Teaching consumer theory to business students: an integrative approach

Dan Axelsen and Hal W. Snarr and Dan Friesner

North Carolina A&T State University, North Dakota State University

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Dan Axelsen [a*]
Hal Snarr [b]
Dan Friesner [c]

[a] Economist
PricewaterhouseCoopers LLP
10 Tenth St., Suite 1400
Atlanta, GA 30309
Email: dan.axelsen@us.pwc.com

[b] Department of Economics and
Transportation Logistics
North Carolina A & T University
Greensboro, NC 27214
Email: hwsnarr@ncat.edu

[c] Department of Pharmacy Practice (Dept. 2660)
North Dakota State University
P.O. Box 6050
Fargo, ND 58108
Email: Daniel.Friesner@ndsu.edu

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Abstract Economists teaching principles of microeconomics courses in business schools face a difficult pedagogical dilemma. Because the vast majority of students in these courses are business majors or minors who will not study economics beyond the principles level, these students need a different set of skills than what is taught in a traditional (liberal arts) setting, which is focused primarily towards economics majors and/or minors. In particular, business students need relatively less emphasis on the mechanics of neoclassical economic theory and relatively more emphasis on how economic tools and concepts form the basis for (and are subsequently integrated into) other business fields, including (but not limited to) marketing, management and finance. This paper presents a case study illustrating how instructors can more effectively teach principles of microeconomics when the majority of students in the course are business majors and/or minors. We use consumer theory as an example. Our goal is to not only describe why principles of microeconomics courses fail to adequately introduce and explain utility and demand theory to this cohort of students, but also to demonstrate how course content can be altered such that learning outcomes are enhanced.

* To whom correspondence should be addressed.

[+] At the time this study was initiated, Dr. Axelsen was an Assistant Professor of Economics in the School of Global Commerce and Management at Whitworth College and Dr. Friesner was an Assistant Professor of Economics in the Gonzaga University Business School.

Introduction and Literature Review

Over the past decade, a significant portion of the economic education literature has studied the effectiveness of principles of economics courses. Unfortunately, the consensus of this literature is that principles courses have a positive, but relatively minor marginal impact on economic literacy (Walstad and Algood, 1999; Walstad and Rebek, 2002). Approximately 40 percent of all college students take at least one economics course and it is in these courses where most students receive their first, and often only, exposure to economics. Thus, the consequences of this failure to increase economic literacy in these courses are quite severe (Sigfried, 2000).

In response, researchers have attempted to identify the reasons *why* principles courses are largely ineffective. Many of these reasons are beyond the direct control of the faculty teaching principles courses, including (but certainly not limited to) student-teacher ratios, research expectations, and the lack of compensation directly tied to teaching excellence (Becker, 2001; Salemi *et al*., 2001; Sigfried and Sanderson, 2003). However, these same studies also contend that the largely ineffective delivery of economic principles to students can be blamed on the conventional tools used by economics' instructors. For example, Becker (2001) argues that principles instructors can enhance learning outcomes by reducing the amount of time spent lecturing (also known as the "chalk and talk" method) and increasing the amount of class time spent actively involving students in discussions and debates about the course material. By incorporating real world examples into class discussions that directly relate to students lives can also permeate student interest and, as a result, enhance student learning. The same can be said for writing homework, test and quiz questions that relate to students as well.

Another approach coveted by the National Council on Economic Education (NCEE) is to reduce course content to a small set of tools and concepts that are considered most important

(NCEE, 1997). Focusing solely on a small set of core competencies allows instructors more time to cover the subject matter, therefore covering the most important concepts in more depth. This also allows instructors to devote greater amounts of class time to covering real world examples and class discussions that are recommended under the active learning approach.

An additional consideration is that principles of economics courses consist of an increasingly wide array of students, each with different backgrounds, educational needs and rationales for taking the course. Three groups, in particular, comprise the majority (if not the entirety) of students taking principles courses: (1) students who intend to major or minor in economics (2) business students taking principles of economics as a core requirement for their major and (3) students who need to complete an economics course in order to satisfy the general education requirements for a college degree. The first group of students needs a much more detailed understanding of traditional approaches to economic modeling than groups (2) and (3) in order to complete upper-level economics courses. As such, the approach coveted by the NCEE might not be viable for instructors if a high percentage of their principles students intend to major or minor in economics. In many cases, however, the first group represents a small percentage of principles students, making the active learning approach and/or the NCEE approach viable for the majority of students taking principles of economics courses.

The second group of students provides yet another challenge for principles instructors. Business students traditionally take principles of economics in the second year of their program, and must complete the course as a prerequisite for admission to upper-level business courses. The rationale for this requirement is that economics forms a theoretical basis for many of the business disciplines. For example, utility theory and derived demand are used as a starting point for consumer behavior in marketing, while producer theory provides a foundation for operations

and supply chain management. Thus, while this group of students does not need as thorough of a treatment as students intending to major in economics, they must nonetheless understand many of the economic principles in order to better understand their upper-level business courses. Performance in these upper-level business courses should improve as well.

Unfortunately, the business education literature has identified a problem similar to that faced in economics; business courses are not sufficiently effective at increasing business literacy. In particular, business students are not adequately learning the inter-relationships between the tools and concepts taught across the various business and economic disciplines. As such, there has been increased pressure on business schools and their faculty (particularly those accredited by the AACSB) to provide a cross-functional, integrative foundation for business majors and minors (Doyle and Wood, 2005). By providing students with a basic set of tools and concepts from each business discipline (such as accounting, marketing and operations), and then showing how those tools and concepts are intra-related, students are not only better prepared to complete upper-level business coursework, but are also more prepared to immediately apply their skills in a "real-world" context post graduation.

Many business schools have attempted to create such a foundation by re-designing their curricula. A number of schools have added senior-level capstone courses, which attempt to integrate discipline specific concepts and skills after virtually all of the coursework for the major has been completed. Other schools have implemented what is known as an "integrated business curriculum", or IBC (Miller, 2000; Lorents, Morgan and Tallman, 2003; and Doyle and Wood, 2005). Under a traditional IBC, students take their second year introductory business courses (including principles of accounting, principles of economics and business statistics) in the traditional (department-specific) fashion. But instead of taking traditional third-year courses

specifically geared towards each business discipline, students complete a single, integrative course whose credit hours equal the combined credit hours of the traditional course(s). The IBC course is then a prerequisite for senior-level coursework in any business major. Thus, one major pedagogical difference between an IBC-based curriculum and a traditional curriculum with a capstone course is the timing at which students are exposed to the relationships between various business disciplines. Students in IBC programs are exposed to interdisciplinary concepts earlier, which gives them more time to develop a broader perspective of their discipline.

