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INDIVIDUAL CHARACTERISTICS AND THE PROBABILITY OF TELECOURSE ENROLLMENT:

AN EXAMINATION OF STUDENT CHOICE

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INTRODUCTION

In recent years many American colleges and universities have actively targeted non-traditional adult students by devoting considerable resources to external degree programs. The phenomenal growth of these programs, in which students can earn college credit toward a degree without on-campus residency requirements, has been due to a variety of factors. The falling numbers of the "college age" population, financial considerations caused by declining on-campus enrollments, and increases in the demand for college-educated labor have all contributed to the establishment of external degree programs.

A wide variety of delivery formats are currently being used by institutions offering classes to non-resident students. The most common delivery format is the "extension class" in which the school sends an instructor to a remote site to teach in the traditional lecture style. Many institutions also offer credit through the use of "telecourses" whereby lessons and lectures are televised to students living away from campus. Other popular formats include independent study classes and self-paced computer-managed courses. Thus, while the particular details of class formats vary from institution to institution, students enrolled in external degree programs often face a choice regarding the instructional format by which their courses are delivered.

From an administration perspective it is important to know what mix of delivery formats is best suited for a targeted student body. Colleges and universities are constantly facing questions of resource allocation and the cost per credit hour generated can vary greatly between the various external course formats. The cost of providing an extension course may only involve renting a classroom from a local school and paying the salary necessary to compensate an instructor, while the capital requirements of producing and broadcasting a telecourse are relatively high (particularly for small student markets). The selection of course delivery formats is therefore dictated by economic factors.

An administrator choosing what appears to be the "least expensive" delivery format may be making a less than optimal choice if the decision does not account for the propensity of students to enroll in certain course formats. Specifically, students may be more likely to take a class offered

in one format relative to another format. Student preferences may cause them to be attracted to one type of delivery method and to "shy away" from other course formats. If student enrollments vary depending on delivery format offered, the "least expensive" choice may not be the most economic choice. Given today's economic realities, the ability to forecast student enrollments across alternative course formats is critical, yet researchers have previously ignored this problem.

This paper presents an analysis of student choice between two external course delivery formats. Utilizing a sample of students enrolled in an external degree program, an econometric model is developed to determine the probability of student enrollment in a telecourse relative to enrollment in a traditional extension course. The second section presents a brief description of the institutional setting of the project and an overview of the selected sample. The econometric model is developed in the third section. The paper concludes with a section presenting the results and conclusions drawn from the estimation of the model.

THE DATA

Our examination of student choice between external course formats was conducted within the institutional context of Western Illinois University (WIU). Located in Macomb, a town of 20,000 residents, WIU serves approximately 12,000 students enrolled in more than 50 undergraduate majors and 32 graduate programs. WIU is the sixth largest public university in the state of Illinois.

Due to demographic shifts in the regional population base, WIU has experienced declining rates of on-campus student enrollments in recent years. As a result, resources have been appropriated from the state to develop course offerings for students living off-campus within the west central region of Illinois and southeastern Iowa. WIU faculty teach extension classes at approved sites within the region and the University has been offering telecourses since the Fall 1983 semester. Currently, WIU grants credit for nationally syndicated telecourses as well as locally produced classes.

Telecourses at WIU are coordinated through the Independent Study Program office and are broadcast over the public television stations of the regional CONVOCOM network. Founded in 1976, CONVOCOM is a telecommunications consortium of several large colleges and universities within the region. CONVOCOM extends public television service to approximately 2 million people living in a 32,000 square-mile area.

Many of the students enrolling in off-campus courses are adults seeking a degree through WIU's Board of Governors Bachelor of Arts (BOG/BA) degree program. Students in this external degree program can earn a baccalaureate degree through their successful completion of off-campus courses. BOG/BA students can apply credits earned through telecourses, extension classes, independent study classes, and work at other colleges toward their degree. There is no campus residency requirement.

To evaluate student choice regarding external course formats, a survey questionnaire was given to BOG/BA students enrolled in telecourses and students taking extension classes at one of WIU's off-campus teaching sites. The survey was taken during the Spring 1987 semester. Telecourse students were surveyed through the mail, and extension class students were surveyed in class by their instructor. Information was collected on a wide variety of student characteristics and endowments.

Table 1 reports selected demographic characteristics, by course format, of the students comprising the sample. While the group characteristics are similar in many respects, the groups are not completely homogeneous.

The groups do not reflect significant differences in sex or race. Both the extension class group and the telecourse group are dominated in numbers by male students. Students belonging to racial minorities make up a little more than six percent of both groups. The similarity in the sex and race characteristics suggests that the choice between course formats may not be strongly influenced by these personal variables. However, the data indicate that the average age of the telecourse group is nearly eight years older than the extension class group. Age may thus be an important determinant of course format choice.

With regard to employment status, the survey suggests that telecourse students are more likely to be full-time workers than are extension class students. Also, students who do not work at all are more likely to enroll in an extension class relative to a telecourse.

