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Proceedings of the Academy of Economics and Economic Education

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AN INTER-DISCIPLINARY COMPARISON OF PUBLISHING PERFORMANCE

Javed Ashraf, University of West Florida
jashraf@uwf.edu

ABSTRACT

This article compares publishing performance in economics with that in other departments. The primary thesis of this study is that the frequency of article publication is not uniform across principles. This article should help faculty members make more informed judgements when they are called upon to serve as peer reviewers outside their own disciplines.

INTRODUCTION

Faculty performance has long been gauged in academics by the frequency and quality of published journal articles. Annual merit reviews, promotion to higher ranks, and the granting of tenure are all tied to this criteria. Within each academic discipline, there is broad consensus on the number and quality of published articles that rank as meritorious. Judgements on the quality of journals is generally not a problem at this level, since departmental peers tend to well-informed about the stature of academic publications in their own fields.

A problem arises however, in the assessment of publication performance outside a faculty member's own field of expertise. At many schools, assessments of performance are made by committees at the departmental, college and university levels. There tends to be general agreement within departments as to what constitutes a "sufficient" number of publications to justify tenure or promotion. As indicated earlier, colleagues within a department tend to be well-informed about both the stature of academic publications in their own field as well as what constitutes a reasonable quantity of such output. This is less true at the college level. Within a College of Science for example, a Mathematics professor is likely not to be familiar with journals in Biology. This problem is compounded even further when review committees are constituted at the university level. With professors drawn from fields as diverse as Nuclear Physics and Music, the judgement of performance across different disciplines is an arduous undertaking.

This article attempts to make such judgments easier by providing a comparison of the average number of articles published within each faculty rank for four different kinds of schools over the twenty-one year period from 1969 to 1989 for a large number of disciplines. This study is unique in that such an inter-departmental comparison of publication frequency has not previously been made in any published study. Studies abound on related issues such as the relative quality of economics departments based on the number and quality of publications produced by them.[1] Similarly a number of authors have ranked journals by their quality.[2] In this article, the average number of articles published by faculty (of different ranks) at four different kinds of academic institutions is listed for

a wide variety of disciplines. These listings should provide Promotion and Tenure Committees with a means to compare publication performance across different departments.

DATA

The data used in this article have been drawn from six national surveys of college faculty in the United States (1969, 1972, 1977, 1984, 1988, and 1989). The 1969, 1984, 1988 and 1989 surveys were carried out by the Carnegie Foundation for the Advancement of Teaching. The 1972 data are from *Teaching Faculty in Academe 1972-73*, originally collected by the American Council of Education, and made available by the Inter University Consortium for Political and Social Research. The 1977 data are from *The 1977 Survey of the American Professoriate* conducted by Ladd and Lipset.

Tables 3-8 list the average number of published articles for four types of academic institutions as categorized by the Carnegie Foundation: *Research, Doctoral, Comprehensive* and *Liberal Arts*. *Junior Colleges*, a fifth classification was not used in this article since the structure of rewards at such institutions is usually not based on research output. At each of these four kinds of institutions, faculty were classified by the traditional three ranks: Professors, Associate Professors and Assistant Professors. Lecturers, Instructors, Adjunct Faculty, etc. were eliminated from the data since the irregular nature of such positions precludes them from being active participants in customary faculty roles (other than teaching). The average number of articles published for each rank within each of the four kinds of academic institutions was computed for each of the academic disciplines reported in the six data sets. There was a large variance in the number of disciplines reported in the data sets. The 1984 data reported only nine disciplines although these were very broadly defined, each encompassing several narrower disciplines. Social Sciences, for example, consisted of a large number of departments. On the other hand, the 1988 data listed as many as 114 disciplines. Thus the 1988 data with four kinds of academic institutions and three faculty ranks had 1,368 cells. The reason for several of them being blank (Table 7) is because there were just not enough observations to fill every cell. For example, none of the respondents in that year happened to be an Assistant Professor in Music History at a Research University.

INFERENCES FROM THE DATA

A clear pattern in the data is the increase in the number of publications in virtually every discipline between 1969 and 1989. This could be for a number of reasons. A likely reason is the increased pressure on faculty to publish to gain tenure or promotion. This together with the increase in faculty strength over the years has led to the emergence of a large number of new journals to satisfy the burgeoning demand for research outlets. The increased availability of easily accessible research data at low cost is another reason publication output has risen sharply. The increasingly computer-literate faculty, along with much improved computer hardware and software has also considerably reduced the time taken to produce a research paper.

Table 1 takes the publication averages from five of the data sets for Economics faculty to gauge how publishing rates have changed over time for economics instructors (the 1984 data did not list Economics separately).

Table - 1
Average Number of articles Published by Economics Faculty

	Reserach			Doctoral			Comprehensive			Liberal Arts		
	Prof	Assoc	Asst	Prof	Assoc	Asst	Prof	Assoc	Asst	Prof	Assoc	Asst
1969	10.69	5.09	1.21	12.60	5.45	1.39	12.43	4.50	2.23	11.12	3.75	1.40
1972	24.23	9.74	3.55	15.78	6.50	2.92	10.77	5.17	1.38	11.13	4.39	1.96
1977	20.28	12.33	12.00	22.00	7.00	-	27.00	7.00	-	40.25	-	-
1988	55.77	23.00	12.22	22.56	12.00	1.67	12.62	10.50	3.33	-	0.00	2.25
1989	32.91	16.43	7.13	32.40	8.73	3.83	14.75	7.88	2.00	23.56	5.50	2.70

It is evident from the data that the number of articles published by economics faculty has been rising over the twenty years between 1969 and 1988[3]. This is true of all faculty ranks. At Research Universities, the average number of published articles for Professors had risen from ten in 1989 to over 56 by 1988. For Associate Professors, there was an almost five-fold increase from 5 to 23. The highest percentage rise was for Assistant Professors (from a little over 1 to about 12). As is evident from the table, gains were quite strong at Doctoral Universities also. The reported increases in the average number of publications was not as pronounced at Comprehensive Universities, however. This might be taken as an indication of research being weighed less heavily in promotion and tenure decisions at such Universities than at their Research and Doctoral counterparts. Alternatively, it could be a result of the generally higher teaching loads at Comprehensive Universities, which leads to relatively less time for research-oriented activities.

COMPARISON OF ECONOMICS WITH OTHER DEPARTMENTS:

Table 7 (computed from 1988 data) being more comprehensive than Table 8 (which uses 1989 data) in the sense of reporting far more departments, is used to compare frequency of publishing by economics faculty, relative to instructors in other departments. Some of the results from Table 7 are presented in Table 2, where the average publishing performance of Professors in economics is compared to that of their counterparts in certain selected disciplines.

Table - 2
Comparison of Average Publishing Performance of Full Professors
in Economics with Full Professor in Other Departments

	Research		**Doctoral**		**Comprehensive**	
Economics	56		23		13	
	Some High - Publishing Departments					
Italian	163		-		16	
Physical Sciences	147		-		11	
Astronomy	128		-		36	
Library Science	121		52		3	
Pharmacy	120		104		16	

Chemistry	112		64		25	
Biology	112		55		17	
English Comp	104		46		10	
	Some Low - Publishing Departments					
Music	15		14		5	
Home Economics	10		8		18	
Accounting	10		5		5	
Drama	6		8		10	
Adult Education	3		-		1	

The basic thesis of this article is clear from Table 2: basing performance of faculty drawn from different departments simply on the number of published articles is likely to lead to misleading conclusions. The variance in publishing rates across disciplines is very high. Among Research Universities, the average number of articles reported for Professors in Economics was 56. This compares with 162 for Professors of Italian. On the other extreme, Professors in Adult Education had an average of only 3 published articles at Research Universities. Of course, it must be granted that article-publication may not be the most important way in which faculty demonstrate merit in some disciplines. Music and the Fine Arts may be some such examples. More importantly however, the process of producing a publishable research paper may be a much more drawn-out process in some disciplines than it is in others. Thus basing merit decisions on raw number of published articles alone would be inappropriate, if inter-departmental comparisons are being made.

CONCLUDING REMARKS

This article has attempted to compare publishing performance in economics with that in other departments. Within individual departments, broad consensus generally exists on the output necessary for tenure and promotion. Difficulties arise when faculty members on Promotion and Tenure Committees at the University level attempt to assess the threshold levels of articles for departments other than their own. The primary thesis of this study is that the frequency of publishing is not uniform across all disciplines. Statistics computed from six national surveys of faculty members confirm that this is indeed true. Promotion and Tenure Committees must be aware of this variability in making inter-departmental judgements. It is hoped that this article will help in not only promoting this awareness, but in helping faculty members make more informed judgements where they are called upon to serve as peer reviewers outside their own disciplines.

NOTES

[1] See for example, Graves et al. (1982), Tschirhart (1989), Laband (1986), etc.

[2] See for example Leibowitz and Palmer (1984), Malouin and Outreville (1987), Ashraf (1992), etc.

[3] For inexplicable reasons, the reported publishing rate was lower in the 1989 data than it was in 1988. Discussion of publishing performance in economics (Table 1) ignores the 1989 data.

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PRACTICAL VALUE AND STUDENT PERFORMANCE: WHY TEACHER-STUDENTS PERFORM BETTER IN INTRODUCTORY ECONOMIC EDUCATION COURSES THAN UNDERGRADUATES IN REGULAR PRINCIPLES COURSES

Larry R. Dale, Arkansas State University

ABSTRACT

Over the past twenty years data has been collected at three centers concerning student performance in both the regular economics class and in economics courses designed specifically for elementary ans secondary teachers. A cursory examination of the raw data indicated that the teacher groups were out-performing students in the regular course by a sizeable margin. This study will attempt to determine if that difference is statistically significant and what factors might have led to that effect. The factors that were considered included: (1) The number of previous courses taken in economics or economic education; (2) An evaluation of the importance of economics studied to career objectives; (3) The personal and intellectual value of the economics studies; (4) The quality of the instruction; (5) Readability of the textbook; (6) The grade they expected to receive, and (7) The grade received. Each person's performance on the TEL was compared with their ratings in these areas using regression analysis testing techniques.

It was discovered that the performance of the te4achers was higher than the regular students using a Chi-square test of means. Further, In the teacher group only the grade expected, evaluation of the importance of economics to career objectives and attitude toward the textbook factors was statistically significant predictors at the .01 level. The most important factor was the importance of economics instruction to career objectives, since that was emphasized in the teacher course. It seems that student performance is enhanced by the feeling that the knowledge they are learning will have some practical use after graduation. Teachers were also 62% more likely to believe in the importance of economics than their counterparts in the principles course.

INTRODUCTION

In my role as Director of a Center for Economic Education in Missouri, West Texas and Arkansas, I taught 43 courses for precollege inservice teachers and educators. As a Professor of economics I also taught the Principles of Economics, both Macro- and Microeconomics, and the Economics of Social Issues Course for undergraduates.

The Department used the Test of Economic Literacy (TEL) as a pre-and post test for a departmental review study from 1979 to 1998 with all undergraduates. I use the TEL as a diagnostic tool for all of my economic education courses. I observed that teachers were generating higher post test scores than the undergraduate groups although their performance on the pretest was similar.

Three conditions would indicate that the principles students should have out performed the teachers; 1) More of the undergraduates had previously taken an economics course, 33% and 31% for the undergraduates respectively compared with 14% for the teachers, 2) The undergraduates had taken those courses more recently, and 3) The graduate course for teachers covers less cognitive economics since a large portion of the time is devoted to curriculum and methodology. I decided to determine if these general observations were accurate, statistically significant, and what factors might be responsible for this situation.

STATISTICAL ANALYSIS

Next, a survey on the 1986-1989 and 1992-1996 classes explored attitudes toward seven classroom elements that might influence success in economics was conducted. The survey was administered to eight classes in Economic Education with 192 students, five classes in Principles with 133 students and four classes in Social Issues with 155 students. The pre- and post-test TEL was administered and students were also rated the following elements on a five-point scale:

The raw data suggested that the teacher group began with a pretest mean score 2.31 points below the Principles group and 3.88 points above the Issues group. This proved not to be significant at the .01 level using the chi square comparison of mean scores. The teachers did have a significant difference in mean scores at the .01 level on the post test, with raw score means averaging 6.17 higher than the Principles group and 7.22 points higher than the Issues group on the TEL a test with 42 questions. The teachers actually learned and retained more information from the course that regular college students.

1. The number of previous courses taken in economics or economic education.
2. An evaluation of the importance of economics studied to career objectives.
3. The personal and intellectual value of the economics studies.
4. The quality of the instruction.
5. Readability of the textbook.
6. The grade they expected to receive.
7. The grade received.

Each person's performance on the TEL was compared with their ratings in these areas using regression analysis testing techniques.

In the teacher group only the grade expected, evaluation of the importance of economics to career objectives and attitude toward the textbook factors was statistically significant predictors at the .01 level. The procedure showed that the grade expected factor was most influential followed by attitude related to career objectives. Teachers did better if they believed that economics was going to be important to them in their career. Teachers were also 62% more likely to believe in the importance of economics than their counterparts in the principles course.

