Study on CET4 Marks in China's Graded English Teaching

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Abstract: This paper deploys Logit model, and decomposes variables by using O-B decomposition to analyze CET4 marks of graded teaching empirically. The result shows graded teaching can help to enhance CET4 marks. The teachers' first school record and the graded students are studying in, and genders of students are the significant variables that affect students' CET4 marks.
Keywords: Graded teaching, CET4, Logit model, O-B decomposition

1 Introduction

According to different English starting points of the university students, university English teaching should consider the students of low English starting points and provide development space for the other students with comparatively higher English ability. According to theoretical researches, graded teaching embodies Krashen's "i+1" language Input Hypothesis. Krashen put forward that only the ideal language input which is a little higher than language learners' present proficiency can enable the learners to achieve ideal learning effect: the difficult "input" may make learners feel diffident and anxious, thus to lead to failed learning; the too simple "input" and especially the input which is approaching and even lower than learners' present ability may make learners unable to achieve new knowledge and skills, and may make them feel disgusted, this makes the entire learning process produce almost no effect. Consequently, China's general academies enforce university English graded teaching. This ensures that students with different starting points make progress individually.

This paper, by using statistical analysis, is to study CET4 results empirically of those graded and un-graded students in Shandong Institute of Business & Technology. Firstly, it is to use Logit regression model to study the difference choice of students' achievements of passing the CET4 exam or not. Secondly, it is to study major factors that lead to differences of exam results by using binary choice O-B decomposition. It is to determine the major impact variables from both the students and the teachers aspects, thus to provide scientific foundation for university English graded teaching hereafter.

2 Data Selection and Variable Description

2.1 Data selection

This study collects and collates all students' (they entered university in the year 2008, and they took the first opportunity of CET4 exam in December, 2009) CET4 results, sexes, English graded grades, and all the teachers' information in Shandong Institute of Business & Technology. By removing the absent candidates, a total of 3,979 valid samples are obtained, including the graded 3,834 students and those un-graded 145 ones.

2.2 Variable description

Table 1 shows the mean and standard deviation statistics of the explained variables and the explanatory variables.

The variable's statistical analysis results of mean and standard deviation are in Table 1.

Table 1 Variable's statistical analysis description

Variable	Variable description	All the samples (n=3 834)	
		Mean	Standard Deviation
Grade	Students' CET4 results, categorical variable, discrete values: =1, qualified; =0, unqualified	0.645 161	0.484 224
Sex	Sex, categorical variable, discrete values: =1, female; =0, male	0.578 818	0.494 358
Teacher	Teacher's first degree, categorical variable, discrete values: =1, Master's Degree; =0, Bachelor's Degree	0.187 192	0.390 547
Jibie	Grades of the graded students, categorical variable, discrete values: B3=0, B2=1, B1=2, A3=3, A2=4, A1=5	2.464 02	1.852 945

The variable description statistical analysis results show that the explained variable is students' CET4 results, namely, the mean of *Grade* is 0.645 161. This shows the overall CET4 results tend to be qualified. Explanatory variables include sex— *Sex*, teachers' first degree— *Teacher* , and students' Grades— *Jibie* . Students' grade mean is 2.464 02, this shows it is at a medium level, and it trends towards B1 grade.

3 Econometric Models and Methods

3.1 Binary choice Logit regression

In this study, the explained variable *Grade* , a binary response variable, shows whether the CET4 results are qualifies or unqualified. Its mean is just a ratio, representing the qualified opportunity rate. Consequently, in order to clear differences on CET4 results of university English graded teaching, the influencing factors have to be picked up. In order to get the influencing factors, Logit regression model has to be established.

$$p_i = E(Grade) = F(\boldsymbol{X}_i\boldsymbol{\beta}) = \frac{1}{1+e^{-\boldsymbol{X}_i\boldsymbol{\beta}}} \quad (1)$$

In this pattern (1), p_i is individual i 's acceptance probability of passing the exam. $E(\bullet)$ stands for mathematical expectation. $F(z)=1/(1+e^{-z})$ is Logistic distribution of cumulative distribution function. $\boldsymbol{X}$ is the explanatory variable vector made up of personal characteristics (gender, level), and teacher characteristics (first degree). $\boldsymbol{\beta}$ is the corresponding coefficient estimates. To rearrange pattern 1 slightly, we can get:

$$\ln\left(\frac{p_i}{1-p_i}\right) = \boldsymbol{X}_i\boldsymbol{\beta} \quad (2)$$

In model (2), $\frac{p_i}{1-p_i}$ is with definite economic implication, and that is named opportunity ratio. From model (2), we can see that regression coefficient for the natural logarithm of the ratio of opportunity will have a linear effect.

3.2 Binary choice Logit regression

In order to further probe into factors resulting in CET4 results' differences of graded teaching, decomposition approach has to be employed. Oaxaca (1973) & Blinder (1973) put forward classic O-B decomposition approach, which portraits differences of sample characters or influences on explained variable's average level from coefficient difference in details. But if the explained variable is Binary

response variable, the classic O-B decomposition will not be effective. Fairlie (2005) raised binary choice O-B decomposition approach on the basis of Logit regression model. This helps remove limitations that the classic O-B decomposition cannot be applied to explain the binary response variable. According to this, students' opportunity ratio of qualified CET4 results' differences can be classified into two parts: explanatory part and unexplainable part. The former is also named characteristic effect, it is majorly caused by differences of students' individual characters and teachers' characters; while the latter is also named coefficient effect, it is mainly caused by regression coefficient and cannot be explained by differences on students' characters. This paper, by making use of Fairlie's (2005) binary choice O-B decomposition approach, is to decompose differences on students' CET4 results. The specific steps are listed as follows:

Firstly, to establish Logit regression model by making use of pattern (1), and to get regression coefficient vector $\hat{\boldsymbol{\beta}}$.