The advantage of the IBC over the traditional, capstone approach is that the block course requires faculty to jointly design both the content of the block course as well as the *sequence* in which that content is presented. In many cases, the block course is designed to be team-taught, which allows faculty the ability to exhaustively integrate content across business disciplines. In those cases where faculty members from each discipline teach separate components within the course, the timing in which those components are covered allows faculty the opportunity to emphasize the cross-functionality of the tools and concepts discussed within that component.

Unfortunately, the IBC model has several limitations compared to its alternatives. First, some faculty may be unwilling to participate in an IBC block course because they are unwilling to cede autonomy over course content and pedagogy. A second drawback is the cost of offering a block course. Faculty members teaching the block course (particularly if it is team-taught) necessarily have higher opportunity costs of time, since the block course forces them to change how they prepare to teach the course. The block course may also carry explicit monetary costs if the block course diverts faculty away from teaching other courses, which must then be covered by temporary faculty (Miller, 2000). The final limitation is that the successes of an IBC block course is constrained by the effectiveness of the faculty teaching, and the effort and skills of the

students taking the introductory level courses (Doyle and Wood, 2005). If students do not adequately retain (learn) the skills taught in the introductory courses then the faculty teaching the block course must first cover the material from the introductory courses before covering new material. This reduces the amount of available time to cover the material originally intended to be discussed in the block course. In many cases, time constraints force the instructor(s) to cover less material, usually applications and interdisciplinary concepts. Alternatively, the instructor might use technology to move learning activities outside of the classroom and more efficiently cover what material is presented in the classroom.

For principles instructors whose students are primarily business majors (or minors), modifying the principles microeconomics course may be an effective way to address both of these problems simultaneously. That is, instructors may choose to focus on a smaller set of economic tools and concepts that students will see again in upper-division business courses. By focusing on a smaller set of tools and concepts, instructors have more time and flexibility to cover the content in more detail, to add more real-world examples and to use additional pedagogical devices to more effectively convey information to students. As a result, students increase both their economic literacy and gain a better understanding about the intra-relationships between the tools and concepts taught across the various business disciplines.[1] This approach to teaching also allows faculty the ability to supplement (or perhaps even partially replace) capstone and/or IBC courses.

In this paper, we present a case study demonstrating how instructors can more effectively teach microeconomic principles when the majority of students in the course are business majors and/or minors. Our approach improves on the current treatment of the subject by more closely

[1] To a lesser extent, this may also be true for students (particularly those majoring in other social sciences) who are taking principles of microeconomics to satisfy general education requirements.

aligning course content with the scientific method, and also by promoting interdisciplinary economic thought in a manner that is more complementary with other business disciplines. As an illustration, we focus on how instructors can enhance economic and business literacy by more fully integrating economic utility theory and derived demand with marketing theory, most notably consumer behavior.

An additional benefit of our approach is that it is consistent with recent developments in the economic education literature. It makes extensive use of course management software (such as Blackboard or Web CT) and spreadsheet modeling techniques to save time and more effectively convey concepts in an integrative and interdisciplinary manner. The use of spreadsheet modeling, in particular, has received a substantial amount of attention by economists. For example, Mixon and Tohamy (1999 and 2000a) use *Excel* to demonstrate models in international economics courses. Cahill and Kosicki (1998) use spreadsheets in upper division micro and macroeconomic courses, while Goddard, Romilly and Tavakoli (1995) make use of them in information technology and macroeconomics courses. Mixon and Tohamy (2000b) use *Excel* to teach micro and macroeconomic topics at the principles level, focusing primarily on the use of spreadsheets to model the impact of a shift in a demand and/or supply curve on the market equilibrium.

According to Paetow (1998) and Mixon and Tohamy (1999), the advantages of using *Excel* in the economics classroom are gained at relatively low cost. First, *Excel* is available today in most business school computer labs. Second, most students are expected to complete assignments in *Excel.* Third, many firms value business school graduates that are highly proficient in *Excel*. Hence, having students use *Excel* at the principles level provides a way of learning a useful/valuable tool while simultaneously developing their knowledge of the content.

While our approach is consistent with the spreadsheet modeling literature, it differs from our predecessors in several crucial ways. First, even though our methodology makes use of spreadsheet modeling techniques, our focus is not on the development of these models. Instead, the model itself is simply a means to an end to promote an integrative, active approach to teaching microeconomic principles.[2] Second, we focus on a different set of tools and concepts than the literature. Our goal is to demonstrate, in a realistic and interesting manner, how utility theory and derived demand work together to explain consumer behavior, and not to evaluate how interventions affect market equilibria. Third, and perhaps most importantly, our focus is on teaching principles to the non-economics (primarily the business) major or minor, who need a different set of tools than their counterparts.

The remainder of this paper proceeds in several steps. First, we present a discussion explaining why most principles of microeconomics do not introduce consumer theory in an effective manner. Next, we provide an example of how instructors might choose to change both course content and the sequencing of that content to increase student mastery of the material. Third, we present some examples of how to use class participation and some simple computer simulation techniques (using Microsoft Excel) to create some interesting and relevant examples to support the lecture and class discussion. We conclude the paper by discussing the benefits and limitations of our work, and also make some recommendations for future work in this area.

What is Wrong with the Current Treatment of Economic Consumer Theory?

It is widely held that economics is a social science grounded in the use of critical thinking and the scientific method (Knoedler and Underwood, 2003, 2004). As such, when investigating an issue, whether one is conducting academic research or introducing new material to students, it is

[2] Our simulations are available upon request from the lead author, and use examples that can be easily tailored by any business school microeconomic principles instructor. As such, they may be of use to instructors wishing to adopt our methodology despite the fact that they are not the central theme of the paper.

common to proceed in several steps, which are conducted in order (McEachern, 2006). First, one must identify the nature of the problem being investigated. Next, one must posit any relevant assumptions to be used in the analysis. The third step is to use these assumptions along with logical reasoning to identify one or more testable hypotheses. Finally, one must test the hypotheses to determine whether or not they are consistent with what is observed in the world as it actually exists (or is believed to exist).

When teaching consumer theory to principles of microeconomics students, the problem is to characterize how economic forces influence the amount of a particular product consumers (whether individually or collectively) are willing to purchase. That is, the task is to develop a theory that allows for the depiction of an individual, and by extension, a market demand curve. Next, one must posit the assumptions underlying the decision process. While not an exclusive list, some of the most crucial assumptions are those of consumer rationality, the formation, stability and completeness of preferences, the law of total utility (i.e., the "Pig Principle", more consumption is preferred to less), the law of diminishing marginal utility, the assumption that the price of the product is the most important factor in the minds of consumers (and thus is labeled on one axis of the demand curve) and a synopsis of all factors held constant when analyzing the problem (i.e., the ceteris paribus assumption).[3] The third step uses these assumptions to set up and solve the constrained utility maximization problem for a typical consumer. This, of course, leads to a single point on this typical consumer's demand curve. One must subsequently repeat this problem at varying prices yielding the consumer's demand curve at these various prices. Repeating this for all consumers in the market (and horizontally summing the results) leads to the market demand curve. Finally, one must employ statistical or other empirical techniques to

[3] The "Pig Principle" was coined by Dr. Daniel Underwood.

determine whether, in reality, consumers do respond to lower prices with a higher willingness to purchase the product in question.