When the test statistics of all secondary level teachers and administrators was separated from the elementary teacher group, 91% of whom taught either economics, social science, or business courses, it was discovered that elementary teachers' rating for grade expected remained statistically significant. The attitude toward the textbook was no longer statistically significant with the elementary teachers.

The elementary teachers' rating of the practicality of the course to their classroom curriculum remained significant, and in fact, proved to be the highest rated score using the procedure. The more practical the course the more interested the teacher became resulting in a higher cognitive post-test score.

In the undergraduate groups only the grade expected and the previous number of courses factors tested to be statistically significant at the .01 level. Grade expected was placed first by the procedure, followed by the previous number of courses in economics factor.

In two of the groups the grade expected from the course was statistically significant and the greatest predictor of success among those elements tested. While further study showed that all three student groups overestimated their grade, the difference between estimated and real grades was small. Therefore, it seems reasonable to assume that those expecting, and usually receiving, a higher grade would perform well on a standardized test of economic understanding.

The second greatest predictor of success on the test for the undergraduate groups was the previous number of economics courses taken. It seems reasonable that the greater the number of economics courses taken the better one would score on a general test of economics. Those who have not had macroeconomics or microeconomics would be at a disadvantage on that portion of the test over students who had taken both courses and that would be reflected in the final score. These factors were not surprising too the investigator.

Teacher's perceptions of the importance of instruction to performance was a critical factor. One reason this may have proven significant with the teachers is the stress placed in the course on the practical nature of the class. Teachers not only learned economics but were exposed to a variety of exciting learning games, activities and instruction techniques that promoted economics learning with students grades Kindergarten through twelve. This same effort was absent in the basic principles course.

The other attitudinal factors did not prove statistically significant predictors for the undergraduates mainly because students tended to rate all as good (or important) or excellent (or very important) regardless of their score on the TEL. For example, 82% of all undergraduates said that understanding economics was either important or very important to their chosen career plans. In rating the text 79% of both groups felt that it was good or excellent, with only 2% stating that is was poor. In rating the instructor 83% said the instruction was either good or excellent. The high rating for instructors was, in part, due to the number of instructors used. In the Social Issues course three different instructors were used, four instructors were used in the Principles group and four in the teacher group. Some instructors taught either two or all three types of classes.

The conclusions of the study would prove more valuable if a greater variety of instructors and institutions were involved. However, this is not a serious drawback.

The teacher group reacted differently than the undergraduates toward the textbook. We used two texts with the teachers; Economic Scenes by Wentworth and Brue served as our content text and Gaming and Simulations in Economics by Dale was the curriculum and materials text. Those who found the text practical and understandable scored better on the test than those who did not. Many teachers felt uncomfortable with the subject of economics and this reluctance translated itself into a negative attitude toward the text. Those who had difficulty with the textbook scored lower on the TEL than those who did not. This provides evidence that the selection of the textbook is critical in

the economic education course. Pre-college teachers' apprehension can be reduced by selecting a well written, lighter styled text.

For elementary teachers attitude toward the value of economics instruction at their grade level was an important predictor of achievement on the TEL as was grade received.
Attitude toward the instructor was not significant, again, because 89% of the teacher group rated the instructor as good or excellent. The value of economics to general intellectual development gleaned an 86% important or very important rating also explaining its rejection as a statistically significant predictor.

IMPLICATIONS

Undergraduate achievement in economics seems to be most closely related to the grade expected, which has some relationship to scholastic ability, and the total number of economics courses taken. Undergraduate students' attitude toward the instructor, text, general educational value, and career relevance may not be reflected in test performance with this group of students. A positive attitude toward the subject and teacher alone does not insure achievement in economic classes at the undergraduate level.

Teachers, taking the Economic Education Course, scored higher if they felt good about the textbook and about the value of instruction. The attitude toward the teacher and intellectual value of economics was very positive but did not insure results on the TEL. A positive attitude toward the practical importance of economics becomes important in working with teachers. We need to make teachers feel comfortable with economics and provide practical curriculum ideas if we are to expect them to achieve in economic education courses, particularly at the elementary level.

We also help insure that our methods will be used in the pre-college classroom by creating a positive learning atmosphere that introduce practical instructional and curriculum ideas. This is not normally part of the general Principles curriculum, but this study indicates that such an emphasis might prove of some value in retention of the material as reflected in test performance. Further study of the general principles course is indicated in order to maximize retention of important economic data.

THE ECONOMICS OF WHAT WE LEARNED IN KINDERGARTEN

John J. Bethune, University of Tennessee
jbethune@utm.edu

ABSTRACT

There are many was to "do" economics in a classroom setting, from the traditional "chalk and talk" approach to some of the newer techniques involving active learning pedagogy. One method, generally considered to be effective, is to apply economic reasoning in an analysis of contemporary issues.

This paper takes some of the basic rules of life, purportedly derived from a kindergarten education, and examines their validity from an economic perspective. This exercise could be used by classroom teachers, as a learning technique, at all levels, since most students are familiar with these basic rules. The end results might lead to a questioning of the validity (efficiency?) of a particular rule, or to a discussion of whether other social considerations might tend to outweigh economic considerations.

INFLATION RATES DEFY ECONOMIC THEORY

Andrew H. Chamberlain, Brigham Young University Hawaii
chamberlain-andrew@byuh.edu

ABSTRACT

This paper discusses recent inflation and unemployment relationships in both developing and developed economies.

INTRODUCTION

How can concurrent inflation and unemployment be so low? Economists have been trying to answer this question recently. Traditionally, economists have agreed that a stable rate of employment can be achieved at the cost of inflation, but recently in the U.S. this cost has been unusually low. As a result, the NAIRU (Non Accelerating Inflation Rate of Unemployment) has been developed to track the relationship between inflation and unemployment. However, this standard sometimes fluctuates; and as a result, economists are divided over its use as a policy indicator.

This study examines data from developed and developing economies to determine if significant relationships exist between policy variables and inflation and unemployment changes. Developing economies should experience a trade-off between inflation and unemployment characteristic of the Phillips Curve. This is due in part to the lack of diversification, lack of capital formation, and lack of efficiencies that increase productivity. As developing countries grow in these areas the negative relationship between inflation and unemployment should decrease. On the other hand, developed economies that have incorporated these productivity-enhancing conditions should experience simultaneous low inflation and unemployment. Monetary and fiscal policy are discussed first to show how inflation and unemployment levels are affected. Next, discussions of significant works are reviewed to establish known theories on the relationship of inflation and unemployment. After presenting the hypotheses and methodology, an analysis of the results follow including a discussion of implications.

MONETARY AND FISCAL POLICY

Monetary and fiscal policy are the two major economic policy choices used in both developed and developing economies. Governments use these tools to control the economy in both expansionary and contractionary periods. Their main purposes are to achieve goals such as full employment, price stability, and economic growth. Much of the 20th century has been dominated by a Keynesian counter-cyclical view.

The general idea behind monetary policy is that by controlling the amount of money in circulation, central banks can stimulate or reduce growth. Most often this is accomplished by

controlling interest rates and buying and selling securities on the open market. For example, when the Federal Reserve of the United States lowers the discount rate, banks can lend to businesses and individuals at a lower rate. This will increase the supply of loans, which will result in greater capital investment. These actions traditionally create more jobs and reduce the rate of unemployment.

Fiscal policy is a government's use of expenditures and taxes to influence spending. For example, during a contractionary period when there is a threat of rising unemployment, the government may choose to decrease taxes. As a result, individuals retain relatively more income giving way to increases in saving and spending. Consequently, increases in spending and saving will decrease unemployment causing upward pressure on wages, which may ultimately increase inflation.

The challenge government's face is to use monetary and fiscal policy tools strategically to achieve both an acceptable rate of employment and stability in the price level. Because inflation and unemployment traditionally move in opposite directions, this can be a monumentous task.

LITERATURE REVIEW

The subject of achieving low inflation combined with low joblessness has been on the minds of economists since the Great Depression. Milton Friedman, John Maynard Keynes, Paul Samuelson, Robert Solow, and A.W.H. Phillips have produced the most prominent works. Their ideas have made major contributions to economies of the free world, and recent additions to their ideas may help economies operate with more stability in the future.

In a 1958 Economica article, A.W.H. Phillips observed that there was a consistent inverse, or negative relationship between the rate of wage inflation and the rate of unemployment. He explains that when the demand for labor is high and there are few unemployed we should expect employers to bid up wage rates to attract labor from other firms in the industry. On the other hand, workers are more likely to offer their services at wages that are less than the market rate when the demand for labor is low and unemployment is high. This inverse relationship between unemployment and inflation is shown in a downward sloping, convex expression named the Phillips Curve (Phillips 283).

In 1960 Paul Samuelson and Robert Solow followed Phillips lead by discussing the unemployment/ inflation relationship in terms of trade-offs. For example, at a high rate of unemployment, the government may use policy tools to lower unemployment to some socially desired rate. To reach this socially acceptable rate of unemployment the price paid is rising inflation. Furthermore, as the rate of unemployment approaches zero, inflation costs increase. The opposite scenario is also true (Samuelson and Solow 177-94).

John Maynard Keynes believed that regardless of where unemployment is at a point in time, it would eventually return to the natural rate level. However, he believed that this self-correcting mechanism took longer than necessary to return to equilibrium. This view is reflected in his famous line, "In the long run, we are all dead" (Friedman 80). In order to speed the rate at which the economy returns to full-employment, he encouraged government intervention in the form of counter-cyclical expenditures and tax changes (Keynes 245-71). As a result, Keynes and his followers are likely to favor active government policy.

On the other hand, Milton Friedman believes government spending and tax changes provide only temporary results. He also believes wages are flexible. Wages and the price level adjust and

return to a natural rate fairly quickly (Friedman 2-4). Therefore, Friedman and his followers see much less need for active government policy when unemployment is high.

In addition, Friedman identified a severe flaw in the original unemployment-inflation relationship. He argued that the Phillips Curve did not account for workers expectations of inflation. This is significant because workers only pay attention to real wages (8-9). Friedman modified the original curve into an Expectations Augmented Phillips Curve. This curve is more realistic because as expected inflation increases, nominal wages rise to prevent real wages from decreasing, and the Phillips Curve shifts upward. The resulting rise in production costs will then shift aggregate supply leftward. Consequently, unemployment will settle at a more realistic natural rate with respect to inflation.

Proponents of NAIRU, or traditional inflation theorists, believe that this tool is valuable despite the current uncertainty surrounding its precise level and direction of change. In fact, Joseph Stiglitz found that holding the unemployment rate one percentage point below the NAIRU for one year would cause a 0.6 of a percentage point increase in inflation. A variation of this size is enough to be noticed. Furthermore, Stiglitz's analysis showed that unemployment alone can explain at least 20% of the variation in inflation (Stiglitz 5). However, this is only effective if the aim is for low unemployment.

Evidence from studies like Stiglitz's have caused some of today's economists to refer to the term NAIRU as a specific number. Long before economists were using the NAIRU acronym, Milton Friedman was using "the natural rate of unemployment" to explain the same phenomenon. In September of 1996 Friedman clarified the meaning of the NAIRU. He explained that the natural rate is not a fixed number, as some of today's economists describe it, but it does have a numerical counterpart. However, this number is difficult to estimate and depends on conditions of time and place (Friedman A22). He defines the natural rate as the "level of unemployment which has the property that it is consistent with equilibrium in the structure of real wage rates" (A22). In other words, it is the rate of unemployment consistent with a constant inflation rate. He further explains that the reason there is a NAIRU is because at this level, real wages tend to rise at a rate that can be maintained so long as factors like capital formation and technological improvements continue in a long run trend (Friedman 8).

Friedman explains that the performance of the U.S. economy has been changing. The U.S. can handle higher growth without increasing inflation. However, he suggests that whether growth leads to more or less inflation depends on what causes it. If increased growth comes from easy monetary policy then it will tend to lead to more inflation. But if stable monetary policy, which allows for gradual increases in the supply of money, is used higher growth will not be inflationary. Greater capital investment, technological improvement, deregulation, increased flexibility of prices, increased competition, and other real changes would cause such growth. This type of growth can lead to lower inflation or even deflation. This means that the same amount of purchasing power is competing for more goods, which tends to drive prices down (Friedman A22).

HYPOTHESES/RESEARCH QUESTIONS

These economists have laid the foundation for modern economics. Next to A.W.H. Phillips, Milton Friedman is perhaps the most noted on the relationship between inflation and unemployment.

The factors surrounding his natural rate theory, which is referred to as the NAIRU today, will be reviewed here. It is expected that this research will show which policy and non-policy factors have been the cause of concurrent low inflation and unemployment. The variables should show which policies have been the most effective in reducing inflation or holding it steady.

According to 20th century theory, as governments exercise their control over monetary and fiscal policy, changes in the jobless rate are expected. Applying the traditional, Keynesian countercyclical theory, it can be concluded that easy monetary policy will cause unemployment to fall and inflation to rise. Conversely, tight monetary policy will induce downward pressure on wages causing lower inflation giving way to rises in unemployment.