Secondly, to calculate the total effect by $\hat{\boldsymbol{\beta}}$, the pattern is listed as follows:

$$\sum_{i=1}^{N} \frac{F\left(\boldsymbol{X}\hat{\boldsymbol{\beta}}\right)}{N} \tag{3}$$

In pattern (3), $\boldsymbol{X}$ stands for Vector of explanatory variable, and N stands for sample size.

Thirdly, calculating the character effect of every explanatory variable, and calculating the coefficient effect.

The character effect of *Sex* should be:

$$\frac{1}{N}\sum_{i=1}^{N} F\left(\boldsymbol{X}\hat{\boldsymbol{\beta}}\right) - F\left(\boldsymbol{X}_i'\hat{\boldsymbol{\beta}}\right) \tag{4}$$

The character effect of *Jibie* should be:

$$\frac{1}{N}\sum_{i=1}^{N} F\left(\boldsymbol{X}\hat{\boldsymbol{\beta}}\right) - F\left(\boldsymbol{X}_i'\hat{\boldsymbol{\beta}}\right) \tag{5}$$

The character effect of *Teacher* should be:

$$\frac{1}{N}\sum_{i=1}^{N} F\left(\boldsymbol{X}\hat{\boldsymbol{\beta}}\right) - F\left(\boldsymbol{X}_i'\hat{\boldsymbol{\beta}}\right) \tag{6}$$

Among them, $\hat{\boldsymbol{\beta}}' = \left(\hat{\beta}, \hat{\beta}_1, \hat{\beta}_2, \hat{\beta}_3\right)$, $\boldsymbol{X}_i = \left(1, Sex, Teacher, Jibie\right)^T$.

4 Empirical Analysis

4.1 Analysis of CET4 results' differences in university English graded teaching

Table 2 lists estimate results of Logit regression model. For model fitting results, seen from the table, McFadden R-squared is 0.91, Residual sum of squares regression model is only 70.82. Both the equation and the coefficients have passed significance test.

Table 2 Results of model regression

Explained variable: GRADE				
Method: ML - Binary Logit				
Sample: 13 834				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-1.021 958	0.239 176	-4.272 824	0.000 0
Sex	1.059 958	0.241 926	4.381 322	0.000 0
Teacher	0.810 721	0.279 712	-2.898 418	0.000 8
Jibie	0.565 101	0.075 167	7.517 907	0.000 0

McFadden R-squared	0.905 502	Obs with Dep=0	137 3
LR statistic (3 df)	107.788 6	Obs with Dep=1	246 1
Probability (LR stat)	0.000 000	Total obs	383 4

Table 2 reports estimation results of Logit regression model. Model fitting result has achieved 0.91, both Equation and the coefficients have passed test of significance. According to regression results, regression coefficient of sex explanatory variable is significantly positive. This shows that female students are more likely to pass CET4 compared with male students. This is in line with sex difference in learning of present university male and female students. Regression coefficient of Teachers' first degree is positive, this shows the higher the teacher's first degree is, the more likely that the students can pass CET4. Its comparatively higher marginal contribution is 0.81. Regression coefficient of grade is also significantly positive. This shows clearly that the higher graded class the students are studying in, the easier they can pass CET4. The marginal contribution is 0.56. To sort according to marginal contribution, factors influencing students' CET4 results are teacher's first degree, grades of the graded classes, and students' sex.

4.2 Character effect analysis of factors influencing CET4 results' differences

To decompose the model's total effect by using binary choice O-B approach, the character effect of respective explanatory variable can be achieved and listed in Table 3.

Table 3 Decomposition of model effect

	Effect ($\times 10^{-2}$)	Percentage
Total effect	5.359	100
Sex		
Character effect	0.058	1.08
Teacher's first degree		
Character effect	4.073	76
Grade		
Character effect	1.228	22.92

On the basis of Logit regression model, to explain the respective variables' influencing degree on students' probability of passing the exam by making use of O-B decomposition. Table 3 reports Logit regression-based contribution degree of the respective influencing factors. From Table 3, teacher's first degree's character effect plays the leading role, and its contribution achieves 76%. Samples' difference in teacher allocation is the major factor that leads to students' different achievement probability of passing CET4. The next important factor that influences students' CET4 results is the graded class. The graded class A & class B are set according to students' CET4 results. Students in class A are afraid of being degraded to class B, while those in class B want to be upgraded to class A by their hard working. So grade is the secondary important factor in contributing to CET4 passing probability. The thirdly important factor is students' sex.

5 Conclusions and Policy Recommendations

The gravelly taught students' achievements are significantly higher than those not. This proves that the general academies' English graded teaching reform at present according to University English Curriculum Requirements enforced by China's Education Department is effective. It can enhance students' CET4 results. The relatively high standard deviation score of the classified taught students'

CET4 results, and the expanded gap between the different classifications, we can see that in classified teaching process, teachers should not just focus on teaching in higher graded classes. They should take into account both the higher grade classes and the lower grade classes, and they even need to focus more on students in the lower grade classes. Besides, to improve the educational level of teachers taking part in classified teaching task, to pay more attention to boys in the classified classes are both beneficial to increase CET4 results of classified taught students.

This paper studies on one college's samples. There is still further discussion on the general academies' English graded teaching, and on its fitness for other types of institutions.

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