A crucial problem with many principles of microeconomic textbooks is that they do not introduce consumer theory in a manner that is consistent with the scientific method (for example, see Frank and Bernanke, 2001; Colander, 2004; McConnell and Brue, 2005; McEachern, 2006). In particular, most principles textbooks begin by discussing only a small number of assumptions underlying demand curves, including rationality, opportunity costs and positive (versus normative) analysis. These texts subsequently introduce market demand curves, supply curves and equilibrium analysis before introducing consumer and producer theory. Elasticities of supply and demand are treated in the next chapter(s), followed by utility theory (along with the remaining assumptions necessary to motivate utility maximization) and producer theory.[4] Moreover, empirical techniques (using experimental methods, computer simulation and/or data available on the world-wide-web) commonly used to test these theories are often relegated to minor sections at the end of the chapter(s) or included in the instructor's manual accompanying the text (McEachern, 2006). In other words, these textbooks jump to step three of the scientific method prior to completely addressing steps one and two. They also place minor emphasis on step four, when in fact it should receive as much attention or more attention as the other three steps.

The consequences of this more traditional approach are twofold. First, students are less likely to gain a complete understanding of demand and consumer theory when taught in this fashion. When demand theory is taught prior to consumer theory students do not understand how the demand curve is derived (e.g., where it comes from), how it is defined and the

[4] One minor exception is Frank and Bernanke (2001). These authors introduce demand elasticities simultaneously with utility maximization. However, they still present supply and demand analysis prior to utility and producer theory.

assumptions underlying the demand curve (e.g., utility assumptions). Furthermore, students have less interest in learning utility maximization because they already know the end result of the traditional paradigm (i.e., a demand curve). As a result, they often see utility maximization as a pedagogical device with little or no relevant "real-world" information to add to the discussion. Moreover, because only a handful of behavioral assumptions are introduced prior to the discussion of supply and demand analysis, students do not gain a full understanding of how values, culture and context (which inherently characterize assumptions such as rationality, the formation, stability and completeness preferences and the law of diminishing marginal utility, among other factors) impact individual decision making, and by extension, market-level decisions, because those assumptions about human behavior have not been adequately identified and discussed in a manner that is consistent with the scientific method. Our experiences are that students never really grasp the utility-demand nexus when taught in the traditional construct because the demand for a good is borne out by solving the constrained utility maximization problem repeatedly by altering its price, *ceteris paribus*. This is particularly problematic with consumer theory because many upper-division marketing courses focus *exclusively* on values, culture, context and environmental factors influencing consumer decisions (as well as strategies designed to exploit these assumptions to influence consumer behavior in a predictable fashion) *without* specifically identifying how those factors relate back to economic assumptions (Engle, Blackwell and Miniard, 1993; Wilkie, 1986). As a result, students are less able to draw inferences and make connections across courses in different subject areas. In short, students fail to adequately learn both the critical and analytical thinking skills so highly prized in the economics and business professions (Knoedler and Underwood, 2003, 2004).

The second problem is that many students have difficulty grasping a theoretical tool or concept unless the theory is presented simultaneously with a real-world application.[5] One method of avoiding this problem is to incorporate experiments and/or simulations into course material (Holt, 1996; Ball, 1998). But by not making these experiments and exercises an integral part of the course (particularly the textbook, which is the typical student's primary outside source of information), students may not fully grasp whether and how the experiment or simulation supports or refutes the theory. That is, students may need more than an in-class exercise to adequately grasp whether or not the theory is consistent with reality.

An Alternative Approach to Teaching Consumer Theory in Principles of Microeconomics

Our approach to teaching consumer theory focuses on three major changes to the traditional principles of microeconomics paradigm: 1) a change in the sequence of topics covered in the course, 2) additional emphasis on how values, culture, experience and environmental factors alter conventional consumer theory corollaries based on the standard neoclassical assumptions, and 3) less emphasis on the algebraic aspects of utility theory and more emphasis placed on the use of spreadsheet modeling and simulation techniques which illustrate the utility maximization and derived demand relationship.

Changing the Sequence of Content Taught in a Traditional Principles of Microeconomics Course

Table 1, Panel A contains a sequential list of topics traditionally covered in a principles microeconomics course. For simplicity, we stop after market structure, since instructors generally cover a wide array of applied micro topics after this point in a typical principles course

[5] This is one plausible explanation why supply and demand analysis is taught prior to utility and producer theory. That is, by showing how the theory is applied, students will (hopefully) be interested enough to pay attention when the theory is subsequently discussed. While this may work for a short period of time, our argument is that the amount of time necessary to cover utility (and producer) theory as it is currently presented in most textbooks is too long for students to maintain interest.

is reached.[6] Concomitantly, Table 1, Panel B contains a sequential list of topics consistent with our approach. The primary difference between our paradigm and the traditional construct is that we cover all of the assumptions underlying economic choice theory prior to discussing utility theory. We also cover consumer and producer theory prior to covering equilibrium analysis, but before market structure.

The major advantage of this paradigm is that it allows the instructor to progress through the topics in a manner that is consistent with the scientific method. In particular, all assumptions concerning consumer theory are now specified in sections 1 and 2, while assumptions regarding firms are specified in sections 1 and 3. Additionally, students have a more thorough understanding of the assumptions and underpinnings of producer and consumer theory prior to discussing market equilibrium. Lastly, while market structure and other applied micro topics are still covered at the end of the course, covering equilibrium analysis and elasticities immediately prior to market structure allows for an internally consistent discussion, and one that allows the instructor to emphasize the role that both competition and the formation of consumer preferences have on the short and long-run success of firms. That is, students can more easily see how demand elasticities and competition create a (potential) difference between one firm's demand curve and the market demand curve.

How Changing the Sequence of Topics Covered Leads to More Synergy with Other Business Courses

There are two, related benefits that arise from changing the sequence of traditional, principles of microeconomics courses to the course outline described in the preceding section. First, students receive a thorough discussion of the assumptions underlying producer and

[6] The topics outlined below are not intended as a collectively exhaustive list. Instead, our intent is solely to identify some of the main topics taught in each of these sections, and how they change under our new paradigm.

consumer theory, instead of covering these assumptions in two chapters, which may be discussed in lectures that are several weeks apart. By discussing these sections in successive class periods, and by holding this discussion prior to developing consumer and producer theory, students have a much more concrete understanding of the assumptions underlying these core economic concepts, and, ultimately, how those assumptions shape each model's outcomes. In other words, by having a complete, detailed discussion of the assumptions prior to developing the theory, the instructor can more easily demonstrate to students exactly what it means to posit those assumptions, both in terms of the economics, as well as in "common sense" terms.

