AN ANALYSIS OF ATTENDANCE AT VOLUNTARY RESIDENTIAL SCHOOLS

Bernard Conlon

No. 91 - December 1996
An Analysis of Attendance
at Voluntary Residential Schools

EMET 102 - 1995

Bernard Conlon

August 1996
Introduction

Students enrolling in external courses at The University of New England, depending on the units being attempted, may be required to attend a residential school at the university. The residential schools, which usually take three or four days per unit, attempt to present the course material to the students and provide an opportunity for interaction with staff where required. Whilst being a valuable educational tool, it is conceivable that the compulsory attendance of residential schools can be very costly to students. If a student is enrolled in three or four units, he or she may need to reside in Armidale for up to two weeks, incurring travel and accommodation costs and possibly requiring leave from work.

To avoid deterring those students to whom residential schools pose a high cost, an alternative is to make the residential schools voluntary where possible. This will allow those students to whom the benefits of residential schools are outweighed by the cost to still enrol in their preferred units.

A voluntary residential school was offered to students who enrolled in EMET 102 in 1995 and this survey was conducted to gain some information from these students about their decisions to attend the residential school or not, focusing on the following three main questions:

1. Do compulsory residential schools deter students?
2. Is no residential school a deterrent?
3. Is there any academic merit in holding residential schools?

The small sample available for this survey suggests that the results should be interpreted tentatively as a pilot study, with the main emphasis being on development of appropriate methodology for a more comprehensive investigation covering all external units.

Initially qualitative responses from the questionnaires are reported. This is followed by some econometric estimation attempting to model the choice to attend the residential school and to estimate the effect the school had on final marks.
Qualitative Survey Results

In this section the qualitative results from the survey are given. The survey was sent out to the 67 external students who completed EMET 102, as provided by university records. Of the 67 sent, 33 students returned completed surveys, and one survey letter was returned unopened due to the student changing address. Ignoring the incorrectly addressed survey, the response rate was 50 percent. Because of the small size of the sample the results reported should be interpreted tentatively.

The questionnaire sent to the students and the accompanying letter, is reproduced for the readers convenience in the Appendix.

The first two questions asked of the students in the questionnaire were for identification purposes, asking for their names and student numbers. Question three inquired as to whether the student had attended the voluntary residential school. Of the 33 responses, 17 replied that they had attended, that is 52 percent.

The next question asked the students whether they would have enrolled in the unit, had the residential school been compulsory, to which 79 percent, replied that they would. A further 12 percent of students replied that they did not know and 9 percent said they would not. This suggests that if the school had been compulsory, at least a further 27 percent of the students enrolled in EMET 102 would have attended, however, the university would risk losing between 9 and 21 percent of the students.

Question 5 looked at whether the students would have enrolled in the unit if no residential school was offered. 94 percent of students replied that they would have enrolled in the unit, of which 21 percent indicated that they had no choice. The "no choice" option on the questionnaire was provided for those students who were required to complete the unit as part of their degree. With the remaining 6 percent of students replying that they were unsure, this suggests a retention rate of at least 94 percent if the residential school had been abolished.

The next question was only relevant to those students who had attended the residential school for EMET 102 in 1995, asking how helpful the school had been on a scale of 1 to 5, with 1 suggesting the unit had not been useful and 5 suggesting it had been very helpful. All of the students responses suggested that the school had a positive affect on their understanding of the unit's material, with 53 percent of the responses being '4' and the remaining 47 percent of students choosing '5'.
Question 7 was relevant to the whole sample and was a query as to whether a students decision to attend the residential school or not, was influenced by how well they were going in the unit. Students enrolled in EMET 102 had the option of submitting two voluntary assignments for which they would have received the marks before the residential school. The students were asked whether the assignment results had affected their decision to attend. 88 percent of the surveyed students replied that the assignment results had not affected their decision, with 9 percent suggesting that it had and 3 percent unsure. This suggested that at least 88 percent of the classes decisions to attend are made independently of how well they are going in the unit.