Table 1 shows that the telecourse group is more evenly spread over the range of class ranks when compared to the extension class group. The fact that no freshmen or sophomores appear in the extension class group is most likely due to the institutional arrangements of the BOG/BA program at WIU. Many students enroll in the BOG/BA degree program after completing a year or two of course work from their local community college. The extension courses offered by WIU cannot be taken from the local community colleges. Thus, while not all extension courses are upper-division classes, most of the students have enough earned credit to be classified in the higher ranks. It is interesting to note that Table 1 indicates that non-resident graduate students are equally represented in the two course formats.

The questionnaire asked students what degree level they expected to receive in their lifetime. Surprisingly, a majority of students in both groups expect to eventually obtain a graduate degree. In fact, more than seven percent of the telecourse group expect to earn a doctorate. The lofty degree aspirations of off-campus students should not be overlooked.

Surveyed students were also queried about their motivation for taking the course. The most popular response for both groups was that the course met a degree requirement. Approximately one quarter of both groups took their course as an elective. Differences in student preference for course format appear for those students taking a course for salary advancement and personal growth. A larger percentage of telecourse students responded that

TABLE 1

SELECTED DEMOGRAPHIC CHARACTERISTICS OF STUDENT SAMPLES

Percent	Extension Class Students	Telecourse Students
<u>Sex</u>		
Male	56.25	63.74
Female	43.75	36.26
<u>Race</u>		
White	93.75	93.40
Other	6.25	6.60
<u>Employed</u>		
Full-Time	64.58	84.62
Part-Time	22.92	12.09
Not Working	12.50	3.39
<u>Class Rank</u>		
Freshman	0.00	1.10
Sophomore	0.00	7.69
Junior	52.08	30.77
Senior	29.17	42.86
Graduate	14.58	13.19
Other	4.17	4.39
<u>Degree Expectation</u>		
A.A.	2.08	2.20
B.A.	35.42	34.07
M.A.	62.50	56.04
Ph.D.	0.00	7.69
<u>Course Motivation</u>		
Required	47.92	45.05
Elective	25.00	24.18
Salary	2.08	12.09
Growth	25.00	18.68
<u>Miscellaneous</u>		
Telecourse Experience	20.83	49.45
Own VCR	66.67	82.42
Long Distance	0.00	70.33
<u>Average Age</u>		
	30.56	38.55
<u>Sample Size</u>		
	48	91

their enrollment was motivated by salary considerations, and a relatively larger percentage of extension class students were motivated by the desire for personal growth.

Students enrolled in a telecourse were more than twice as likely to have taken a telecourse previously. Successful experience with a telecourse apparently influences future enrollment. The biggest difference between the two groups involves the geographic location of the student's place of residence. The "Long Distance" variable reported in Table 1 indicates the percentage of students living fifty miles or more from the extension class site. No student reported traveling this distance to attend an extension course. However, more than seventy percent of the telecourse students reported living beyond the fifty-mile radius. As expected, the statistics suggest that the convenience of taking a telecourse from a remote location is important in a student's choice of course format.

The demographic characteristics of our sample are similar to those of other external degree student samples reported elsewhere (see Brey and Grigsby). While descriptive data such as that reported in Table 1 offer insights into the factors that may influence a student's choice between course formats, a more elaborate statistical analysis is needed to identify the relative importance of each factor.

THE MODEL

A student's decision regarding the format of the courses in which to enroll is an economic choice between two or more competing alternatives. As with any choice, many factors may influence an individual's decision. Economic theory and previous studies regarding student retention in external courses (refer to Research Communications and see Maher) suggest that a variety of personal characteristics and endowments will determine the selection of course formats by students. Let us assume that the following functional relationship holds true:

$$\text{Course Format Choice} = f(\text{Personal Characteristics, Employment Status, Geographic Location, Previous Experience, Degree Aspirations, Class Rank})$$

This type of relationship can be empirically investigated utilizing probit analysis and the data collected from the student survey.

Each of the students in the sample faced a dichotomous (two alternative) choice regarding the format of the course they chose to take. As non-resident students, they could enroll either in a telecourse or in an extension class. Probit analysis is designed to estimate the probability of an individual making a particular decision when faced with such a dichotomous choice (probit analysis is often used in studies regarding voting behavior). Statistically, probit analysis is analogous to standard

regression techniques when the dependent variable reflects a two alternative choice. (For an excellent explanation of the probit technique, see Pindyck and Rubinfeld, pp. 280-285.)

The probit model is based on a threshold form of behavior. In our application, we hypothesize that student characteristics and endowments interact to determine the value of a decision variable. If the value of the decision variable is above the threshold level, the student chooses one direction. If it is below the threshold level, the student decides in the other direction. The parameter estimates of the probit model indicate both the sign and magnitude of the various characteristics in the decision function.