Perhaps more importantly, instructors can also use time in these class periods to draw connections and compare/contrast the economic assumptions underlying utility (producer) theory with the assumptions underlying consumer (producer) theory as taught in marketing (operations management). For example, the economic assumptions about the formation, completeness and stability of preferences can be compared and contrasted with the assumptions about attitudes commonly utilized in consumer behavior. The assumption that consumer attitudes have "consistency" is very similar to an economist's assumption that preferences are stable. Similarly, the assumption that attitudes are "object-specific" can be compared and contrasted with the economic assumption that people gain utility from "consuming things". Third, the assumption that attitudes are specific to the situation at hand is comparable to the assumption in economics that utility is inherently subjective. As a fourth example, the assumption of rationality can be compared and contrasted to information processing and the decision-process continuum (i.e., extended problem solving to limited and habitual problem solving).[7]

[7] While the emphasis of this paper is on teaching consumer theory, one can make similar arguments for producer theory. As an example, when discussing average costs and economies of scale, the instructor can ask students, in practical terms, why larger firms may (or in the case of diseconomies of scale, why larger firms may not) have cost advantages over smaller firms. Some common responses are that larger firms receive purchasing discounts on

Additionally, when defining a total utility function in economics, the function is traditionally kept simple; it is usually static, individual-specific, and covers only a few goods. It also makes no discrepancy between purchasing decisions made for the first time and decisions that are made repeatedly. While such a simple model is quite useful in that it conveys the process of utility maximization and derived demand simply, it is not entirely realistic because of its oversimplification. Thus, it is also important to engage student discussion about how these assumptions might be relaxed. This leads to a discussion of some of the core assumptions and concepts of consumer theory in marketing, such as the hierarchy of effects model, the effects of social class, status and environmental factors on purchasing decisions, individual versus organizational decision-making, and initial versus repeated consumption.

More advanced marketing concepts, such as cognitive dissonance theory and attribution theory can also be introduced to economic consumer theory by positing (in a very general sense) sequential utility maximization problems. For example, to illustrate cognitive dissonance, in the first stage, the consumer may make a purchasing decision. In the second stage of utility maximization, the consumer may act to reduce the "guilt" (or further increase utility) by choosing to actively seek out positive reinforcement to support decisions made in the first stage of the process.

When conducting these discussions, it is critical for the instructor to emphasize one important caveat to students; namely the crucial role of the *ceteris paribus* assumption in business and economics. In particular, economics as a general rule does not deny that the

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inputs, they have the resources to more effectively control inventory, and they may be able to more quickly and effectively incorporate new technologies into the production process. Examples of diseconomies of scale include a loss of corporate culture, and the fact that larger companies tend to be unionized, and thus exhibit higher wage expenses. In any case, this allows the instructor an opportunity to introduce related concepts such as the value chain analysis and lean manufacturing systems, which are commonly discussed in operations management as means to capture economies of scale (or to avoid diseconomies of scale).

assumptions underlying utility theory (at the principles level) are over-simplified, and that the assumptions underlying marketing theory are more general. At the same time, it is important for students to grasp the simple, utility-maximization model, as well as which assumptions are simplified, and how those simplifications impact the model's outcomes *prior to relaxing those assumptions in the upper-level marketing courses*. In other words, utility theory as posited in principles of microeconomics provides a simple foundation that is meant to be built upon in upper-division marketing courses. Thus, it is not that economics is "wrong" or that marketing is "right". Rather, the goal is to start with some simple concepts, which can be extended as student's progress towards the completion of their degrees. The role of principles of microeconomics instructors is to demonstrate to students the direction in which that progression takes. In doing so, students will see the connections between principles of microeconomics and their upper division courses, and (hopefully) become more interested and place more effort towards learning the material. This, in turn, benefits both students and instructors in upper-division business courses.

Why This Paradigm Requires Greater Use of Technology and Innovative Pedagogical Techniques in Order to be Implemented Successfully

One potential drawback of this paradigm is that by waiting until the course is approximately half over before beginning the discussion of supply and demand analysis, students (especially those who have prior exposure to economics, either through a high school economics course or who have already taken principles of macroeconomics) may lose interest in the course, and not gain an acceptable understanding of the tools and concepts taught in the class. As such, an instructor attempting to successfully implement this paradigm must be able to move through the material in a thorough, but efficient manner.

In our experience, we have found that an effective solution is to place less emphasis on the algebraic aspects of utility (and producer) theory and more emphasis on the use of spreadsheet modeling and simulation techniques to demonstrate how utility (profit) maximization allows for the derivation of a demand (supply) curve and the practical relationship between these concepts and the world as it exists (or, we believe to exist). While there are certainly other approaches to effectively convey this information to students, simulation and spreadsheet modeling is perhaps the most commonly used and most versatile tool currently available to economics instructors (Cahill and Kosicki 2000; Fisher 2001; Mixon and Robson 2001; Naevdal 2003; Craft 2003; and Caplan 2005).[8]

There are several advantages to using spreadsheet modeling and simulation techniques. First, it allows instructors to work through computationally intense problems in a minimal amount of time. For example, if an instructor wishes to work through a traditional constrained utility-maximization problem to show that an optimal choice equates all marginal utility to price ratios, performing this exercise algebraically via the "chalk and talk" method is very time consuming, in addition to not adding much to the discussion other than to demonstrate something many students either grasp intuitively (if they have already taken calculus) or simply intend to memorize for the exam – this is not an exercise in learning economics but more of an exercise in learning math. Students at this level often become frustrated and lost in the mathematics as well, decreasing their levels of potential economic literacy even more.

A second, and related, advantage of simulation and spreadsheet modeling is that it allows the instructor to perform sensitivity analyses very quickly. Within the context of consumer theory, this is very useful for deriving an individual demand curve. That is, for given income

[8] An alternative approach suggested by Bergstrom and Miller (2000) is to frame lectures and examples within the context of simple classroom experiments. Yet another alternative posited by Friesner and Axelsen (2006, 2007) is to base lectures and examples in the form of game theory exercises.

and prices, the constrained utility maximization problem only identifies a single point on the individual demand curve. To construct the entire curve, one must work through this problem several times with varied prices for a single good, holding all else constant. Again, this is very time consuming when done via algebra, but can be completed in a matter of seconds (and displayed effectively as a graph in the spreadsheet) using a tool such as Microsoft Excel.

A third advantage of simulation and spreadsheet modeling is that it can also be used within the context of a class experiment to quickly generate aggregated results for the experiment. As an example within the context of consumer theory, the instructor may ask each student in the class to define his or her own unique utility function.[9] Then given a specific set of prices and a consumer's income, a student can identify one point on his or her individual demand curve, and by changing the price and repeating the utility maximization problem, each student can map out his or her individual demand curve. The advantage of the spreadsheet is that the instructor can collect these results from students, type them into a spreadsheet, and within a matter of seconds, can horizontally sum the results at each price to generate a market demand curve.