The last two questions considered the communication of the external students with the academic staff at the university. Question 8 requested information on what means of communication the students generally preferred when contacting a lecturer. The telephone was the most popular means with 33 percent of students replying that they had made use of it. The second most popular facility was the fax with 12 percent of students using it, followed by mail which was utilised by 6 percent. Nobody contacted the lecturer by email.

The final question asked of the students, was whether they felt more comfortable about contacting the lecturer if they had attended the residential school. Of the 17 surveyed students who had attended the residential school, 71 percent suggested that they did feel more comfortable (one of which responded 'a little'). The remaining students said 'no difference', leaving no one responding that they felt 'less comfortable' contacting the lecturer.

The survey's findings suggest that the existence of compulsory residential schools deters some students from enrolling in the units, however, this is a fairly small proportion. On the other hand, removing access to residential schools does not appear to limit the number of enrolling students. All of the students whom attended the residential schools believed that they benefited from the experience, in terms of both comprehension of the unit's material and feeling more comfortable contacting the teaching staff at the university. The decision to attend does not appear to be affected by the students perception of how well they are going in the course.
Assignment Marks and the Decision to Attend: A Probit Analysis

It seems reasonable to suggest that students' decisions whether to attend a voluntary residential school may depend on their perception of how well they are currently going, and the level of understanding of the unit's material that they have attained prior to the school. In the case of EMET 102 in 1995, the students had two voluntary assignments, both due before the residential school, for which they had received the marks. These assignments could be considered indicators of how well the students are handling the course.

A probit analysis was conducted on all of the students whom had completed the course, utilising data on both students who did attend and those who did not attend the residential school; a total of 59 students.

A complication that arose in setting up the dependant variables was how to allow for the fact that the assignments were voluntary. Clearly, marks were available only for those students who had chosen to complete the assignments, all other students were recorded as having zeros. It is conceivable that the decision whether to submit an assignment may have an impact on whether the student would attend the residential school. A student who does not submit an assignment may not have looked at the course and will feel that he/she needs to attend the residential school. Alternatively non-submission may indicate that a student does not intend to apply him/herself in the unit.

Using only the assignment marks as a regressor would confuse the effects of the decision to submit the assignment or not on the dependant variable, with the effect of the magnitude of the mark for those students who submitted. Thus it was necessary to introduce a dummy variable taking the value one if the student did not submit the assignment and zero otherwise. The dummy variable takes into account the decision effect, and allows the assignment marks variable to describe solely the effect of magnitude of assignment marks on the dependant variable.

(i) Quadratic Model

In the Probit Model, an index $I$ is created which is a linear function of the right-hand side variables, so for observation $t$: 
\[ I_t = X_t' \beta = \beta_0 + \beta_1 A_1 + \beta_2 A_2 + \beta_3 D_1 + \beta_4 D_2 \]

The index \( I \), which has a range from minus infinity to plus infinity, is then translated to a 0-1 range by the use of the Normal cumulative density function. So the probability of occurrence of the dependant variable, \( P(Y = 1) \) can be described as:

\[ P_t = F(I_t) = P(Z < I_t) \]

where the random variable \( Z \) follows a standard normal distribution.

When considering specification of the probit model, there are potentially two effects associated with assignment marks, the first being a low assignment mark causing a student to decide to attend the residential school because they are concerned that they are having difficulty understanding the course material, and the second being that a high assignment mark may indicate a keen student who will also want to attend. If this is the case we expect that both high and low assignment marks increase the probability of a student choosing to attend and a quadratic specification should be used.

