

HINT: Answering this sub-question involves solving two equations for two unknowns.

Make sure that you have Esteban Clavell's consumer theory handout, posted to the website. Find the the pair of demand functions at the bottom of page 2:

$$x^* = \frac{\alpha M}{p_x} \tag{3}$$

$$y^* = \frac{\beta M}{p_y} \tag{4}$$

e) For the income and prices given above, use in 3 and 4 to solve for the optimum values of x^* and y^*.

f) Compare your answer from part (d) and part (e). Explain why they are the same or different.

g) Provide the Gilbert's choices of both *Bordeaux and yogurt under the following circumstances (consider each seperately):*

i. Gilbert's income increases to \$600.

ii. The price of Bordeaux increases to \$40.

iii. Gilbert finds a new brand of *y*ogurt that he absolutely loves. As a result, his preferences change, and are now represented by the following utility function

$$U(x, y) = x^{\frac{1}{4}} y^{\frac{3}{4}} \tag{5}$$

h) BONUS: *Using page 2 of the Clavell consumer theory handout (see handouts folder on WebCT), derive the Marshallian demand functions for Gilbert's new utility function given in eq. 5. Show and briefly explain each step. [Note: In some sense, this is just a matter of copying the derivation from the handout. This is useful in itself. Even better, however, is to motivate each step clearly.]*