Perhaps the most important advantage of spreadsheet modeling is that students not only understand how to use spreadsheets more effectively (often better than the instructor) but view the use of the tool as something that has real world application. That is, students understand the power and versatility of a spreadsheet, and expect to use this tool on a daily basis after graduation in their day-to-day jobs and lives. As such, students are more likely to be interested in applying tools and concepts that can be formulated within the context of a spreadsheet, as opposed to an algebra problem, even though in many cases the two are equivalent. The spreadsheet, per se, becomes a tool that enhances student interest and learning in the course, and

[9] The following section provides an illustrative example similar to what is currently being described.

also more effectively facilitates a discussion of how a model's assumptions drive its outcome. This in turn facilitates a discussion of the similarities and differences across the assumptions used in economics and marketing, and how that influences similarities and differences in core economic and marketing principles.

Having described the proposed methodology, as well as its strengths and weaknesses, we are now in a position to provide an illustrative example of how to teach utility theory using our paradigm. We illustrate our proposed paradigm in the next section.

A Pedagogical Illustration

In this section, we present an example of how one might use simulation to effectively facilitate an instructor's attempt to implement the paradigm outlined in the proceeding sections. In what follows, we assume that the instructor has used the sequence of topics outlined by our methodology. Hence, at the time the instructor actually introduces consumer theory, a significant amount of in-class discussion has already occurred, covering the basic assumptions underlying the problem, and how those relate to consumer behavior in marketing. As a consequence, building the model becomes more of a review or a practical illustration of the material already discussed, and the discussion quickly turns into a presentation of using utility maximization to derive demand. In other words, the spreadsheet model should simply be considered as a means to an end. Primary emphasis should be given to illustrating how assumptions (and changes in those assumptions) lead to different behavioral patterns, as well as how those assumptions vary across the two disciplines.

For instructors teaching in computer laboratories, or in classrooms with wireless laptop access, we suggest that instructors post a sample model of the spreadsheet on Blackboard, Web CT, or an alternative online source. In the previous lecture, students should be made aware that

the spreadsheet has been posted on the site, and that it is their responsibility to download and use the spreadsheet prior to the next class period.[10]

The Case

Consider a typical college student named Amy. After paying all of her other bills (rent, tuition and books) Amy has $75 left over each week to spend on entertainment. Amy's favorite pastime is going to the theatre to watch movies. Amy generally buys a small popcorn and soda to enjoy with her movie which in total (movie ticket, popcorn and soda) costs Amy $10. On the other hand, Amy can't spend all of her money at the movies, because she also loves to go dancing. The cover charge at her favorite dance club is $2, but because she likes to have one cocktail while dancing the total cost of going dancing is $5. While Amy loves going to the movies, she also enjoys "getting her sweat on" occasionally during the week. Her best estimate, per se, is that she enjoys going to the movies about twice as much as "getting her sweat on".

Setting up the Simulation Model

Setting up the constrained maximization problem consists of three steps. The first is defining the choice variables and the budget constraint. If we define *M* to be the number of times Amy sees a *M*ovie each week and *G* to be the amount of times she *G*ets her sweat on, the budget constraint can be expressed as:

$$\$75 = \$5 \cdot G + \$10 \cdot M \ . \qquad (1)$$

Defining the total utility function is slightly more challenging. We suggest that the instructor provide a particular function to the class, as opposed to letting the students attempt to posit one. While there are certainly a number of parsimonious functional forms (including the Cobb-Douglas and quasi-linear functional forms), we typically utilize

[10] Please see the following website for several examples of Excel spreadsheets and simulations that may be used in the classroom and that cover a number of different topics: http://www.halsnarr.com/teach.htm.

$$TU = 40 \cdot \ln(1 + M) + 20 \cdot \ln(1 + G). \quad (2)$$

The advantage of this functional form is that it is both consistent with the traditional economic literature and also allows the instructor to easily demonstrate to students how the assumptions underlying consumer values, tastes, preferences and experiences influence happiness, and by extension, consumption patterns.

This last point is important, and, in our opinion, is a common reason why principles students do not fully grasp economic utility theory, nor its similarities to consumer theory as taught in marketing courses. That is, while the utility function is an equation, and produces "utils" that are measured as numbers, it *is the relative meaning of these numbers, and not the values of the numbers themselves,* that are important in consumer decision making. Thus, it is vitally important that instructors carefully and completely impart to students that each number in the function is simply a representation of one or more assumptions about consumer values, beliefs, tastes, preferences and/or experiences. For example, the numbers 40 and 20 are utility weights, and express the relative proportion of "happiness" (or in marketing terms, "attitude weights") Amy receives from going out to the movies versus getting her sweat on. In reality, this is no different than how we as consumers think about a set of competing goods; we constantly compare and contrast how best to spend our limited budget on these two related goods.[11] The use of the natural logarithm allows Amy's happiness to satisfy assumptions about the laws of total utility (i.e., the Pig Principle, more of one or both goods is preferred to less) and diminishing marginal utility (see Exhibit 1). Lastly, the adding of one to both *M* and *G* in the utility function normalizes utility, such that zero consumption produces zero happiness, and not

[11] Instructors may also go further by demonstrating to the class that a central tenant of consumer behavior is actually to influence these weights by skewing them towards the good of interest to the marketer.

"utter despair" which would happen when the expression in one or both parentheses equals zero, sending ln(0), and thus total utility, to negative infinity.

The third step is the actual construction and implementation of the model, which takes the place of the algebraic (and possibly calculus-based) solution (Exhibit 2). In particular, finding the levels of consumption that maximize Amy's happiness is a two-step process. The first step is to find all possible combinations of the two goods Amy can afford to buy, given her budget and the prices of movies and dancing (i.e., getting her sweat on). These values are expressed in the first two columns of the output table in Exhibit 2. For simplicity, we have rounded these consumptions possibilities to whole units, and only consider those options that exhaust her budget. The second step applies the total utility function to each set of consumption patterns to determine the combination of the two goods that maximizes her total utility. This is contained in the sixth column in Exhibit 2's output table.[12] Clearly, under the assumptions of our model (and the initial conditions), Amy should go to the movies and go dancing (i.e., get her sweat on) 5 times each.

Using the Model to Stimulate Class Discussion and Enhance Student Learning

Having introduced the basic utility maximization model, the instructor can subsequently cover several extensions of this concept. The first extension is to demonstrate (without calculus) that the optimum choice for both goods consumed equates marginal utility to the ratio of grocery and movie trip prices. This is quite easily accomplished using a spreadsheet, as shown in the ninth and tenth columns of Exhibit 2's output table, because students can simultaneously compare the ratio of the marginal utilities to the price ratio for each set of consumption choices

[12] In the simulation that we have constructed a red asterisk appears next to the value of the maximum level of utility to help students locate the maximum level of utility more quickly. An equal sign appears between MU_M/P_M and MU_G/P_G when these values are relatively close to zero.

to see how these factors lead to an increase in total utility.[13] The instructor may also use this example as a means to express (and explain) the algebraic form of this rule commonly posited in principles textbooks:

$$\frac{MU_M}{P_M} = \frac{MU_G}{P_G} \tag{3}$$

A related issue is to ask students "does this answer make sense?" That is, given that (a) Amy prefers a movie at twice the level to that of getting her sweat on and (b) going to the movies is twice as expensive as getting her sweat on, does it make sense that she would consume equal amounts of each? By posing these types of questions to students, the instructor can facilitate a discussion about how the assumptions and values placed on Amy, in turn, dictate the choices she makes.