The following quadratic specification for the probit model was estimated in SHAZAM utilising observations on the 59 students who completed the course:

\[ I_t = X_t' \beta = \beta_0 + \beta_1 D_1 + \beta_2 D_2 + \beta_3 A_1 + \beta_4 A_2 + \beta_5 A_1 SQ + \beta_6 A_2 SQ \]

The variables used for the probit analysis, and their descriptions are given in the following table:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>1 if attended residential school, else 0</td>
</tr>
<tr>
<td>D1</td>
<td>0 if submitted assignment one, else 1</td>
</tr>
<tr>
<td>D2</td>
<td>0 if submitted assignment two, else 14-</td>
</tr>
<tr>
<td>A1</td>
<td>Mark attained in assignment one, 0 if did not submit</td>
</tr>
<tr>
<td>A2</td>
<td>Mark attained in assignment two, 0 if did not submit</td>
</tr>
<tr>
<td>A1SQ</td>
<td>The square of the variable A1</td>
</tr>
<tr>
<td>A2SQ</td>
<td>The square of the variable A2</td>
</tr>
</tbody>
</table>
The results are presented below:

<table>
<thead>
<tr>
<th>VARIABLE NAME</th>
<th>ASYMPTOTIC ESTIMATED COEFFICIENT</th>
<th>ASYMPTOTIC STANDARD ERROR</th>
<th>ASYMPTOTIC T-RATIO</th>
<th>ELASTICITY AT MEANS</th>
<th>WEIGHTED AGGREGATE ELASTICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>4.5258</td>
<td>9.1698</td>
<td>0.49355</td>
<td>0.87298</td>
<td>0.86159</td>
</tr>
<tr>
<td>D2</td>
<td>-0.66283</td>
<td>17.974</td>
<td>-0.37991E-01</td>
<td>-0.15805</td>
<td>-0.15673</td>
</tr>
<tr>
<td>A1</td>
<td>0.10243</td>
<td>0.22896</td>
<td>0.44739</td>
<td>5.1451</td>
<td>4.9796</td>
</tr>
<tr>
<td>A2</td>
<td>-0.26366E-01</td>
<td>0.42568</td>
<td>-0.61937E-01</td>
<td>-1.2616</td>
<td>-1.2139</td>
</tr>
<tr>
<td>A1SQ</td>
<td>-0.56801E-03</td>
<td>0.14151E-02</td>
<td>-0.40140</td>
<td>-2.5719</td>
<td>-2.4922</td>
</tr>
<tr>
<td>A2SQ</td>
<td>0.23937E-03</td>
<td>0.24866E-02</td>
<td>0.96186E-01</td>
<td>1.0534</td>
<td>1.0136</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-3.9973</td>
<td>15.942</td>
<td>-0.25074</td>
<td>-3.0327</td>
<td>-2.9446</td>
</tr>
</tbody>
</table>

The correlation matrix is as follows:

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
<th>D2</th>
<th>A1</th>
<th>A2</th>
<th>A1SQ</th>
<th>A2SQ</th>
<th>CONSTANT</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D2</td>
<td>-0.46</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>0.99</td>
<td>-0.46</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>-0.98</td>
<td>0.46</td>
<td>-0.99</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1SQ</td>
<td>-0.98</td>
<td>0.46</td>
<td>-0.99</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2SQ</td>
<td>-0.98</td>
<td>0.48</td>
<td>-0.99</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-0.95</td>
<td>-0.96</td>
<td>-0.94</td>
<td>-0.86</td>
<td>0.48</td>
<td>-0.48</td>
<td>-0.96</td>
</tr>
</tbody>
</table>

The results of the estimation are disappointing because of the low significance of the estimated coefficients. The t-ratios suggest that none of the variables are significant. The lack of any strong relationship between the individual regressors and the probability of attending the residential school could be due to high levels of multicollinearity between the variables as shown in the correlation matrix. The variables showing the strongest evidence of multicollinearity are recorded in bold type. The effect of this multicollinearity between the regressor variables is to reduce the efficiency of the estimation, incurring larger standard errors and consequently lower t-values. The parameters, however, will still be estimated consistently. Obtaining a larger sample for the estimation would reduce the standard errors and improve the significance of the estimated coefficients.

A test of the overall significance of the probit model was conducted, using the Wald test. The calculated Chi-Square statistic was 2.03, for a chi-square distribution with 6 degrees of freedom. The p-value for the test was 0.917, exceeding the 0.05
level of significance by a considerable amount, which suggests that the overall model is not significant.