This traditional relationship is expected to be true in developing economies. For instance, changes in inflation will be associated with opposite changes in unemployment. This is due in part to the lack of diversification, lack of efficiencies that increase productivity, and lack of capital formation. As developing countries adopt these factors the trade-off between inflation and unemployment will decrease. In contrast, developed economies will behave in a manner that defies the traditional theory. For example, changes in unemployment will not necessarily be associated with changes in inflation. In addition, as developed economies' stable policy leads to growth it will be the result of deregulation and greater efficiencies such as technological improvements. These should lead to lower inflation or deflation as has been recently observed in the United States.

HYPOTHESES

Performance of developing economies will be consistent with the traditional theory.

Inflation and unemployment will be negatively correlated.

Use of fiscal policy tools will have significant effects on the relationship between inflation and unemployment.

In contrast, developed economies will defy the traditional theory.

Inflation and unemployment will not be related.

Use of fiscal policy tools will have no significant effects on inflation and unemployment.

Concurrent low inflation and unemployment are caused by deregulation, technological development, and efficiencies, which increase productivity, rather than by measures such as monetary and fiscal policy. These productivity measures are more prevalent in developed economies.

METHODOLOGY AND ANALYSIS

The numeric data used in this analysis were taken from 10 annual editions of the CIA World Factbook. The 10 year time series data from 10 countries were selected to observe and a regression analysis was applied. Annual figures from 1987 to 1996 were recorded for gross domestic product, government expenditures, government revenues, inflation rates, unemployment rates, and growth rates. All monetary figures were adjusted to per capita form and as a percentage of GDP. Furthermore, all monetary figures are represented in current United States dollars. This is sufficient because we are not trying to predict growth rates, but rather observe relationships. Growth rates are

discussed in real terms to account for inflation, and inflation rates are based on consumer prices. All numeric data except for two dummy variables representing developed and developing countries as groups were calculated into rates of change before performing the regressions. This has provided for uniform comparability between the selected economies.

Economic development and structure vary significantly throughout the world. Sample countries were chosen based on per capita GDP. There was no effort to provide an even representation of the world's economies. The United States, Canada, South Korea, Fiji, Thailand, Malaysia, New Zealand, Japan, the Dominican Republic, and Egypt were selected for observation. In the regressions, it was necessary to group economies as developed or developing in order to provide a substantial data set. The World Bank classes economies as developing or developed based on per capita GDP. Their criterion is used as the standard. Fiji, Thailand, Malaysia, the Dominican Republic, and Egypt met the criteria as low and lower-middle income countries. They have an average population of 31 million and per-capita GDP of $6,100. These five countries are referred to as "developing" economies. The US, South Korea, New Zealand, Canada, and Japan, have an average population of 240 million and per capita GDP of $22,000. These countries are referred to as "developed" economies. Discussion of significant coefficients is based on a standard .05 confidence interval.

RESULTS

The regression results are presented in Tables 1-5. Explanations and implications follow in the Discussion section.

TABLE 1
Coefficients: Regression 1/Hypothesis 1 DEVELOPING

Model	Coefficients-B	Std. Error	t	Significance
(constant)	5.383E-02	1.838	.029	.977
Δ_Unemployment	-1.110	.405	-2.743	*.011
ΔG	.199	.146	1.357	.187
ΔTaxes	-3.813E-02	.136	-.281	.781
Δper capita GDP	.840	2.606	.322	.750

Dependent Variable: Δ_Inflation *≤ .05 Level of significance

To test the first hypothesis, developing economies were selected. In this regression, the change in inflation was used as the dependent variable. The independent variables were the change in unemployment, government spending, taxes, and per capita GDP. This regression returned an R-square value of .279. Three of the four coefficients were greater than the .05 standard. Based on these insignificant results we can conclude that fiscal policy tools do not impact inflation in the developing economies. However, this regression indicates a significant negative relationship (to .01) between changes in inflation and changes in unemployment in developing economies. This supports the traditional negative relationship proposed in the first hypothesis.

TABLE 2
Coefficients: Regression 2/ Hypothesis 1, DEVELOPING

Model	Coefficients-B	Std. Error	t	Significance
(constant)	1.115	.777	1.436	.164
Δ Inflation	-.215	.078	-2.743	*.011
Δ G	.132	.061	2.164	*.041
ΔTaxes	-8.23E-02	.057	-1.441	.162
Δ per capita GDP	-.730	1.140	-.640	.528

Dependent Variable: Δ_Unemployment *≤ .05 Level of significance

To further test the first hypothesis, the dependent variable, change inflation, was exchanged with the independent variable, change in unemployment. The regression returned an R-square value of .349. As observed in the first regression, the same negative significance between inflation and unemployment occurred. Changes in government spending had a significant positive relationship (to .04) with changes in the unemployment rate. The direction of this relationship is inconsistent with the first hypothesis and with theory.

TABLE 3
Coefficients: Regression 3/ Hypothesis 2, DEVELOPED

Model	Coefficients-B	Std. Error	t	Significance
(constant)	-5.701E-02	.379	-.151	.881
Δ Unemployment	.136	.164	.828	.415
Δ G	9.156E-04	.001	.640	.527
ΔTaxes	-7.850E-03	.012	-.680	.502
Δ per capita GDP	.657	1.911	.344	.733

Dependent Variable: Δ Inflation *≤ .05Level of significance

TABLE 4
Coefficients: Regression 4/ Hypothesis 2, DEVELOPED

Model	Coefficients-B	Std. Error	t	Significance
(constant)	.248	.421	.591	.559
Δ Inflation	.170	.205	.828	.415
Δ G	-9.824E-04	.002	-.614	.544
ΔTaxes	1.448E-03	.013	.111	.912
Δ_per capita GDP	-1.622	2.118	-.766	.450

Dependent Variable: Δ Unemployment *≤ .05 Level of significance

To test the validity of the second hypothesis, developed economies were grouped in a third regression. The change in inflation was selected as the dependent variable. The independent variables were the change in unemployment, government spending, taxes, and per-capita GDP. The insignificance of the coefficients and R-square of .042 indicate that developed economies defy the traditional, Keynesian theory. Uses of fiscal policy tools have no significant effects on changes in inflation. Additionally, based on the independent variable, change in?unemployment, the statistics show that changes in inflation and unemployment are not related. To further test these figures the dependent variable, change in inflation, was exchanged with the independent variable, change in

unemployment. Likewise, the same insignificant correlations returned, which supports the second hypothesis.

TABLE 5
Coefficients: Regression 5/ Hypothesis 3

Model	Coefficients-B	Std. Error	t	Significance
(constant)	4.210	1.103	3.818	.000
Δ G	3.274	5.539	.591	.556
Δ Taxes	-4.649	4.949	-.939	.350
Developed & developing	3.239	1.474	2.197	*.031

Dependent Variable: Absolute value of the difference between Δ inflation rate and Δ unemployment rate.

*≤ .05 Level of significance

To test the final hypothesis, both developed and developing economies were grouped in one regression. The dependent variable was the absolute value of the difference between changes in the inflation rate and changes in the unemployment rate. This was suitable because the amount of the difference needed to be determined, not the direction of the difference. The independent variables were the change in government spending, taxes, and a dummy variable coding countries as developed (0) or developing (1). The regression returned a significant association (to .03) between developing countries and larger differences between changes in inflation and changes in unemployment. Moreover, the use of fiscal policy tools is not associated with differences between changes in the inflation rate and changes in the unemployment rate.

DISCUSSION

In variance to the first hypothesis, the use of government spending in developing countries had a significant positive relationship with changes in unemployment. To explain these findings we could assume that most individuals are aware of government spending and that the economy is highly influenced by their expectations. If this is true, increases in government spending in developing economies may cause individuals and businesses to anticipate higher taxes. Anticipation of higher taxes generally causes a decrease in capital investment, which ultimately results in positive unemployment growth. Another explanation for these results may be that when businesses and individuals observe increases in government spending they lose confidence in the economy. A loss of confidence in the economy will also reduce capital investment, which will ultimately increase unemployment. A third explanation is that increases in government spending in developing economies may be an incentive for the self-employed to enter the labor force. Yet, the self-employed enter the labor force as unemployed. Therefore, increases in government spending may cause increases in the unemployment rate. These explanations, however, are not entirely satisfactory and can only be offered as counter-intuitives. Additional research with a larger data set may give further insight to these results.

In light of these findings, developing economies should not mimic the policy decisions of developed economies. If a reduction in government spending in the United States is accompanied by lower unemployment, a decrease in government spending in Fiji will not necessarily have the same outcome. It is important for developing economies to look closely at what causes specific efficiencies

in developed economies and analyze what will induce a positive change in their economy before implementing policy decisions.

In harmony with the second hypothesis, the use of fiscal policy tools in developed economies had no significant relationship to changes in inflation rates and unemployment rates. This can be explained in part by the theory of crowding out. When governments in developed economies offer bonds to generate cash flows, the price of bonds decrease. The decrease in price leads to an increase in the interest rate. A high rate of interest discourages individuals from investing in government bonds. Individual investment is, therefore, crowded out by government investment, which ultimately leads to the opposite desired outcome.

Perhaps the most interesting of all the results was that of the third hypothesis. These results show that the behavior of inflation and unemployment varies from developed to developing economies. The traditional trade off between inflation and unemployment in developing economies still exists. So, developing economies can still expect factors such as inflation and unemployment to move in opposite directions even though these factors may behave differently in more developed economies. On the other hand, the relationship between inflation and unemployment in developed economies defies traditional theory. Developed economies are more likely to have concurrent problems or concurrent stability in areas of the economy that would traditionally oppose each another.

These findings are significant to the extent that policy makers in both developed and developing economies look to other economies or to traditional theory as a model for their own. Policy makers must first look closely at their own economy and not assume that what is good for others will be good for them.

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A VIDEO ON DEMAND PROJECT EVALUATION: IMPLICATIONS FOR DEVELOPING AN ENTREPRENEURIAL MODEL FOR ECONOMIC INSTRUCTION

Fred Carr, University of Akron
fmc1@uakron.edu
Isadore Newman, University of Akron
inewman@uakron.edu

ABSTRACT

Video on demand (VOD) is a technological method that has great growth potential in assisting teachers in instructing students. Public Television WNEO/WEAO, 45/49 in Northeast Ohio developed video clips in Math and Science and matched these video clips with the state of Ohio student proficiency objectives for grades 4-9. The project demonstrated that significant concept attainment was possible through the use of VOD. The 45/49 project found that there were various start up difficulties. These difficulties related to teacher and school system inexperience in computer online setups. There were also difficulties related to the initial matching of video clips to subject objectives and the overall length and quality of the clips used. None of these difficulties however prevented the use of VOD as an effective teaching method.

Economic educators, entrepreneurs and the television media have the opportunity to develop innovative materials, which can duplicate the success of this study. Using the experiences of the 45/49 VOD model, various creative and effective VOD programs could be implemented. Economic educators could form beneficial partnerships with entrepreneurs and media organizations to provide cutting edge computerized instructions to meets increasing demands related to student proficiency examinations, many of which contain economic and entrepreneurial concepts.

INTRODUCTION

Video on demand is a growing segment of teacher assistant technological advances. These advances are well documented as reported by Wyman (1997) and Van Dusen (1995), Cawkell (1997) and Hargadon (1995). Teachers with varying technological capabilities are being brought into the world of computer assisted learning. Economic educators, entrepreneurs, and the public and private television sectors have tremendous potential for using vast video files to enhance this process. Northeastern Ohio Public Television station channel 45/49 has recognized this potential and has started an innovative project to develop a partnership with schools to assist teachers, within it's viewing area, to furthering student concept attainment in science and math through the 45/49 web site. The initial success of this educational effort holds potential applications for the field of economics and economic education. The Video On Demand Project (VOD) also provides a

projection of future partnerships, which can be developed between schools, television studios, and those organizations or individuals with and entrepreneurial proclivity towards innovation in instructional methodology.

The future potential for VOD types of project is discussed by Vedro (1995) and Galbreath (1996), who both illustrate the infancy of these types of projects and the great potential teacher assistance partnerships hold for both education and public television. Channel 45/49 is developing a good model from which field of economics and economic education could develop, refine, and enhance instruction for students K-16 in furthering economic concept attainment.

OVERVIEW

Public Television Station WNEO/WEAO, Channels 45/49 in Northeast Ohio has developed an ongoing project, which entails classroom teacher use of, selected video clips in mathematics and science. The project director was Mr. Steve Mitchell, Director of Educational Services for Channels 45/49. Teachers volunteered, from selected schools, for the project. The volunteer participants were asked to view and select from videotapes taken from Channel 45/49 video files concerning topics in mathematics and science. The teachers were then asked to formulate math and science instructional objectives, which would match the content of the videotapes with the State of Ohio Proficiency Competencies for their grade level. The development of the instructional objectives necessitated repeated reviews of the videotapes. Channel 45/49 reduced the selected videotapes to no more than three-minute computerized video clips. After the teachers interpreted the instructional objective(s) within the clips, they composed six questions, which related to the same instructional objective(s). The questions were randomly selected to make up a three-question pretest and a three-question posttest. The overall goal was to create computerized video clips that the teachers could show in their classrooms via the internet, provided by the 45/49 studio web site, that reflected the math and science subject area and grade level at which the teachers realistically instruct.