A third extension of the utility maximization problem is the demonstration *ceteris paribus* in the presence of a price, income, or preference change. Exhibit 3 presents an illustrative example of this approach, showing what happens to the optimal consumption bundle when the price of going to the movies decreases to $5. In our courses, students are placed in groups (or individually if there are enough computers in the room) and asked to repeat the exercise depicted in Exhibit 2 with a different price for a movie trip, *ceteris paribus*. In doing so, students must change the price in the spreadsheet, *ceteris paribus*, which in turn changes the available consumption options, total utility and marginal utility to price ratios, all of which lead Amy to choose differently. As such, students are not given Exhibit 3, but asked to create it as part of the class discussion. After students have repeated this exercise with four or five different

[13] One potential problem plaguing all discrete definitions of marginal cost (which is the norm in principles courses) is that marginal utility to price ratios will not be exactly the same at the optimum point if the unit of measurement for the outputs and total utility are sufficiently small in scale. As such, instructors must be careful to round all calculations to ensure that these ratios are equal. An alternative is to ask students to approximately choose the marginal utility to price ratios that are as close to being equal as possible.

movie trip prices, they can plot movie price-consumption combinations on graph paper (see Figure 1). After students derive Amy's movie demand, they, on the same graph paper, plot the price-consumption combinations for getting her sweat on. Because the price of getting her sweat on does not change, students demonstrate to themselves demand shifts caused by prices changes of related goods. In addition to changes in prices, the instructor, if time permits, can also use this same type of exercise to illustrate demand shifts by varying Amy's income or preferences.

The fourth extension of our model is to actively involve students in a class experiment, and use that information to simulate a market demand curve. That is, the instructor can ask the class, "Would you have the same utility weights, or place the same relative values, on each of these two goods if you were in Amy's shoes? If not, what weights would you choose?" As an exercise, students are subsequently required to choose a set of utility weights that reflect their own values and interests, and repeat the initial spreadsheet analysis problem. And as before, one can also ask students to repeat their analyses using different movie prices to derive their demand curves. Using Excel or another spreadsheet tool, these results can be quickly and easily aggregated to create a market or class demand curve. Table 2 and Figure 2 contain an illustrative example of what this type of analysis might look like with a class of 5 students.

The final task is to ask students to discuss the nature of the problem in general. That is, having completed all of these tasks with a specific utility function, and having discussed some of the basic assumptions underlying both economics and marketing as they apply to consumer behavior, the class should discuss how the utility maximization model might change if one or more of the simplistic assumptions commonly applied in principles of microeconomics were to be relaxed. While the discussion should be kept general and not overtly technical, the goal is to demonstrate three, related facets. First, in reality, the task of deriving market demand curves is

quite complicated, because while every individual has some sort of utility function, its makeup and definition will vary dramatically from one individual to the next. It may also vary depending on the type of good being considered in the analysis. Thus, utility maximization as a philosophical construct has merit, however complicated, because it forms an important bridge between marketing theory and economic theory.

Second, and perhaps because of the high degree of difficulty in solving a "real-world" utility maximization problem, one can see why marketers tend to focus primarily on the assumptions of consumer behavior, such as culture, initial versus repeated decisions, information processing and individual versus organizational decision-making, because these factors play such a critical role in forming consumer decisions. As mentioned earlier, the contribution of economics in this discussion is to form an intuitive argument to explain the connection between these assumptions and the decisions that are made. Without this critical piece of information, it is also more difficult for other disciplines and instructors in those disciplines to effectively and efficaciously express their concepts and tools to students.

Third, one can illustrate how these economic tools are utilized "in the real world" by experts in consumer theory. One of the central tenets of consumer behavior in marketing is that utility weights in a consumer's (i.e., Amy's) decision process are dependent upon the amount of information available to her. As such, by advertising to consumers (either persuasively or informatively) in general, and Amy in particular, a firm (perhaps a local movie theatre or dance club) can cause the utility weights in a typical consumer's (Amy's) utility function to change in a manner that benefits the firm implementing the marketing campaign. The previous sensitivity analysis should make it obvious to students as to how a particular firm attempts to skew these weights. Additionally, this should lead to several other, practical questions, which students will

learn in subsequent marketing courses. For example, how should a firm advertise to most effectively skew consumer utility weights? Additionally, how does one measure utility weights in the first place? When discussed in class, the instructor should point out to students that these questions will be answered in their promotion and marketing research courses, respectively.

Additional Considerations

Having presented our approach to teaching principles of microeconomics, as well as an illustration of our approach, it is important to consider several issues that may impact the feasibility of (or the approach taken when) implementing our methodology. One issue concerns the mix of majors taking the course. Our approach is aimed primarily at enhancing economic literacy among business majors and minors. To a lesser extent, it may also be useful at enhancing literacy among students taking the course to satisfy general education requirements. Can the same be said of students taking the course to satisfy an economics major or minor? Obviously, this is a fundamentally empirical issue, and depends on the nature of the instructor teaching the course and the extent to which our methodology is implemented. However, on average, we argue that the answer to the question is "yes". Economics majors and minors will likely take the intermediate micro and macro course sequence upon completion of the principles sequence. But in most cases, the primary difference between the principles and intermediate course sequence is not the content coverage, but the level of rigor (i.e., the use of mathematics and logical analysis) used in the intermediate courses. This implies that our methodology should also enhance (average) economic literacy among economics majors and minors, because they will leave the (micro) principles course with a deeper knowledge of the *intuition* behind the economic concepts being studied. As such, they are more likely to learn more in the

intermediate course because they can focus on learning the technical tools, as opposed to both the economic intuition *and* the technical tools taught in the intermediate course(s).

A second concern is the additional amount of time necessary to implement our methodology, compared to the traditional approach of teaching micro principles. Clearly, there is an initial investment in terms of the time necessary to re-prepare for the course. An additional cost is the time spent in class working through the simulations and discussing the assumptions underlying consumer theory. In our experience, this extra coverage takes between one and two weeks of class time. In order to recoup this lost time, we generally require students to complete online quizzes (via Blackboard, WebCT, Aplia, or another medium) prior to coming to class. This allows us to move through the material more quickly, since less time is necessary to both review prior material and also to introduce new material, particularly basic concepts and definitions, in a more efficient manner.