The results of the probit model are now used to predict the probability of a student attending the residential school based on their own particular circumstances. To compute predicted probabilities after the coefficients have been estimated, we use:

\[
\hat{Y}_i = \hat{p}_i = F(X'\hat{\beta})
\]

In the context of our analysis, we can use the estimated results to predict the probability of a student attending the residential school based on four cases; whether they attempted the assignments 1 or 2 or both or neither. Because the predicted probabilities differ depending on the assignment marks attained average marks were used for this prediction. The average mark for assignment one was 88.77 while for assignment two it was 90.76.

**Case 1: Student submitted both assignments**

(D1=0, D2=0, A1=88.77, A2=90.73)

\[
\hat{Y}_i = F(-4.00 + 0.102*88.77 - 0.0006*88.77^2 - 0.026*90.73 + 0.0002*90.73^2)
\]

\[
= F(-0.386) = 0.350
\]

**Case 2: Student submitted assignment 1 but not assignment 2**

(D1=0, D2=1, A1=88.77, A2=0)

\[
\hat{Y}_i = F(-4.00 - 0.683 + 0.102*88.77 - 0.0006*88.77^2)
\]

\[
= F(-0.357) = 0.361
\]

**Case 3: Student submitted assignment 2 but not assignment 1**

(A1=0, A2 = 90.73, D1=1, D2=0)

\[
\hat{Y}_i = F(-4.00 + 4.526 + 0.026*90.73 + 0.0002*90.73^2)
\]

\[
= F(-0.186) = 0.426
\]

**Case 4: Student did not submit either assignment**

(D1=1, D2=1, A1=0, A2=0)

\[
\hat{Y}_i = F(-4.00 + 4.526 - 0.682)
\]

\[
= F(-0.156) = 0.438
\]
The predicted probabilities do not differ very much between the four categories, and due to the insignificance of the estimated coefficients on which they are based the reader should be wary of putting too much faith in them. This demonstrates the result of the Wald test which suggested that no regressors were relevant as the incorporation of different variables across the categories causes very little change in the predicted probability of attending the residential school.

The calculated probabilities indicate that a student who submitted no assignments was most likely to attend the school, followed by a student who had submitted assignment 2 (and received an average mark). A student who only submitted assignment 1 is the next most likely category to attend the residential school while the least likely category, are those students whom submitted both assignments.

(ii) Linear Model

Due to the insignificance of the estimated probit model above, it was decided to remove the quadratic terms, A1SQ and A2SQ, in favour of a simpler linear model. Removing the two variables will reduce the multicollinearity inherent in the explanatory variables, as it can be seen from the earlier correlation matrix that these variables exhibited high pairwise correlations with other explanatory variables. The new probit model, to be estimated on the same sample, has the following specification:

\[ I = X'\beta = \beta_0 + \beta_1 D1 + \beta_2 D2 + \beta_3 A1 + \beta_4 A2 \]

The estimated results are presented below:

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>ESTIMATED COEFFICIENT</th>
<th>ASYMPTOTIC STANDARD ERROR</th>
<th>T-RATIO</th>
<th>ELASTICITY AT MEANS</th>
<th>WEIGHTED AGGREGATE ELASTICITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>.92419</td>
<td>1.8018</td>
<td>.51292</td>
<td>.17802</td>
<td>.17640</td>
</tr>
<tr>
<td>D2</td>
<td>.97460</td>
<td>1.9810</td>
<td>.49199</td>
<td>.22527</td>
<td>.22345</td>
</tr>
<tr>
<td>A1</td>
<td>.10946E-01</td>
<td>.19630E-01</td>
<td>.55762</td>
<td>.54904</td>
<td>.53215</td>
</tr>
<tr>
<td>A2</td>
<td>.13514E-01</td>
<td>.21136E-01</td>
<td>.63937</td>
<td>.64572</td>
<td>.62402</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>-2.0453</td>
<td>2.0021</td>
<td>-1.0216</td>
<td>-1.5496</td>
<td>-1.5105</td>
</tr>
</tbody>
</table>
The correlation matrix for the explanatory variables used in the model is as follows:

<table>
<thead>
<tr>
<th></th>
<th>D1</th>
<th>D2</th>
<th>A1</th>
<th>A2</th>
<th>CONST</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D2</td>
<td>-0.43</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>0.96</td>
<td>-0.38</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>-0.42</td>
<td>0.97</td>
<td>-0.41</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>CONST</td>
<td>-0.45</td>
<td>-0.60</td>
<td>-0.48</td>
<td>-0.60</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The estimated coefficients of the two dummy variables are both positive suggesting that non-submission of an assignment increases the probability of a student attending the residential school. The coefficients for the assignment mark variables are also positive, indicating that a higher mark in the assignment will increase the likelihood of a student choosing to come to the residential school. However, none of the coefficients in the model are statistically significant from zero which suggests that there is not a very strong relationship between the explanatory variables and a student's decision to attend.

The lack of any strong relationship between the individual regressors and the probability of attending the residential school could again be due to the high levels of multicollinearity between the variables as shown in the correlation matrix of the explanatory variables with a correlation of 0.96 between A1 and D1 and of 0.97 between A2 and D2. As mentioned earlier, the effect of this multicollinearity between the regressor variables is to reduce the efficiency of the estimation, incurring larger standard errors and consequently lower t-values. The parameters, however, will still be estimated consistently. Obtaining a larger sample for the estimation would reduce the standard errors and improve the significance of the estimated coefficients.

Again a Wald Chi-Square test was conducted, testing for the overall significance of the regressor variables. The calculated test statistic, for a chi-square distribution with 4 degrees of freedom, was 1.91 with a p-value of 0.75. As before the test suggests that the probit model is clearly not significant. The predicted probabilities for the four categories based on this newly specified model are as follows:

**Case 1: Student submitted both assignments**

(A1=88.77, A2=90.73, D1=0, D2=0)

\[ \hat{y}_t = F(-2.05 + 0.011 \times 88.77 + 0.014 \times 90.73) = F(0.154) = 0.561 \]
Case 2: Student submitted assignment 1 but not assignment 2
(A1=88.77, A2=0, D1=0, D2=1)
\[
\hat{y}_t = F(-2.05 + 0.011 \times 88.77 + 0.975 \times 1) = F(-0.099) = 0.461
\]

Case 3: Student submitted assignment 2 but not assignment 1
(A1=0, A2 = 90.73, D1=1, D2=0)
\[
\hat{y}_t = F(-2.05 + 0.014 \times 90.73 + 0.924 \times 1) = F(0.053) = 0.542
\]

Case 4: Student did not submit either assignment
(A1=0, A2=0, D1=1, D2=1)
\[
\hat{y}_t = F(-2.05 + 0.924 \times 1 + 0.975 \times 1) = F(-0.225) = 0.442
\]

The predicted probabilities do not vary very much across the four categories, suggesting that the explanatory variables are only minor influences on a decision to attend. This is consistent with the Wald test for the model.

In conclusion, probit analysis conducted on the students enrolled in EMET 102 in 1995 does not suggest that there is a strong relationship between how well the students are going in the course and their choice whether to attend the residential school. This supports the qualitative results from the survey which found that only 9 percent of students believed that their decision was influenced by their assignment results. The probit analysis, however, was hampered by the high multicollinearity found between the explanatory variables. A major reason for this result arises from the fact that the assignments were voluntary and if this were not the case improved estimation is likely. Both a quadratic and a linear model was specified as potentially valuable methods for prediction of residential school attendance. Whilst the results from this initial analysis were disappointing, it is suggested that with a larger sample size and the removal of the multicollinearity problem which arose from incorporating the voluntary nature of the assignments, much more reliable results may be obtained.
Does attending the Residential School affect the final grade of a student?