The Video on Demand (VOD) Project involved twelve teachers from seven school locations located within the Channel 45/49 viewing area in Northeast Ohio. The schools were selected to represent urban, rural, and suburban neighborhoods. The school levels were two high schools, one middle school, and four elementary schools. The small scale of the 45/49 project was necessary due to the expense and lack of operational maintenance for a beginning project. The research done by Tristram (1995) also found that small video systems are currently the most successful. The teacher participants began evaluation formulation and familiarization processes in February 1997 and concluded with the data collection through December 1997. Participants were to provide qualitative and quantitative data. Teacher participants were asked to provide qualitative data through analyzing project activities at participant determined appropriate occurrence intervals beginning with the formative evaluation process. In addition, teacher participants were given data pre/post test data sheets to provide evaluators with quantitative data. Qualitative and quantitative data was collected from six of the seven schools: one high school, one middle school and four elementary schools. Ten of the thirteen teacher participants provided pre-test/post-test data on 518 students and post-post-test data on 306 students from six teachers. Probable reasons for the differences in total posttest scores recorded and post-posttest scores recorded are discussed in the study limitations section.

EVALUATION PLAN

The evaluation plan was to derive qualitative and quantitative data from all project teacher participants. The effectiveness of the video clips was analyzed from test and a teacher participant journal perspective. Elementary and middle school student knowledge growth was assessed using a pretest-posttest control group design (Cambell & Stanley 1966). The research design was analyzed using the analysis of covariance, co-varying teacher differences (McNeil, Newman & Kelly 1996) (Newman & Benz 1995). High school and middle school students were given a pretest and posttest of their knowledge of the video clip math and science content. Within group and across group evaluations were analyzed using bi-directional tests of significance at alpha level .05. To access each segment, students were required to answer questions about the concept included in the video. After the video segment was viewed, the student was required to answer questions to test whether the concept had been learned. Outside math and science consultants were given questionnaires and asked for qualitative judgments as to the objective matching, effectiveness and quality, of the developed video clips.

Participant teachers were asked to keep a log of what worked and what did not, including statements about their success in using the video clips, computers, and the Internet. A qualitative analysis was then done on the activity logs.

STUDY LIMITATIONS

While the overall results of the study were encouraging, project analysis was hampered by several factors. Schools and teacher participants could not be randomly selected which is not uncommon in educational research data with a start up project that must develop its content. Schools are reluctant to enter a blind pool and therefore administrative support must be solicited for participation resulting in the selection of a limited number of schools. Attempts to gather data from schools with rural, urban and suburban locations was made but the pooled data did not account for an effect breakout by location for this study.

Differences in teacher affect were analyzed in the pre/post text data. However a number of teachers, 3 out of 12 on the pre/post test data and 6 out of 12 on the post/post-test data, did not turn in results. No reasons for teacher incomplete records were gathered. However, from the qualitative activity logs, it can reasonably be assumed that several factors caused this phenomenon:

Trouble with computer services
Inexperience with computer applications
Teacher load and conflicting schedules

It is highly probable that the VOD project will overcome these limitations as the video clips become more refined, teacher participants become more familiar with PC operations and the Internet and the overall project design develops into a more formal and deliverable teaching tool. The data did show, even with these complications, significant results when data results were compared across all test results.

A final limitation was the lack of data collected on student perceptions about the clips and the learning process. The second phase of the VOD project will collect student input on concept

attainment using the Internet. The limitations of this study, however, should not detract from the overall completion of the VOD project and the positive learning experiences attained by all the participants.

VIDEO CLIP OBJECTIVES

Two outside experts in science and five outside experts in math were asked to rate the video clips and the instructional objectives. The objectives were rated as to how well they related to the selected video clips in their subject areas. The objective clip question form is presented in Exhibit 1.

Exhibit 1

FM01 Objective
125.0 Clip number

How good a match is this clip to the objective?

5	4	3	2	1
Very good	Good	Fair	Poor	Very Poor

How effective do you think this clip is in teaching the objective?

5	4	3	2	1
Very good	Good	Fair	Poor	Very Poor

In general, the quality of this clip is:

5	4	3	2	1
Very good	Good	Fair	Poor	Very Poor

Comments on this clip.

The form allowed the experts to judge the objectives in three ways. The criteria asked was:
Did the objective match the clip?
Was the clip effective in teaching the objective
The overall quality of the clip in teaching the objective

A Likert style scale of 1 to 5 representing very poor to very good was used to quantify the results. For individual ranking of each math video clip objective, see Appendix A. For individual ranking of each science video clip objective, see Appendix B. Summative data in Exhibit 2 and Exhibit 3 show the mean and standard deviation for the math and science objectives respectively.

Exhibit 2

Correlation Analysis

4 'VAR' Variables: MATH MATCH EFFECTIVE QUALITY

Simple Statistics

Variable	Mean	Std Dev	Sum	Minimum	Maximum
MATH	1	0	145	1	1
MATCH	3.0896	1.1136	414	1	5
EFECTIVE	3.0896	1.1136	414	1	5
QUALITY	3.1194	1.1375	418	1	5

Exhibit 3

Correlation Analysis

4 'VAR' Variables SCIENCE MATCH EFFECTIVE QUALITY

Simple Statistics

Variable	Mean	Std Dev	Sum	Minimum	Maximum
SCIENCE	1	0	52	1	1
MATCH	3.0652	1.3233	141	1	5
EFECTIVE	3.0652	1.3233	141	1	5
QUALITY	3.2826	1.2049	151	1	5

The math evaluation results showed that out of 29 clips, approximately 50 percent were rated above average in matching, effectiveness, and overall quality and 50 percent were rated below average. The science evaluation results showed that out of 26 clips, approximately 50 percent were rated above average in matching, effectiveness, and overall quality and 50 percent were rated below average. The math and science evaluations showed the objective/clip match to be in the mid-range (fair, 3.08 for math and fair, 3.06 for science). Similar results were found for effectiveness (3.09 for math and 3.06 for science) and quality (3.1 for math and 3.3 for science). Teachers found it difficult in making the objectives fit the clips. Comments such as “It was very difficult to pin objectives on some of the clips” were expressed throughout the educators' logs in variety of similar expressions. The clips, however, were shown to be effective in producing significant student gains supported by the pre/post test results, which follow. It could reasonably be expected that clips could be made, with future revisions, to rate in the upper ranges in future VOD phases.

QUALITATIVE RESULTS

Project participants entered the project with expressed eagerness and relatively high expectations. There was evidence that the teachers had a wide range of computer experience, which was expressed from very little to widely experienced. Anxiety over being able to accomplish the project requirements was also evident. Participants expressed appreciation for 45/49 support through assignment of staff personnel to the individual schools.

As the project progressed, the teacher participants' expectation levels of what the video clips could accomplish lessened. The clips were seen as being too short, not good enough in content or overall having little effect. Some comments made were of the nature of " clips were too short, not enough (objective) explanation." and "some videos were good, some were cut off too much". Some teacher disillusionment with the project continued but results were confounded by outside variables. Teachers with little computer experience and very little support from their schools experienced a higher frustration level than teachers with greater computer experience and/or support from a colleague with a higher level of computer experience. Disillusionment was also impacted by high teacher expectations that their schools would be on-line with a high level of computer service and functioning in correlation with their video clip instruction. Comments were made throughout the teacher activity logs that were typically reflected by this teachers comment "September - PC's not delivered and Internet not running." When school networks did not come on line in time or failed to perform as anticipated, teacher project participants experienced frustration, which was transferred to difficulties with the project. Comments such as "…(we) have met approximately six times after school to access the clips and to decide which ones we would like to use in our classrooms first. Each time we have done so there has been a problem. It is getting very frustrating. The computers crash, the server is down, or we just cannot simply get to the clips." There were also insightful observations about the group and project reflected by this statement, "I felt very proud today. I think people, in general, have a negative tendency which frustrates me. This project is workable. We are the frontiers for VOD." Overall, concerns were gradually lessened as computer systems came on line and the teachers worked with the materials.

Participants experienced misconceptions, which became evident as the project progressed. The project was thought to have required much more work than was originally anticipated. In addition, participants expressed concern over how much time the project consumed. Comments were made such as "The other frustration I have is that I do not have enough time. It has been a challenge to incorporate the clips into my teaching". Participants were not prepared for, or generally misperceived, the amount of time and work involved.

Other participant misconceptions also occurred in project student outcomes. Initially, the teacher participants had very high student outcome expectations in which a "home run" for subject level improvement was the anticipated norm. The project design did not allow for the immediate "home run" effect. Initial use any material has inherent difficulty of use and combined with beginning use of PC's and the Internet through first year school system set-ups, teachers did not receive immediate positive feedback in many cases. There were, however, many "little hits" which the following quantitative data will support which were not perceived by the teachers. Had the teachers been aware of the "little hits" during the course of the project, the evaluation of the teachers' subjective perceptions could be expected to be higher than reported. This emphasizes the advantage of doing

both qualitative and quantitative data, in that, the quantitative analysis was capable of detecting this "small hit" difference while the quantitative analysis was not.

PROJECT QUANTITATIVE OUTCOME

Subject area pretest/posttest was collected. Pre/post test comparisons were made on subject areas using project developed clips and subject areas not using project-developed clips. Teachers randomly selected certain subject objectives that would be taught by video clips and subject objectives that would be taught without using video clips. The quantitative data was run through two measures of analysis. A Pearson Correlation Coefficient analysis and an Analysis of Variance controlling for teacher difference were run. In the Pearson Correlation (Point-Biserial Correlation), there was a significant difference between the "clip" and "no clip" usage such that the students using project developed clips gained significantly more in concept attainment than when students did not use the project developed clips. Probability was found to be at the 0.0001 level with an n=518 (see Exhibit 4). The results of this project support the study of Branch and Durran (1996) which found VOD system to be a benefit to students, which use it.

Exhibit 4

Pearson Correlation Coefficients / Prob > IRI under H0 : Rho = 0
(Point-Biserial Correlation which is a t-test)
Number of Observations

	CLIP	NOCLIP	M	F	PRE
GAIN	0.26418	-0.26418	-0.0444	0.0444	-0.6319
	0.0001	0.0001	0.3132	0.3132	0.0001
	518	518	518	518	518

Post-posttest data run on 306 student subjects showed no significant gain between the posttest and the post-posttest scores. The data demonstrated that the knowledge obtained between the pretest and the posttest period, that gain was not significantly changed ("maintained") since there were found no significant difference between the posttest and the post-posttest scores (p=.49). (See Exhibit 5).

Exhibit 5

Model: MODEL2
Dependent Variable: GAIN2

Analysis of Variance

Source	DF	Sum Of Squares	Mean square	F Value	Prob>F

Model	3	0.2408	0.08027	0.807	0.4907
Error	303	30.13403	0.09945		
C Total	306	30.37483			
	Root MSE	0.31536	R-square	0.0079	
	Dep Mean	-0.00449	Adj R-sq	-0.0019	
	C.V.	-7030.91344			

There was a concern that the significant difference produced by the Pearson Correlation analysis may in part, have been due to a difference within the participating teacher group. An Analysis of Covariance was run which held any differences related to the instructing teachers constant. Again, the probability value was significant at the 0.0001 level (see Exhibit 6).

Exhibit 6

Model: MODEL1
Dependent Variable: GAIN

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	10.88648	1.81441	21.667	0.0001
Error	511	42.79089	0.08374		
C Total	517	53.67737			
	Root MSE	0.28938	R-Square	0.2028	
	Dep Mean	0.11834	Adj R-sq	0.1935	
	C.V.	244.53133			

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for HO	
Paramater=0	Prob > ITI				
INTERCEPT	1	-0.118119	0.03553292	-3.324	0.001
CLIP	1	0.175159	0.02552354	6.863	0.0001
TEACH1	1	0.145043	0.0521236	2.783	0.0056
TEACH2	1	0.350123	0.06729452	5.203	0.0001
TEACH3	1	0.024151	0.04968067	0.486	0.6271
TEACH4	1	0.422931	0.05347739	7.909	0.0001
TEACH5	1	0.153231	0.03691427	4.151	0.0001

As shown in the quantitative analytical charts above and as noted earlier, the quantitative data did not support the participant teacher subjective data, which expressed concern over subject clip usage effectiveness. The clips were shown effective in student subject concept attainment.

IMPLICATIONS FOR ECONOMICS AND ECONOMIC EDUCATION

The promise of this creative educational effort should not go unnoticed by private sector entrepreneurs, economists and/or economic educators who believe that innovative technological instructional methods hold forth the potential for effective content and concept attainment by students. Developed video clips, proven to be effective, could be expected to be in high demand in the classrooms of the future.

Educators and creative entrepreneurs in the field of student instruction, who follow the study format, can expect to encounter many of the same difficulties that were encountered by the 45/49 initial project. There will be differences in teachers' technological skill levels. Video's appropriate to the field of economics will have to be located and analyzed, however, any television station with news that pertains to the economy could be a potential computerized instructional video clip.

One major advantage to this type of project is the capability to use local economic events, which have been, recorded by local news shows and public television programs. These local economic news events could be used for realistic applications of economic concepts with which area students readily identify. An example may be the bankruptcy or successful growth of a local business, with which the local students are familiar, to illustrate the concepts of supply and demand through a computerized video clip. Such clips could also be updated and kept current to make instruction more meaningful and relevant.