As an example, one of the authors uses two types of online quizzes. The first type, which is a definitional pre-quiz is referred to as *Online Reading Excitement*, typically involves 20 multiple choice questions that are mostly definitional and sequenced with the reading assignment. The purpose of this definitional pre-quiz is to overcome the difficulty of getting students to literally crack open the text and read it. The second type of online quiz, referred to as *Online Home Excitement*, contains more difficult, computational multiple choice questions, which comprise several sets of questions that refer students to diagrams and/or tables. *Online Reading Excitements* are timed and students only have one chance at them, while students are allowed multiple attempts and as much time as they need to complete *Online Home Excitements*. Students are encouraged to print *Online Home Excitements* out so that they can work each question out mathematically or graphically. Questions for these assignments are selected from

the text's instructor's resource CD containing the test bank using the exam builder program that was packaged with the test bank. After the quizzes are written, they are exported and uploaded to the instructor's online course management system (e.g., Blackboard, WebCT, or Aplia).

A final consideration is class size. Our approach is much easier to implement in smaller classes, particularly those with 30 or fewer students. However, for larger sections, the instructor might ask students to complete the simulations in groups. Additionally, in many universities, the course is broken apart into a single lecture (with several hundred students) and multiple, smaller recitation sessions. The instructor might choose to introduce the concepts and simulations in the lecture, and subsequently assign the discussions and applications to be completed in the recitation sessions.

Conclusions

In this paper, we introduce a new paradigm for teaching principles of microeconomics. We argue that this paradigm is not only effective at increasing learning outcomes for all students, but also provides an integrative foundation for upper-level business courses. Hence, our paradigm should also help business courses, particularly those taught in an IBC format, achieve better learning outcomes.

It is our opinion that economics should be taught in the same way that the models are actually constructed. This is not a far cry from reality, and no different than say building a home. Home builders do not start by building the roof; they begin by leveling the land, building a foundation, etc. We see teaching economics no differently. Because demand is derived from consumer theory (utility) and supply is borne out of producer theory (production and costs), consumer and producer theory should be sequenced before demand and supply, respectively. We believe that teaching economic principles in this manner helps students better understand the

fact that utility (production and costs) and the assumptions that utility encompasses are directly related to demand (supply). To gain a full understanding of demand (supply) means students must attain a thorough understanding of consumer (producer) theory. By teaching in this way—as advocated by this paper—we strongly believe the decline in economic literacy can be abated.

Secondly, at the principles level it is more important to understand the relationship between consumer theory and demand, and producer theory and supply, than learning (or, memorizing) the math needed to derive supply and demand curves. At the principles level, we believe understanding economic theory is much more important than memorizing mathematics. And, for those who continue on in economics the math will be taught (and learned) in upper-level coursework so there is really no loss in knowledge for economics majors as well. In fact, the mathematics of the upper-level courses will be better understood because the principles will be better understood using the paradigm we advocate in this paper. We believe using critical and analytical analysis, model-building (through simulations, classroom experiments and spreadsheet modeling) and relating economics to student's lives are the most efficacious ways of meeting this goal, e.g. economic literacy.

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Table 1:
Sequencing of Course Topics

A Traditional Micro Principles Course

1) The Basic Economic Problem
   Topics covered:
   - unlimited wants given limited resources
   - rational self interest
   - opportunity costs
   - comparative and absolute advantage
   - positive versus normative analysis
   - production possibility frontiers
   - the scientific method

2) Economic Agents and the Definition of an Economy
   Topics Covered:
   - household markets
   - product markets
   - resource markets
   - international markets
   - the role of the government
   - the circular flow diagram

3) Supply and Demand Analysis
   Topics Covered:
   - law of demand
   - changes in demand
   - changes in quantity demanded
   - law of supply
   - changes in supply
   - changes in quantity supplied
   - market equilibrium

4) Elasticities of Demand and Supply
   Topics covered:
   - general definition of elasticity
   - own-price elasticity of demand
   - cross-price elasticity of demand
   - income elasticity of demand
   - own-price elasticity of supply
   - tax incidence analysis

Our Suggested Course Sequence

1) The Basic Economic Problem
   Topics covered:
   - unlimited wants given limited resources
   - rational self-interest
   - opportunity costs
   - comparative and absolute advantage
   - positive versus normative analysis
   - production possibility frontiers
   - the scientific method

2) Consumer Theory
   Topics Covered:
   - tastes and preferences
   - other assumptions
   - total utility
   - marginal utility
   - diminishing marginal utility
   - utility maximization
   - equality of marginal utility to price
   - derived demand
   - market demand
   - indifference curves
   - consumer surplus

3) Producer Theory
   Topics Covered:
   - explicit and implicit costs
   - accounting versus economic profit
   - long run versus the short run
   - other assumptions
   - short run production theory
   - short run total, average and marginal costs
   - long run average costs
   - short run profit maximization.
   - the interdependence of production, costs and supply.

Table 1, Continued

5) Consumer Theory
   Topics Covered:
   - tastes and preferences
   - total utility
   - marginal utility
   - diminishing marginal utility
   - utility maximization
   - equality of marginal utility to price
   - derived demand
   - market demand
   - indifference curves
   - consumer surplus

6) Producer Theory
   Topics Covered:
   - explicit and implicit costs
   - accounting versus economic profit
   - defining the long run versus short run
   - short run production theory
   - short run total, average and marginal costs
   - long run average costs
   - short run profit maximization

7) Market Structure
   Topics Covered:
   - perfect competition
   - monopoly
   - monopolistic competition
   - oligopoly (game theory)

8) Other Applied Micro Topics per Instructor and Class Interests

4) Economic Agents and the Definition of an Economy
   Topics Covered:
   - household markets
   - product markets
   - resource markets
   - international markets
   - the role of the government
   - the circular flow diagram

5) Supply and Demand Analysis
   Topics Covered:
   - law of demand
   - changes in demand
   - changes in quantity demanded
   - law of supply
   - changes in supply
   - changes in quantity supplied
   - market equilibrium

6) Elasticities of Demand and Supply
   Topics covered:
   - general definition of elasticity
   - own-price elasticity of demand
   - cross-price elasticity of demand
   - income elasticity of demand
   - own-price elasticity of supply
   - tax incidence analysis

7) Market Structure
   Topics Covered:
   - perfect competition
   - monopoly
   - monopolistic competition
   - oligopoly (game theory)

8) Other Applied Micro Topics per Instructor and Class Interests

Exhibit 1

(A)