In this section the effect of attending the residential school on the students final marks is measured. The students were divided into two groups, with group one being comprised of those students who attended the residential school and group two consisting of the students who did not attend. The final marks for the unit were obtained, and a hypothesis test was then conducted comparing the mean of the final marks for group 1 ($\mu_1$) with that for group 2 ($\mu_2$). It was expected that the residential school was beneficial for those students whom attended, suggesting the following null and alternative hypotheses:

\begin{align*}
H_0: & \quad \mu_1 = \mu_2 \\
H_1: & \quad \mu_1 > \mu_2
\end{align*}

The test statistic, which follows a Students $t$ distribution with 57 degrees of freedom, was calculated as 1.621. This value rejects the null hypothesis, $H_0$, in favour of the alternative hypothesis, $H_1$, at the 10 percent level of significance, and only just fails to reject at the 5 percent level, with a $p$-value of 0.056. That is, there is strong evidence to suggest that the students who attend residential schools perform better on average than those who do not. In fact, for this particular survey, a student who attended the residential school on average achieved a final grade approximately 9 marks higher than that of a student who did not attend.
Conclusion

This study set out to investigate students reactions to the voluntary residential school offered to EMET 102 external students in 1995 at The University of New England, and to provide a pilot study for future analysis in the area. The survey results have suggested that compulsory residential schools may deter students from enrolling in units. However, there is strong evidence from both the qualitative survey results and regression analysis that the students who attend the residential schools perform better in the unit, thus, compulsory residential schools are beneficial to maintenance of the university's standard of education.

A students decision to attend the residential school was also explored, with consideration of the possibility that the students perception of how well they were going, prior to the school, may have affected their choice. Both the qualitative survey results and a probit model were utilised for this purpose, with both showing that the decision appeared to be independent of a students current marks. However, these results were severely hampered by the existence of a multicollinearity problem, due to the voluntary nature of the assignments, and the limited sample size.

Before concrete conclusions are made a broader study encompassing most of the university departments involved in distance education should be conducted, following the method of analysis described here.
1st June, 1996

Dear Student,

I am writing to you to obtain some information which could be of help to UNE. As you may be aware, this Department last year had voluntary Residential Schools, on a trial basis, for the first time.

The Deputy Vice-Chancellor, Professor Michael Stoddart, is most interested to learn about our experiences, with a view to possibly encouraging all departments to consider voluntary schools.

We have been given some funds from the Academic Development Unit to obtain some information and provide statistical analysis on a number of issues.

I am writing to you as one of our 1995 students in Econometrics 102 - Introductory Statistics B (EMET 102). Could you please give 5 minutes of your time to complete the very brief attached survey and return it in the envelope provided by 17th June? Your contribution will be appreciated.

Yours sincerely,

Professor Howard E. Doran
Head - Department of Econometrics
Residential School Survey

(Please circle response where appropriate)

1. Name: ________________________________

2. Student Number: _______________________

3. Did you attend the Residential School for EMET 102?
   Yes   No

4. Would you have enrolled in the unit if the Residential School was compulsory?
   Yes   No   Don’t Know

5. If a Residential School was not offered would you still have enrolled in this unit?
   Yes   No   No Choice   Don’t Know

6. If you attended the Residential School, please indicate on the following scale how helpful you found it?
   (Not at all) 1 2 3 4 5 (Very Helpful)

7. Did your assignment results before the Residential School influence your decision to attend?
   Yes   No   Don’t Know

8. Did you use any of the following means of communication with the lecturer before the Residential School?

   Phone:   Yes   No

   Letter:   Yes   No

   Fax:   Yes   No

   Email:   Yes   No

9. If you did attend the Residential School, did you feel more comfortable about contacting the lecturer with subsequent problems?
   Yes   A Little   No Difference   Less Comfortable
WORKING PAPERS IN ECONOMETRICS AND APPLIED STATISTICS


A Note on A Bayesian Estimator in an Autocorrelated Error Model. William Griffiths and Dan Dao, No. 3 - April 1979.


A General Equilibrium Approach to the Construction of Multilateral Index Numbers.


Bayesian Econometrics and How to Get Rid of Those Wrong Signs. William E. Griffiths, No. 31 - November 1987.