One of the most important aspects of this type of effort is that the video clips can be used to develop a partnership between business, education (K-16), and the media. The idea of a profitable entrepreneurial educational VOD development holds promise, especially if the results of the 45/49 VOD project prove to be effective with further refinement and testing. Certainly, economic education would benefit from VOD development if the right financial, media and educational partnerships can be established

SUMMARY

The Video on Demand project showed that video clips produced significant quantitative gains in subjects who were exposed to them. This project also demonstrates the value of taking a qualitative and a quantitative analytical approach simultaneously. Our example clearly demonstrates a meaningful amount of information would have been lost in taking either methodology alone.

Several outside variables which impacted negatively on teacher project perceptions could be expected to disappear in future project efforts as school systems become effective in providing consistent computer network services and teacher computer usage comfort levels increase. In addition, teacher misconceptions about project time consumption and work involved can be expected to decrease greatly as subject clips are refined and support activities are further developed.

The 45/49 VOD project has demonstrated success in its initial development and promises an even greater effective teaching potential with future product refinement. Due to the results of this

study, it would be reasonable to expect that an expanded effort of this nature can positively work on a nationwide scope.

Appendix 1

Obj	Clip	Match	Effective	Quality
FM01	84	4,4,2,1,1	3,4,2,1,1	3,2,3,1,1
FM01	125	3,3,3,2	3,3,3,2	3,3,3,2
FM02	129	3,1,4,1,1	3,1,3,1,1	3,1,4,1,1
FM03	106	1,3,4,4,2	1,3,4,4,3	3,4,4,3,1
FM04	132	1,4,4,1	1,4,4,1	1,4,3,1
FM08	55	3,2,4,4,3	3,2,4,4,3	2,5,4,3,3
FM10	118	4,3,4,3,1	1,4,3,4,3	4,4,4,3,1
FM10	119	5,4,4,3,1	5,4,4,3,1	5,5,5,3,1
FM18	401B	3,2,3,3,2	2,3,2,3,3	3,2,2,3,2
FM20	30	4,4,4,4,3	4,4,4,4,3	4,4,4,3,4
FM20	193	3,4,4,5,4	3,4,4,5,4	3,4,5,5,4
FM21	133	3,2,4,4,2	3,2,3,4,2	2,4,4,2,3
FM22	56	2,1,2	2,1,2	2,1,4
FM23	58	4,1,1	4,1,1	4,1,1
FM24	113	2,3	2,3	2,3
FM24	115	3,5,3,2	3,4,3,2	3,3,3,2
FM25	402B	2,1,4,4,2	2,1,4,4,2	1,4,4,2,2
NM01	152	3,4,4,4,1	4,3,3,1,2	4,3,4,1,2
NM01	154	1,4,4,5,2	2,4,4,5,2	2,4,4,4,2
NM05	199	4,3,4,3,4	3,3,3,3,4	3,3,3,3,4
NM05	200	4,4,5,4	4,4,4,4	4,5,5,4
NM09	166	3,3,4,4,3	3,3,4,4,3	3,4,4,3,3
NM09	167	3,3,3,3,2	3,3,3,3,2	3,4,3,2,3
NM11	196	4,3,4,5,4	4,3,5,5,4	3,5,5,4,4
NM12	205.1	4,4,4,2	4,4,4,2	4,4,4,2
NM13	403B	3,4,4,4,4	3,4,4,4,4	3,4,4,4,4
NM15	189	4,4,3,3,4	4,4,4,4,3	4,4,4,3,4
NM16	185	2,4,4,3,3	2,4,3,4,3	4,4,4,3,2
NM16	186	2,4,4,4,3	2,4,4,4,3	4,4,4,3,2

Note: For match, effective and quality categories, the number under each category represents each judge's ratings of the clips

Appendix 2

Obj	Clip	Match	Effective	Quality
FS01	343			
FS02	209	2,2	2,2	3,2
FS03	369	3,1	3,1	2,1
FS05	210B	5,3	5,3	5,3
FS05	210	5,2	5,2	5,2
FS06	289	3,4	3,4	3,4,4
FS07	202.2	4,1	4,1	4,3
FS08	322	2,3	2,3	2,3
FS11	371	4,2	4,1	4,2
FS12	353	5,4	5,4	5,4
FS12	354	5,1	5,1	5,1
FS13	334	4,2	4,2	4,2
FS14	214	5,4	5,4	5,4
FS15	314	5,3	5,3	5,3
FS16	344	4,1	4,1	4,1
FS17	234	4,4	4,4	4,4
NS05	310	4,1	4,1	4,1
NS07	237	3,1	3,1	3,3
NS08	225B	5,3	5,3	5,3
NS10	223	4,2	4,2	4,4
NS11	217	2	1	2
NS12	400B	4,2	4,1	4,2
NS15	387	4,2	4,1	4,2
NS16	388			
NS18	213	4,3	4,2	4,4

Note: For match, effective and quality categories, the number under each category represents each judge's ratings of the clips

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DISCOUNTING PRICE RIGIDITIES

Robert Stretcher, Hampton University
stre@visi.net

ABSTRACT

This paper re-examines the menu cost version of price rigidity promoted by Mankiw and other New Keynesian economists. The inconsistency of the micro model's assumption of single period profit from price changes is examined in light of an assumption on the macro level of a positive opportunity cost of capital. In essence, the macro model assumes multi-period profit concerns through discounting of future profits. When the positive opportunity cost of capital is applied to the micro model of price change incentives, the price rigidity argument breaks down as an extreme case of the more general model. An equational reconciliation of this problem is presented. Implications for the price rigidity argument are included in the conclusion.

INTRODUCTION

A major goal of the New Keynesian research agenda is to develop microeconomic foundations for price rigidities that form the basis for transmission of monetary events to real variability in the macroeconomy. The assumptions of monopolistically competitive firm structures and the presence of menu costs have been utilized to justify large business cycle results from changes in individual firms' demand. This is because changes in profit are small (second order) and are often offset by a similarly small menu cost which results in a threshold effect and thus, price rigidity (Mankiw, 1991).

Most of the applications of this scenario involve the recognition of the possibility of a transfer of price rigidity to the macroeconomy if monopolistically competitive firm structures characterize a significant portion of the economy (i.e., are 'representative'). A characteristic of macro models to which this concept is applied, however, is often ignored when micro level price rigidity is asserted. The characteristic is a positive opportunity cost of capital that implies that firms will discount future incremental cashflows, including expected changes in profit from the price change decision. In other words, a firm, rather than making its price change decision based on a comparison between a one time menu cost and the change in profit in a single time period, will instead discount future incremental profits resulting from the price change decision.

In essence, the decision to incur the cost of a price change can be thought of as an investment decision. It may therefore be treated similarly to capital budgeting, cash management, and receivables management models.

In these models, the present value of incremental cash inflows is compared to the corresponding present value of incremental cash outflows. The implication is that, in order to produce a rigidity, the menu cost (present value of cash outflows) must exceed the present value of all future changes in profit expected from that price change.

An alternative treatment of the menu cost is to consider it to be an operating cost, rather than a capital investment decision. There are several ways to rationalize this scenario which one may wish to group into the 'near rationality' model.

A SIMPLE NON MARKET CLEARING MODEL WITH A POSITIVE OPPORTUNITY COST OF CAPITAL

The macroeconomic framework onto which we graft the assertions of the New Keynesian theory is important to the overall effect of nominal price rigidities and real rigidities. A simple representation of this type of model is the Barro and Grossman non market clearing format (Barro, Grosman 1976, ch 2). In this model a positive opportunity cost of capital exists.

Price rigidities are utilized in order to highlight the transmission of monetary shocks to real variables within an equational system. The micro justification for price rigidity is of great importance to the New Keynesian agenda, which is for the most part dedicated to finding microfoundations for rigidities rather than accepting exogenous assertions serving the same purpose.

It is assumed here that New Keynesian theorists would accept the proposition that the existence of a positive opportunity cost of capital in the macro model should be consistent with the micro level foundations. Therefore, a monopolistically competitive firm will discount benefits and costs at the market opportunity cost. In most versions of macro models, this is represented as a generic 'interest rate.' Even if the interest rate is not the rate of discount used by firms, we can imagine that the discount rate used may co-move positively with market interest rates. The acceptance of this proposition results in several implications which can be addressed in this extension.

Although market clearing conditions are not possible under the Barro and Grosman price rigidity model, we still consider an economy which is internally consistent. The essence of this type of model is represented by "internal consistency conditions", reflecting not only price rigidity but also, in a recessionary period, a constraint on output representing excess supply.

Price levels are not included as arguments in the equational system. This is because prices are predetermined in the model. One New Keynesian justification for this is the existence of monopolistically competitive firm structures which set prices according to a suboptimal position which is near rational; that is, only a small departure from full rationality (optimality). The reason for this justification is that price changes, although costless, do not appreciably increase profit, because profit is second order (Akerlof, Yellen, 1991). The alternative to a near rational explanation of price inertia is to assume the presence of positive but fixed costs of changing price, or a menu cost. Although menu costs are small, it is argued, the change in profit from the price change is also small, and therefore the firm does not change price in reaction to a small change in nominal aggregate demand. A threshold effect prevails, in other words, where the firm will only change price if the increase in profit from doing so exceeds the cost incurred by the price change. Often, theorists tend to reject that a suboptimal choice is normative, even though it may be justifiable as an assumption because of observed occurrences in the real world. It therefore appears that for New Keynesian theory to remain a theory strictly embedded in optimizing micro behavior, that the menu cost version of price inertia is the crucial point to argue theoretically and prove empirically.

Price rigidity is the vehicle which "teases a market failure" out of an otherwise internally consistent model (Gordon, 1990, p.1136). The transmission of monetary shocks to real variables is

carried out via an interest rate mechanism. For example, consider a purely monetary event. A monetary restriction often involves a fall in the flow supply of real money balances accompanied by a rise in the flow supply of government securities.

The effects in the non market clearing framework are that the decrease in the flow supply of real money balances creates excess demand in the money market, and the increase in the flow supply of government securities (an earning assets component) causes excess supply in the earning assets market. The automatic correction is carried out by an increase in the rate of interest, restoring market clearing in both markets. The interest rate increase suppresses investment demand and consumption demand, which causes further excess supply (supply in excess of an already constrained supply curve) in goods markets (and further excess supply in the labor market). Output and labor employed thus adjusts downward, initiating a form of multiplier effect (as defined by the equational system). This highlights the accepted theory that price rigidity in combination with a demand constraint can result in significant negative macroeconomic consequences.

One might ask, why do firms not change price? With the presence of an exogenously determined demand constraint, firms would not be conditionally maximizing profit if they lowered price. If monopolistically competitive firm structures are representative, however, the price rigidity is explained by the menu cost. This is not to say that price levels do not change; it is simply that they are non-reactive (inertial) to a change in nominal aggregate demand, up to a point (threshold).

THE MENU COST MODEL

Mankiw's model of menu cost price rigidity involves a direct comparison of the menu cost to the change in profit that would result if the firm changed price. It seems logical to compare the *benefit* of the price change directly with the *cost* of the price change to determine the rationale of changing price.

In the menu cost version of price rigidity profit is assumed to be a continually differentiable function of the price of the firm's output. That is, it differs from perfect competition in that product price is an argument in the profit function; in the case of perfect competition, price is predetermined (firms are price takers). A key to the menu cost argument is that small deviations from the profit maximizing price result in only an infinitesimal change in the second order profit function.

The demand function (and therefore, marginal revenue function) faced by the imperfect competitor is downward sloping. Equationally, marginal revenue may be stated in terms of the price elasticity of demand and the price of the firm's output:

$$MR = (1 + \frac{1}{\eta})P \qquad \textbf{(1.1)}$$

where:

MR = marginal revenue
P = price of the firm's output
η = price elasticity of demand

Demand is defined in terms of real output and nominal GNP:

$$P = f(y) \times Y; \quad \partial P/\partial y < 0 \qquad \textbf{(1.2)}$$

where:

y = real output

Y = nominal aggregate demand (spending)

Nominal aggregate demand (Y) becomes a shift variable for the price function. We define total cost in terms of productive factor costs, real output, and nominal aggregate demand:

$$TC = h \times y \times Y; \quad (\therefore MC = \partial TC/\partial y = h \times Y) \qquad \textbf{(1.3)}$$

where:

TC = total cost

h = cost of inputs

This equational form assumes that if input costs, output, or nominal aggregate demand rise, then (ceteris paribus) the firm's total cost will rise.

Graphically, this can be represented as downward sloping demand and marginal revenue. For the sake of simplicity, we will also assume constant marginal cost and linear demand curve as shown in exhibit 1.