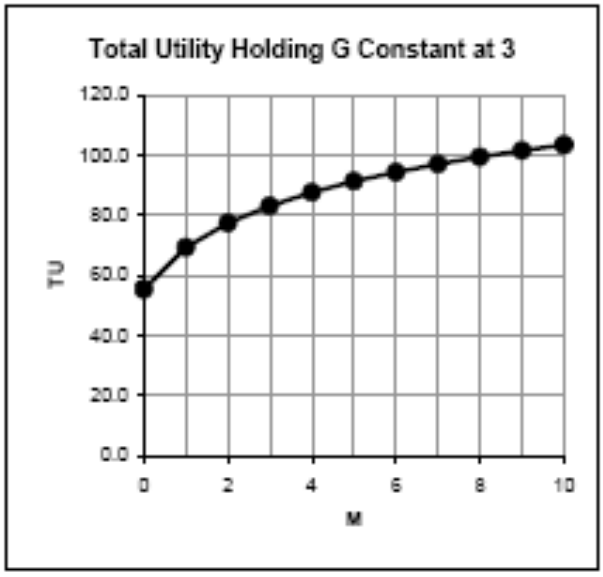
Choices		
G	*M*	*TU*
0	0	0.0
1	1	41.6
2	2	65.9
3	3	83.2
4	4	96.6
5	5	107.5
6	6	116.8
7	7	124.8
8	8	131.8
9	9	138.2
10	10	143.9

(B)

Choices		
G	*M*	*TU*
3	0	55.5
3	1	69.3
3	2	77.4
3	3	83.2
3	4	87.6
3	5	91.3
3	6	94.4
3	7	97.0
3	8	99.4
3	9	101.5
3	10	103.4

(C)

Choices		
G	*M*	*TU*
0	2	22.0
1	2	49.7
2	2	65.9
3	2	77.4
4	2	86.3
5	2	93.6
6	2	99.8
7	2	105.1
8	2	109.9
9	2	114.1
10	2	117.9



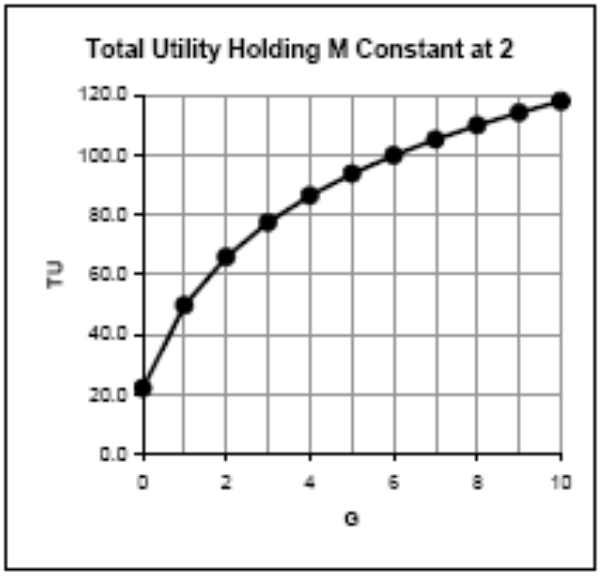


Exhibit 2: Amy's Constrained Utility Maximization Problem

Utility Weight = 0.50

$$TU = 40\ \ln(1+M) + 20\ \ln(1+G)$$

Budget Constraint Param

P_M	P_G	*Income*
10	5	75

Constrained Utility Maximization: max U = 107.5

Choices		Spending							
M	G	on M	on G	Total	TU	MU_M	MU_G	$\frac{MU_M}{P_M}$	$\frac{MU_G}{P_G}$
0	15	0	75	75	55.5	40.0	1.3	4.00	0.30
1	13	10	65	75	80.5	20.0	1.4	2.00	0.29
2	11	20	55	75	93.6	13.3	1.7	1.33	0.33
3	9	30	45	75	101.5	10.0	2.0	1.00	0.40
4	7	40	35	75	106.0	8.0	2.5	0.80	0.50
5	5	50	25	75	107.5 *	6.7	3.3	0.67 =	0.67
6	3	60	15	75	105.6	5.7	5.0	0.57	1.00
7	1	70	5	75	97.0	5.0	10.0	0.50	2.00

Exhibit 3: Amy's Constrained Utility Maximization Problem

Utility Weight = 0.50

$$TU = 40\ln(1+M) + 20\ln(1+G)$$

Budget Constraint Param

P_M	P_G	*Income*
5	5	75

Constrained Utility Maximization: max U = 131.8

Choices		Spending							
M	G	on M	on G	Total	TU	MU_M	MU_G	$\frac{MU_M}{P_M}$	$\frac{MU_G}{P_G}$
0	15	0	75	75	55.5	40.0	1.3	8.00	0.30
1	14	5	70	75	81.9	20.0	1.3	4.00	0.27
2	13	10	65	75	96.7	13.3	1.4	2.67	0.29
3	12	15	60	75	106.8	10.0	1.5	2.00	0.31
4	11	20	55	75	114.1	8.0	1.7	1.60	0.33
5	10	25	50	75	119.6	6.7	1.8	1.33	0.36
6	9	30	45	75	123.9	5.7	2.0	1.14	0.40
7	8	35	40	75	127.1	5.0	2.2	1.00	0.44
8	7	40	35	75	129.5	4.4	2.5	0.89	0.50
9	6	45	30	75	131.0	4.0	2.9	0.80	0.57
10	5	50	25	75	131.8 *	3.6	3.3	0.73 =	0.67
11	4	55	20	75	131.6	3.3	4.0	0.67	0.80
12	3	60	15	75	130.3	3.1	5.0	0.62	1.00
13	2	65	10	75	127.5	2.9	6.7	0.57	1.33
14	1	70	5	75	122.2	2.7	10.0	0.53	2.00

Figure 1 Amy's Demand for the Movies

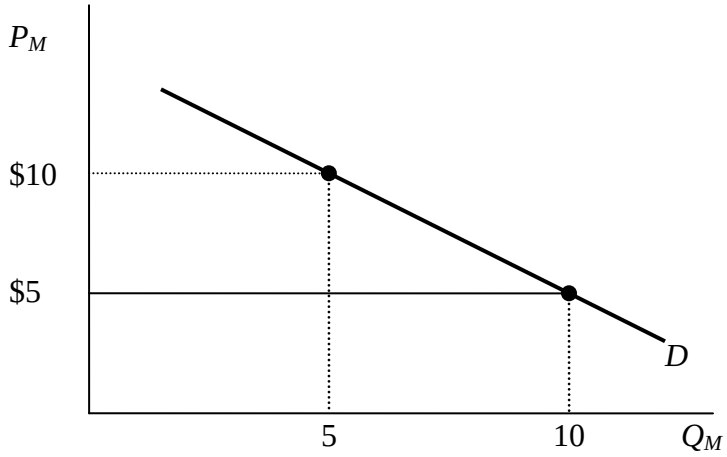


Table 2 Market Demand

Student	Quantity of Movie Trips		
	U weight	***P* = $5.00**	***P* = $10.00**
1	0.50	10	5
2	0.25	13	6
3	0.85	8	4
4	0.20	13	6
5	0.65	9	4
Total Qty Demanded		53	25

Figure 2 The Class' Market Demand for the Movies