A probit model based on the functional relationship described above to estimate the probability of a student enrolling in a telecourse relative to enrolling in an extension class can be easily constructed. The variables in the following form were taken from the survey data to proxy the functional relationship:

CHOICE = 1 if student enrolled in telecourse; 0 if student
enrolled in extension class

SEX = 1 if male; 0 if female

RACE = 1 if white; 0 if other

AGE = number of years old at time of survey

FULL-TIME WORK = 1 if student working full-time; 0 otherwise

PART-TIME WORK = 1 if student working part-time; 0 otherwise

LONG-DISTANCE = 1 if student lives at least 50 miles away

PREVIOUS TELECOURSES = 1 if student reported completing tele-
courses prior to enrollment

SEEKING DEGREE = 1 if student is actively seeking a degree;
0 otherwise

CAMPUS ENROLLMENT = 1 if student is also taking courses on campus

REQUIREMENT = 1 if course required for degree program;
0 otherwise

CLASS RANK = 1 if student is at least a college junior;
0 otherwise

The probit equation can thus be written as:

$$\begin{aligned} \text{CHOICE} = & \text{CONSTANT} + B_1(\text{SEX}) + B_2(\text{RACE}) + B_3(\text{AGE}) + B_4(\text{FULL-TIME WORK}) \\ & + B_5(\text{PART-TIME WORK}) + B_6(\text{LONG-DISTANCE}) + B_7(\text{PREVIOUS TELE-} \\ & \text{COURSES}) + B_8(\text{SEEKING DEGREE}) + B_9(\text{CAMPUS ENROLLMENT}) + \\ & B_{10}(\text{REQUIREMENT}) + B_{11}(\text{CLASS RANK}) + \text{ERROR TERM} \end{aligned}$$

where the B's represent the probit parameters to be estimated. The values and magnitudes of the probit parameters estimate the direction and degree of influence each independent variable places on the probability of an external degree student deciding to enroll in a telecourse.

RESULTS AND CONCLUSIONS

The results of the estimated probit model are reported in Table 2. Statistically, the model appears to fit the relationship rather well, given the cross-sectional nature of the data. The R^2 statistic indicates that the independent variables account for approximately 67% of the observed variation in the decision to enroll in a telecourse.

Examination of the estimated model parameters reveals that five of the coefficients obtain levels of statistical significance. The coefficients for AGE, PART-TIME WORK, LONG-DISTANCE, PREVIOUS TELECOURSES, and SEEKING DEGREE all are significant at acceptable statistical levels. Thus, these variables are found to have the most important influence on the probability of telecourse enrollment relative to extension class enrollment.

Interestingly, each of the significant coefficients is positive. The positive age coefficient indicates that older students are more likely to enroll in a telecourse than are younger students. Also more likely to take a telecourse are students who are employed on a part-time basis, students with previous telecourse experience, and students actively seeking a degree. And, as expected, the LONG-DISTANCE coefficient indicates that students living at locations far from teaching sites have a much greater probability of taking a telecourse rather than an extension class.

The absolute size of the coefficients indicates the relative importance of the variables in the determination of choosing the telecourse format. In descending order, the significant coefficients can be ranked as LONG-DISTANCE, PART-TIME WORK, SEEKING DEGREE, PREVIOUS TELECOURSES, and AGE. The results indicate that the student's distance from the teaching site is more than three times as important in the decision process as degree seeking and employment status and more than four times as important as the student's age.

Such results are not surprising. Telecourses are a convenient method for non-resident students living in remote locations to continue their educational experience. Students with part-time work responsibilities may

TABLE 2

PROBABILITY OF TELECOURSE ENROLLMENT:
 PROBIT REGRESSION ANALYSIS RESULTS

VARIABLE	COEFFICIENT	t-STATISTIC
Constant	-3.071	-0.661
Sex	-0.005	-0.012
Race	-0.191	-0.225
Age	0.063	2.646***
Full-Time Work	0.951	1.371
Part-Time Work	1.362	1.713*
Long-Distance	4.054	2.391**
Previous Telecourses	0.678	2.155**
Seeking Degree	1.225	1.826*
Campus Enrollment	-4.163	-0.974
Requirement	-0.353	-0.856
Class Rank	-1.363	-0.316
R^2	.67	

* significant at the .10 level
 ** significant at the .05 level
 *** significant at the .01 level

not have the opportunity to reconcile regular class meetings with their schedules and therefore opt for the telecourse format. Non-resident students actively pursuing a degree appear to enroll in telecourses as a means of securing necessary course work. Older students may have relatively greater degrees of self-motivation necessary to succeed in a telecourse environment. And, previous telecourse experiences appear to create positive reinforcement for any student to enroll in additional telecourses.

The current results indicate that students with different characteristics and endowments do make different choices regarding external course formats. Once the determinants of student preference are known, administrative decisions concerning the selection of course delivery formats become easier to make.

This paper has attempted to examine the decision of students to enroll in telecourses using an ad hoc model of student choice based on elementary economic theory. The results indicate that student choice is dependent on a variety of personal characteristics and endowments. A formal model that can explicitly explain and predict course format choice by students has not yet been developed. To accomplish this, additional research is needed in the overlooked area of student enrollment behavior.

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