We can illustrate the effects of a change in nominal aggregate demand, where the firm would be able to sell less output at a given price. The firm's demand curve shifts to the left in exhibit 2. We can compare the positions of a profit maximizing firm versus a firm with nonresponsive pricing by considering the disequilibrium position (Exhibit 3; dotted lines):

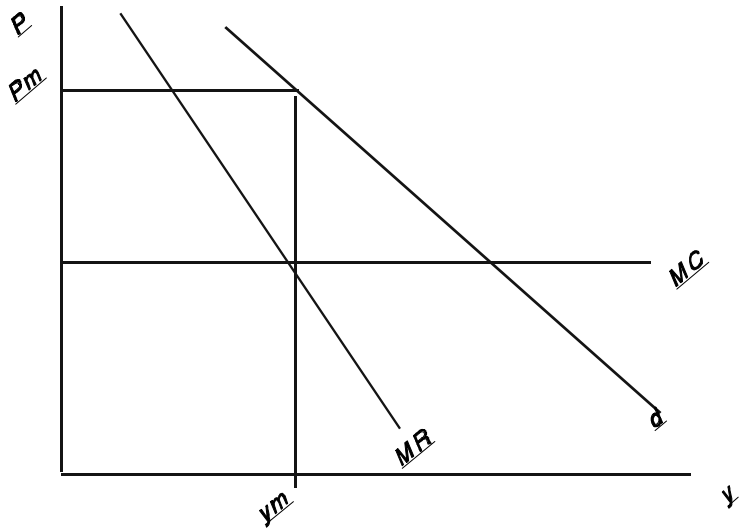

Exhibit 1

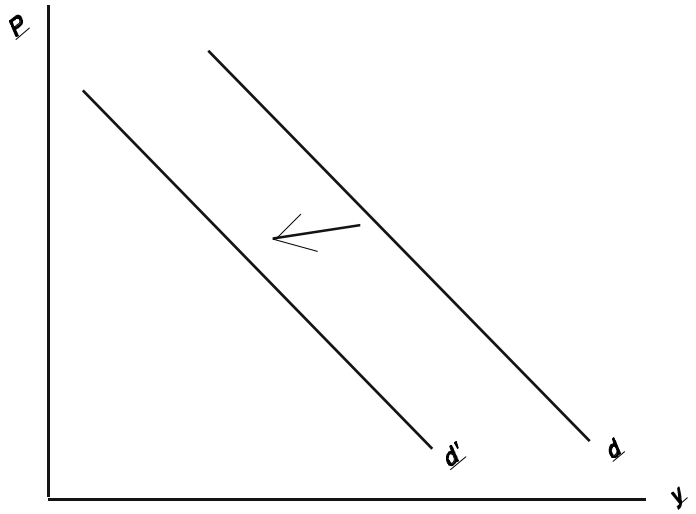

Exhibit 2

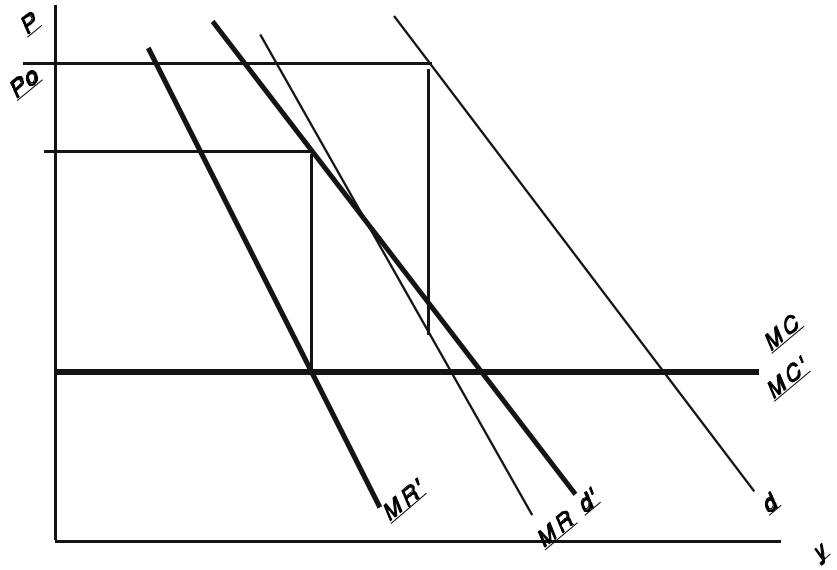

Exhibit 3

We can more simply illustrate what the firm would gain versus what the firm would lose upon changing price by considering the relevant (current period) demand curve and the suboptimal price charged by the unresponsive firm (Exhibit 4): The gain to the firm of resetting price may be defined for a one period model as rectangle B in the graph, whereas the firm would lose rectangle A if it reset price. The relationship of A to B depends on the price elasticity of demand, of course, but we know that the net gain to the firm would be B-A. It is important to recognize this net gain as a second order

function, because a central argument in the menu cost position is that the gain from cutting price is small. The firm incurs a one time cost of changing price: a menu cost. The second order gain in profit from changing price need only to be smaller than the menu cost to prevent the price change for a fully maximizing firm. The resulting decision rules relating the menu cost (Z) to the single period change in profit (B-A) logically follow: If B - A < Z, then it is fully rational for the firm not to change price. On the other hand, if B - A > Z, then it is fully rational for the firm to change price.

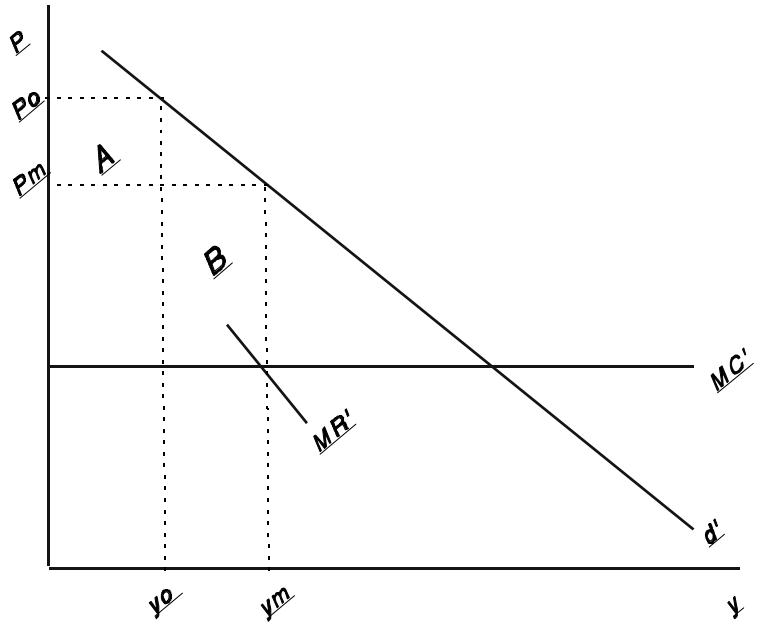

Exhibit 4

EFFECTS OF A MENU COST IN A MODEL WITH A POSITIVE OPPORTUNITY COST OF CAPITAL

In most macro models, including the one exemplified here, a positive opportunity cost of capital exists. It is therefore logical to assume that the existence of this opportunity cost of capital would be applied to the microfoundations.

With this in mind, the change in present and future profits resulting from the price change should be discounted to a present value. We can directly compare this present value to the (also discounted) cost of the price change or price change plan (whereby future plans for price changes would be considered as well).

Assume for simpler exposition that the cost of a single price change to occur now is already in present value. This is similar to the assumption Mankiw makes that the menu cost is a fixed, one time cost of a price change. This amount is known with certainty, if the cost will fully accomplish the price change.

Not only would the price change affect incremental profits in the current period, but also would affect incremental profits in future periods. On what basis would the decision be made to change price, or, not to change price?

For a price change to occur under fully optimizing firm structures, the present value of all future incremental changes in profit discounted at an appropriate discount rate must exceed the amount of the menu cost. In other words, the present value of the benefit must outweigh the present value of the cost for the decision to be a positive *net present value* action.

In order to state this relationship precisely, let represent the discounted present value of current and future profits resulting from the price change:

$$\pi_0 = (B-A)_0 + \frac{(B-A)_1}{(1+d)^1} + \frac{(B-A)_2}{(1+d)^2} + \ldots + \frac{(B-A)_n}{(1+d)^n} = \sum_{t=0}^{n} \frac{(B-A)_t}{(1+d)^t} \qquad \textbf{(1.4)}$$

We can state the decision rule in the same notation as the single period form above. If < Z, then it is fully rational for the firm to not change price. If, on the other hand, > Z, then it is fully rational for the firm to change price. If our analysis is limited to fully rational firms, then the menu cost should be treated as a capital investment expenditure.

THE MENU COST AS AN OPERATING COST

An alternative way to look at the menu cost, and an argument that might be pursued by practitioners, is that the menu cost in practice is not viewed as a capital investment decision. It is viewed, rather, as an ordinary operating cost, incurred in the normal operation of the company. In reality, expected changes in profit directly resulting from the price change may be difficult, if not impossible, to segment from changes in profit from other managerial actions. These arguments are natural pragmatic reactions to abstract models of managerial behavior.

It is difficult to argue that business practices should be ignored in the building of economic models. In the strict sense, allowing menu costs to be incurred without considering the effect on profit, however uncertain, is a satisficing, rather than a maximizing position. Although placement of models which reflect suboptimal positions has occurred in the New Keynesian agenda, it appears that the overall agenda of microfoundations research is dedicated to fully rational models to explain price rigidity. Most efforts build upon fully rational, rather than near-rational, foundations.

FREQUENT PRICE CHANGES

It is conceivable that a firm may change price rather frequently, and not necessarily as a reaction to spending (This is an important point to consider, because the extreme view of the rate at which price changes occur is that of instantaneous price change, reflecting the classical absence of friction, that New Keynesians wish to dispute). If this is the case, then the incremental changes in future profits attributable to the current price change under consideration may be difficult to predict beyond a short period. Future changes in spending and prices would certainly offset or enhance the effects of the current price change.

This dilemma could be addressed by the presence of uncertainty in the neoclassical sense. A discount rate (*d* in equation 1.4) which is positively related to the degree of variance of expected future changes in profit can be assumed. In this way, increases in 'risk' would result in a lower present value of future incremental changes in profit.

The inability to predict the nature of future price changes and their effect on incremental profit estimates may not seem to be a burdensome task. The accuracy of forecasts with the presence of multiple price change expectations, however, could result in highly uncertain profit estimates.

CONCLUSIONS

This simple extension of the menu cost version of price rigidity involves at least four implications for the Mankiw model. They are as follows:

(1) The discounted present value of future incremental changes in profit will tend to be large relative to the single (current) period incremental change in profit associated with price change. In other words, the total of the current period's change in profit in combination with the sum of the present value of all future changes in profit will exceed the one period change in profit pursued in the Mankiw model. In equational form:

$$\pi_0 = \sum_{t=0}^{n} \frac{(B-A)_t}{(1+d)^t} > (B-A)_0 \qquad \textbf{(1.5)}$$

(2) The firm is more likely to change price under conditions where a positive opportunity cost of capital exists, because the benefit from changing price is greater than in the absence of discounting.

(3) As the perceived variation of estimated future incremental changes in profit increases, the firm is more likely to leave prices unchanged. This is because as the discount rate (*d*) for future incremental changes in profit increases, falls. The smaller is (relative to the menu cost) the more likely is price inertia.

(4) The limit of the present value of future incremental changes in profit as the discount rate approaches infinity (as variance rises) is equal to the single period incremental change in profit as in Mankiw's framework. If viewed in this light, the single period model represents a special case which operates under the relatively extreme assumption of infinite discount rates. The single period model would therefore appear logically inconsistent with macro models where a positive but non-infinite opportunity cost of capital exists.

Although the conclusions from this simple extension of the menu cost model are rather modest, they do address one criticism of the model. Some have suggested that menu costs are small, and are therefore unlikely to cause firms to practice price inertia. The counter-argument is that the change in profit is also small (second order) and therefore, the menu cost, though small, results in price inertia.

The conclusion drawn from including a positive opportunity cost of capital is that considering all future changes in profit will tend to promote price change, at least to a larger degree than the single period Mankiw version. A lesser degree of price rigidity thus translates to the macroeconomy. If prices are relatively flexible, then it is less likely that price rigidity is the cause of large macro fluctuations.

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THE THRILL OF SIMPLICITY, THE AGONY OF REALISM: AN ASSESSMENT OF THE SPORT OF UTILITY THEORY

Robert Stretcher, Hampton University
stre@visi.net

ABSTRACT

This paper develops an exposition of utility theory from its roots in classical theory to its newer forms. The theme of the exposition is that in its simplest form, utility theory provides precise solutions to standardized behavioral traits of self-interest, but in its more realistic forms, real world complication can oppose the conclusions of the simple model. The world of utility theory is assessed in terms of Stigler's acceptance criteria, and conclusions are drawn about the usefulness and direction of utility theory.

INTRODUCTION

A framework for analysis of the choices made by individuals is a necessity for theorists who wish to understand a population of individuals and their behavior. The way to form an effective framework is to specify a model of reality based on a set of axioms that govern the population's behavior. The postulates that form the foundation for utility theory precisely characterize a simple form of 'rational' behavior. This set of conditions forms the analytical framework with which general statements can be formulated explaining choices ultimately made in the marketplace.

In an ongoing effort to better describe the choices made in various areas of economic activity, new assertions regarding, specifically, the over-simplicity of the basic theory of utility, and generally, of maximizing behavior, have appeared in much the same way that Keynes' revolutionary macroeconomic challenge occurred in the 1930's. In essence, Keynes observed that choices were made which were logical in their construction or apparent from observation, yet did not adhere to the axioms of classical microeconomic theory. As Keynes indicated, this can occur for a variety of reasons, some of which he identified and explored in developing his own General Theory (Keynes, 1964). In microeconomic theory, similar observations have been made for explaining behavior which appears rational, but seems unable to adhere to the axioms and properties of classical utility theory.

Often, an economist will assert that if a theory consistently explains or predicts well, there must be some kind of axiomatic foundation which governs the consistent behavior. The purpose for economists, therefore, should be to *discover* these governing axioms. Economists pursuing this purpose are counting on the premise that the factors affecting behavior have not been discovered yet. Those still pursuing that purpose after an initial theory is in place are counting on the premise that that the axioms have been analyzed incorrectly, that they are misstated, or that they are just plain wrong.

Recent work in Microeconomics has revealed the position of classical utility theory as a rather extreme special case of a phenomenon found by many arguments to have much more complication than the simple classical version. The purpose of this paper is to describe the current classroom presentation of the theory, present some of the efforts attempted to enhance the model, and to evaluate this effort in terms of generality, manageability, and congruence with reality.

THE BASIC UTILITY MODEL: THE THRILL OF SIMPLICITY

In its most basic form, utility theory serves as a means of ranking an individual's preferences by the level of appeal of available alternatives at a point in time. It also determines, among other things, the solution of variables endogenous to the model, such as the quantities of alternative products an individual will consume while maximizing utility under the restriction of a budget constraint. The rankings are based on axioms that describe 'economic rationality'. These axioms are as follows:

1. Completeness: If A and B are any two situations, then only one of the following can be true:

    1) A is preferable to B
    2) B is preferable to A
    3) An individual is indifferent between A and B (Indecision is not an option)

2. Transitivity (or consistency): If A is preferred to B, and B is preferred to C, then A must be preferred to C. An individual is assumed to fully understand the consequences of the choices to be made, and thus makes decisions that are internally consistent.

3. Continuity: If A is preferable to B, then outcomes "suitably close" to A are preferable to B also. This axiom is necessary in order to analyze differential changes in income and prices which affect outcomes to a small degree but are not sufficiently large to affect the ordinal ranking of situations (compiled from: Copeland, Weston 1988, Kreps, 1990, Nicholson, 1989, Chiang 1984).

In the further development of utility theory, several other properties should be included. First, any utility function will be *order preserving*. We can even assign values to utility in order to provide a way of enumerating and ordering preferences. This is simply a matter of convenience and is only useful to the extent that it preserves preference ordering; in no way can one individual's utility be compared to any other individual's utility. Second, conditions affecting utility other than those under consideration are assumed to be constant; this is called *the ceteris paribus* assumption. Third, individuals are assumed to be able to make *rational* choices among a wide array of situations; to be able to compare any given situation on the basis of relative appeal at any specific point in time. Fourth, the very nature of one's utility is based on a wide variety of *factors that provide satisfaction both directly and indirectly*. For example, although income yields no direct utility, the security of having a sufficient amount of income could in itself provide satisfaction. Usually, economists prefer to limit the analysis to direct utility, which comes only from the spending of that income. This is understandable; often the information an analyst wishes to derive from utility theory is to find out

what items on which individuals will spend income. Economists, however, have often extended the use of utility theory to include indirect versions, including utility of income, utility of current income relative to future income (time valuation), utility of consumption relative to leisure, and utility of certain benefits versus uncertain benefits.

Other complicating factors include complementary products, substitute products, economic 'bads', or consideration of attributes of goods rather than the good itself as the direct provider of utility. Other characteristics present in the academic literature but specific to instructional and/or academic special cases are omitted here. In some applications, the additional assumption of perfect knowledge of all alternative choices is assumed.

The usual representation of consumer demand begins with a description of a 'good' as a bundle of economic products which together provide a positive level of satisfaction or utility (as opposed to an economic 'bad', which provides negative utility). As a result of this bundle being good, more of the bundle is preferable to less of the bundle. The next step is to introduce more than one good, usually presenting quantities of two goods graphed as good x and good y in a two dimensional diagram. This representation allows a mapping of points of combinations of the two goods from which the individual would derive the same level of utility, and defines an indifference curve. The negative of the slope of the indifference curve at a given point is called the marginal rate of substitution, which is assumed to be diminishing (or alternatively, well balanced bundles of goods are preferable to bundles which contain large portions of one good and little of the other good. This identifies strict convexity, which is equivalent to an assumption of diminishing marginal rate of substitution). The concept of diminishing MRS can also be approached from the standpoint of marginal utilities, without explicitly referring to the utility function.

The general shape of this indifference curve lends itself to further restriction to form ideal analytical models that have appealing characteristics, such as the Cobb-Douglas form. This particular utility function has a familiar mapping, is homothetic (each curve looks similar to the others because the slope at any point depends only on the ratio of one good to the other), and exhibits a simple proportional relationship between income and the quantities of good x and good y desired (Douglas, 1934).

In cases where indifference curves do not exhibit the characteristics of diminishing MRS, the solutions, when a budget constraint is employed, often do not present difficult analytical problems. For example, the case of perfect substitute goods implies that an individual will simply buy from the lowest price producer. Perfect complements imply a particular proportional relationship between two goods, and the solution will be in fixed quantities of both goods. For cases of more than two goods, a relatively simple mathematical adjustment for utility maximization (subject to a budget constraint) is required. Changes in income or in prices of the goods in question are not problematic for the familiar forms of utility theory; they involve shifts in the budget or isocost functions, and after such adjustments, solutions may be recalculated. The theory of utility as developed above serves as a very neat analytical tool that forms a sturdy base for much of microeconomics.

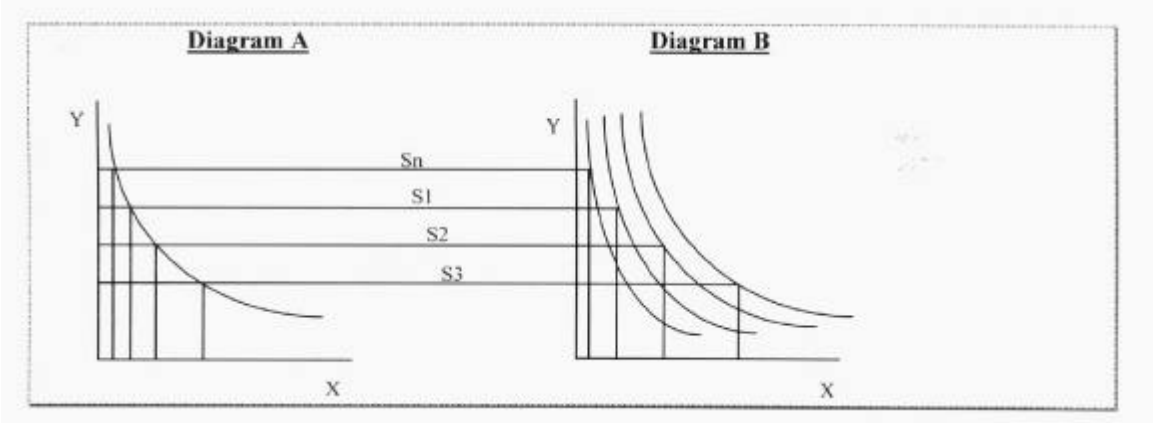
DEVELOPMENT OF LESS CONSTRAINED MODELS: THE AGONY OF REALISM

As we try to encompass more and more of reality into our model, we complicate the analytical framework of utility theory which, in a way, defeats the purpose of developing a simple model; the

original objective of drawing precise conclusions about a population of individuals must be balanced against the desire of the analyst to be accurate in describing the behavior on which those conclusions are drawn. At the root of the behavioral description are the axioms of utility theory. Are they reasonable? Are they necessary? And is there a better alternative to describing the general behavior of a population? To explore these possibilities it may be helpful to look at the manner in which analytical methods change when a variety of situations arise.

1. Generalizing Preferences

Suppose we accept a more general definition of individual preference. Instead of limiting situations to being "preferable to" other situations, we relax preference to a weaker version: "is preferred or is equally preferable to". Any two situations can now have a common extreme element. This defines the difference between "strict preference" and "weak preference" (Kreps, 1990, pp. 22-26). Indifference, then, would appear to be defined as the 'equally preferable' situation, although this implies a strange indifference map. For the definition of weak preference to hold, an indifference curve could be represented by a group of situations (S1, S2, S3,...Sn) whereby each situation can be ranked in terms of weak preference, and yet it is possible for S1, the highest-ranked situation, to be equally preferable to Sn, the lowest ranked situation (diagram A). On the other hand, the same set of situations could simultaneously be represented by differing levels of utility (diagram B). The mere existence of this strange indifference result would imply an infinite number of solutions, unless factors explaining the weakness of preference could be identified and included in the model.



2. Cyclical Preferences

Imagine another situation in which an individual is unable to rank preferences in an ordinal ranking (such that A is preferred to B and B is preferred to C but, strangely, C is preferred to A). If you doubt the possibility of such a scenario, just ask a child their preferences for Christmas presents every day for a month prior to Christmas. With no visible change in information, the preference will often cycle around choices that are appealing but, through some unknown process, are not ordinally ranked. This indecisive behavior could be the result of a wide variety of manifestations. This baffling scenario can be mirrored in other situations as well. Although from a modeling point of view it may appear impractical to assume an axiomatic basis for behavior other than rationality, a theorist might seek explanations other than those implied by the model in cases of inconsistency such as this.

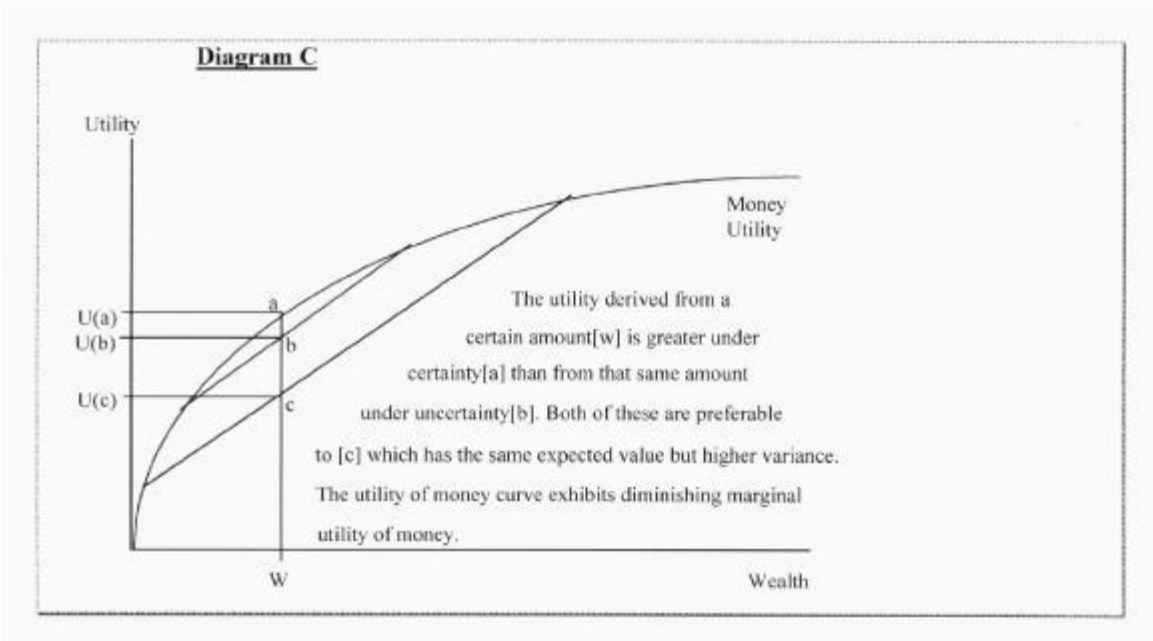
3. Modeling Uncertainty

In reality, individuals make decisions based on uncertain future situations, without formal thought about probabilities of outcomes. Often there is no choice but to go ahead and make decisions, even if complete information does not exist or the decision doesn't result in an optimal utility outcome, ex-post. Uncertainty can take several different forms within the realm of utility theory. One of the most basic effects is the ambiguity in preference due to the possibility of deviations from expectations. Preferences become dependent on a variety of factors which, while still describing a single time period, are no longer known with certainty.

Because of this, preference may not be abundantly clear. A modeler would have to make allowances for indecision (if no information is valid for basing a decision on) or introduce a soluble element based on probability distributions (if useful information is expected to surface before a decision is made) or, if possible, based on contingencies.

Uncertainty can also take the form of a simple choice between a certain outcome and an uncertain, but statistically predictable, outcome when that choice is available to an individual. The well-known development of this concept is the utility for money. It begins with the premise that more money is preferred to less money, or the assumption of a strictly increasing utility function. The second premise is that a unit of money at a lower level of income will increase utility to a greater degree than the same unit of money at a higher level of income (or that the marginal utility of money is decreasing). This assertion has some profound results, characterized by 'risk averse' behavior.

This simply means that a certain outcome (with no variation) of a particular value V is preferred to a fair gamble (with variation) with an expected value V. For example, would an individual prefer receiving $10 with certainty or would he or she prefer a gamble with a .5 probability of receiving $5 and a .5 probability of receiving $15? The expected value of both outcomes is $10 and the only difference is that with the gamble, there is risk (variation about the mean) involved. An individual who is risk averse (has a decreasing marginal utility of money), would prefer the certain $10 payoff than the gamble with the same expected value, because the $10 payoff would yield a higher level of utility than the gamble (diagram C). This result has been helpful in pricing insurance and in estimating demand for financial assets (Von Neuman, Morganstern, 1944).



Perhaps a slightly different approach to modeling uncertainty is called for in situations where preferences are contingent upon certain events or circumstances. It seems that two possibilities could arise: one, that a decision could be postponed until after the event occurred or two, that a decision must be made in the present time period for one reason or another. In the latter case, an example might be the availability of an investment whose outcome is contingent on an event, such as an investment in a company whose rate of return depends on the acceptance or rejection of a large contract. If the contract is accepted, the return on the investment would be larger and if rejected, the return would be small or negative. Usually such an investment would not be offered at the same price to an individual before and after the event. As such, the decision could not be postponed and the individual, if the investment is to be undertaken, must invest quickly.

In reaction to just this type of situation, the market makers for securities have invented hedging tools in order to reduce the risk of low or negative return, such as the issuance of options or warrants. Here again, it appears that a decision can be made based on a less questionable future by the application for the utility of money. Because investors have different risk preferences, another investor might be willing to pay the first party to agree to sell his investment in the future at a specified price. This is the essence of a stock option. The owner of the investment would have a hedge against downside risk and the owner of the option would have the possibility of a huge profit should the stock price increase above the exercise price of the option.

Still another uncertainty model may be built upon strategic concerns. Suppose two options are available for choice, one maximizing individual ones' utility, the other maximizing individual twos' utility, each choice being suboptimal for the other. The consequences of failure to agree on one choice or another is that no option will be chosen and, therefore, no utility will be gained by either party. For whatever reason, as illogical as it may be, sometimes the parties may fail to agree, neither one gaining anything. This is one of many examples of noncooperative games, which often reflect the

more complex circumstances of economic interest in the real world. A variety of solutions may exist for noncooperative games, such as strict dominance, successive strict dominance, weak dominance, maximizing solutions, hedging solutions, backwards inductive solutions, or Nash equilibria (Kreps, 1990).

A solution to a noncooperative game can even take the form of utility maximization for both (or all) parties involved, both forms of analysis producing the same result. The deviations from the basic forms of these situations can be infinite, as an infinite number of combinations of circumstances may be stated as conditions for the game. Some questions about the usefulness of these uncertainty models remain, however. Although very complex situations can be modeled, it is unknown at present how this can be used to obtain useful information about populations. The most useful role of specific games is their ability to explain or predict behavior (or, as the case may be, explain or predict indecision and suboptimality) in situations too complex or too specific to be modeled well by simpler models.

4. Utility Interdependencies

Like it or not, isolation tank results often don't predict environmental behavior. As we are social animals, very rarely are our utility preferences totally independent of others' utility preferences. For some reason, the fact that the next door neighbor just upgraded from a carport to a three-car automatic door heated and air-conditioned garage and workshop complex, seems to affect our own satisfaction with our own 'carport.'

This and other effects, although not directly developed by comparing utilities, is typical of bandwagon, snob, and Veblen effects summarized by Liebenstein. The bandwagon effect describes the tendency for people to desire and item because, presumably, everyone else desires it. The snob effect is the tendency for people to desire an item for its exclusivity, and the Veblen effect is the tendency for people to desire an item for its high price tag. The changes in utility implied by this behavior are assumed to be reflected directly in the demand functions faced by firms (Liebenstein, 1948, pp. 165-201).

5. Interrelated Utilities

Often, the decisions made by microeconomic agents are the result of the related utility assessments of more than one individual. Some examples of this kind of situation are committee decisions, societal choices, partnership decisions, choices made by married couples, or choices resulting from agency relationships. The complications introduced by these possibilities can be tremendous; in each case, the mere fact that differing values, beliefs, and morals are present is enough to build a specific model of extreme magnitude. Consider, for example, the view of the utility of a choice made by a politician. The candidate who presented an image, a set of morals, and campaign promises, who supposedly represents the concensus view of his district or representative group, who has selfish tendencies, and who is tempted by choices which break the rules of the game, must summarize all of these preference scenarios into specific political decisions.

Consider the committee (or partnership, or marriage) decision, which is a result of a "game" which may involve radically different preference rankings, dominant individual preferences, different outcome evaluations, and/or different thought processes. Consider the agency relationship, where an individual or group of individuals represent another individual or group of individuals in making

decisions that are supposedly in the best interest of the group represented. Although any and all of these constructions of convenience, of necessity, of consequences, or of codependence are present in society, few can be summarized using well behaved utility models (designed to draw generalities about populations). Most are specific and unique in nature, and often the observed results are far from what one might expect from rational, utility maximizing populations.

K. J. Arrow has even developed separate axioms for the formulation of social preferences from the point of view that an infinite number of utility solutions can develop depending on the way in which decisions are arrived at in a particular situation. For a solution to be feasible, it must meet the characteristics of: 1.complete ordering (completeness) 2.responsiveness to individual preferences (reflects the preferences of the individuals whose utilities are interrelated) 3.nonimposition (social preferences are not imposed independently of individual preferences) 4.nondictatorship (social preferences are not determined by only one individual) 5.independence of irrelevant alternatives. Arrow then asserts that in general, it is impossible to meet all of these criteria in constructing social preferences. This is known as the 'Arrow Impossibility Theorem'(K.J. Arrow, 1951 [Henderson, Quandt, 1980, p 312]).

Less constrained models represent some of the anomalies of the current state of utility theory. As we encompass more of reality into our models, we complicate the analytical framework; we also strive for a more applicable model to accurately describe observed behavior.

THE ESSENCE OF AN EMERGING CONSENSUS

Stigler presents "A Theory of Economic Theories" with three criteria for wide acceptance of an economic development. They are:(Stigler, pp. 148-53)

1. Generality
2. Manageability
3. Congruence with Reality

Stigler asserts that a successful theory is almost always more general than the preceding theory. Although there have been exceptions to this argument, particularly in macroeconomic theoretical development, it is reasonable to expect that if a conclusion can be reached in a less restrictive manner, it would probably have more appeal to theorists who desire to accurately describe.

The ability to bring a theory to use in analyzing specific problems is a desirable quality for a successful theory. This is especially important in a field such as economics, which often involves mathematical complications or extensions to less obvious applications in making models generally applicable. A popular argument within economics is on the one hand, the more closely a model reflects reality, generally the greater the likelihood of wide acceptance by theorists. Intuitive assertions are accepted only to the point of belief and agreement, in an academic discipline where empirical evidence is often required as proof. On the other hand, the more closely reality is reflected, the less likely a simple (restricted to simplicity for the sake of precise conclusions) axiomatic foundation is readily applicable.

With these criteria in mind, we can assess the likelihood that development of any of the aforementioned complications to the analytical framework of utility theory will become an integral

part of mainstream economic thought. All three of these criteria are generally applicable to economic theories. The third criterion, congruence with reality, may convince us to look at the possibility that the rational basis for utility theory could be inadequate for general application in the real world. The following section examines each of the relaxed constraints previously discussed, evaluating them according to these criteria

UTILITY APPLICATIONS

The strange indifference curves resulting from weak preference rankings (diagrams A and B) represent a direct inconsistency with the axiom of transitivity. While this axiom could still hold true for rankings involving no question of equality of ranking, the possibility exists for an individual to rank situations in a way that is internally inconsistent. Changing from strict to weak preference would therefore appear to support the analytical framework of utility theory, but in specific cases where we allow simultaneous existence of preferable or equally preferable choices, the analytical framework collapses because of its inability to explain this anomaly. While meeting the criterion of congruence with reality and greater generality, the inclusion of weak preferences as part of a utility theory does not appear to be a very manageable development.

Cyclical preferences are another source of inconsistency which precludes the existence of not only transitivity but also the axiom of completeness. Utility theory simply does not allow for the possibility of an individual being unable to ordinally rank cyclical outcomes. Again, while meeting the criteria for generality and congruence with reality, the inclusion of the possibility of cyclical preferences undermines the integrity of the axiomatic foundation of utility theory.

Considerable strides have been made in the modeling of (statistically predictable) risk within the realm of utility theory. One of the most common approaches is to form probability distributions about expected (mean) outcomes and use these as a numerical proxy for utility. Although there are numerous measurement and statistical problems under certain circumstances, probability distributions do not appear to undermine the basic axioms of utility. Also, if used in a static model and considered the only basis for ordinal rankings (ignoring variance), expected values are order preserving, the property of choice among a wide variety of situations is still intact, and expected values would appear to embrace both direct and indirect versions of utility functions. One property, the ceteris paribus property, is not binding in a static model strictly using expected values, because factors affecting the variation from expectations are not required to be constant; they account for the variation about the mean, which does not affect ordinal rankings.

The utility for money has been explored extensively by theorists and there appear to be few problems in applying the concept of risk aversion to utility theory. in fact, this concept has become the basis for financial asset pricing models, demand models for insurance products, and for explaining risk averse behavior observed in financial markets. The indirectness of the utility function for money as a provider of satisfaction has not resulted in prohibitive complications. Not only is utility theory enhanced as a more general model, it also explains real world markets better while still retaining manageability. The market participants themselves have invented tools to manage uncertainty, including options, warrants, and futures. Currently, utility theory as well as other theories are being used to analyze and evaluate these instruments. Although the mathematical process is growing more

complicated, it appears that utility theory is still intact as a foundation for many of these models that pool individual uncertainties or provide for forward contracts, or are hospitable to hedging properties.

Strategic concerns, another way that uncertainty can surface in the real world, appear to be beyond the general applicability of the simple framework of utility theory, simply because so many factors and circumstances may be introduced into the model. Although useful in analyzing specific cases, strategic analysis (or noncooperative game theory) does not comply with the simple calculus of utility theory. On the basis of generality, strategic analysis incorporates many more real world situations than utility theory can, but conclusions usually are imprecise and not applicable to other situations. The degree of manageability, it seems, would be a subjective assessment; the economist might argue that strategic analysis results in an infinite number of possible solutions and ambiguity in its conclusions, whereby the strategic analyst might assert that flexibility and accuracy, whether intuitive or not, are needed more than a decision based on a precise but inaccurate model. Although there are some key differences in strategic analysis and game theory, the application is quite similar; both are used for specific cases that may be quite complicated and totally unfit for simpler models of behavior.

Utility interdependencies have been intuitively explained in relation to demand. The curious results in demand analysis should be reflected in the utility curves that support demand theory. For example, the utility function for a 'bandwagon product' would be a function not only of the attributes inherent in the product itself but also would be positively related to the size of the market for such a good. The 'snob' effect is a reversal of the bandwagon relationship between demand and market size, where utility is a function of the attributes of the product and a negative function of market size. The 'Veblen' effect encompasses utility as a function of product attributes and as a positive function of price, which defines conspicuous consumption. The adjustments of utility functions to accommodate these effects are not complicated ones, and they add to the applicability of the utility model to a greater number of situations. It would appear from the three criteria for wide acceptance of a model that these effects are easily accepted. Liebenstein does not present the manifestations in utility theory exhibited here, but is keyed to demand and observable results. These applications to utility theory follow traditional lines of thought from utility to demand analysis.

Interrelated utilities form a special kind of problem for the axioms of utility. One of the basic postulates of utility is that one individual's utility cannot be compared or measured relative to another individual's utility. According to the 'rationality' of behavior, an individual would only enter a condition of cooperative decision making if it were possible to achieve a greater level of utility. If this rationality is generally applicable, the only relationships attainable would be ones of greater utility for both (all) parties involved. One could even argue that convenience, necessity, consequences, or codependence all provide inherent utility and that a situation of interrelated utilities complements the axioms of utility; that utility is simply difficult to comprehend and measure. We should have difficulty, however, in defining just which type of utility is to be maximized. When and how does an individual decide to sacrifice his own utility to maximize the utility of the group as a whole (Davidson, Davidson 1988)? What happens if conflict occurs? These questions are unlikely to be answered in the limited scope of utility theory. Most utility interrelationships are specific in nature and would not easily be explained by a general model. If a model were to be constructed to reflect these conditions, it may well be so analytically complicated that it is impractical to construct for all but the most rewarding uses.

CONCLUSION

What type of concensus may eventually emerge concerning the usefulness of the axiomatic version of utility theory? It is obvious that as we encompass more and more of reality into our model, we complicate its analytical framework. Many of the changes discussed are manageable adaptations and they extend the explanatory or predictive ability of the model. Others, such as introducing weak preference or cyclical preference, appear to undermine its axiomatic foundation.

It seems likely that successful analysts depend not only on a restrictive theory of behavior but also realize the importance of a wider range of conditions and anomalies of the real world which affect economic events. One thing is certain: as long as observed behavior is seemingly unexplained by current economic models, economists will strive to explain them in terms of a new set of axioms and postulates which describe the general behavior characteristics underlying these observable results.

It also seems reasonable to expect that the strict assumptions associated with simple constructs might be relaxed to form a more general model encompassing a greater range of cases, enhancing, if not the predictive ability of utility theory, the explanatory ability of microeconomic analysis.

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