Chapter 4

Statistical Modeling

A statistical model was used to describe the pattern of transfer of major by the undergraduate students admitted to PSU, Pattani between 1999 and 2007.

4.1 Model Fitting

Logistic regression was used to investigate the independent effects of the determinants (faculty-religion-gender, year of admission and duration of study) on the outcome (transfer or not transfer) as described in chapter 2. Sum contrasts were used. Figure 4.1 shows the observed and fitted plots and deviance residuals plot from logistic regression. A plot of the observed counts of transfer students and the expected values given by the model are shown on the left panel. The scatter plots of the observed count and fitted values are scattered along the diagonal line. The right panel shows a plot of the deviance residuals versus the normal quantiles, where one outlier are visible. This outlier corresponds to 49 Muslim male students from the faculty of Science and Technology admitted in 2005 where 3 transfer students were in their 'second or the third year' of the study. The residual deviance base on the model is 301.66. The number of degrees of freedom for assessing the goodness-of-fit is 201.

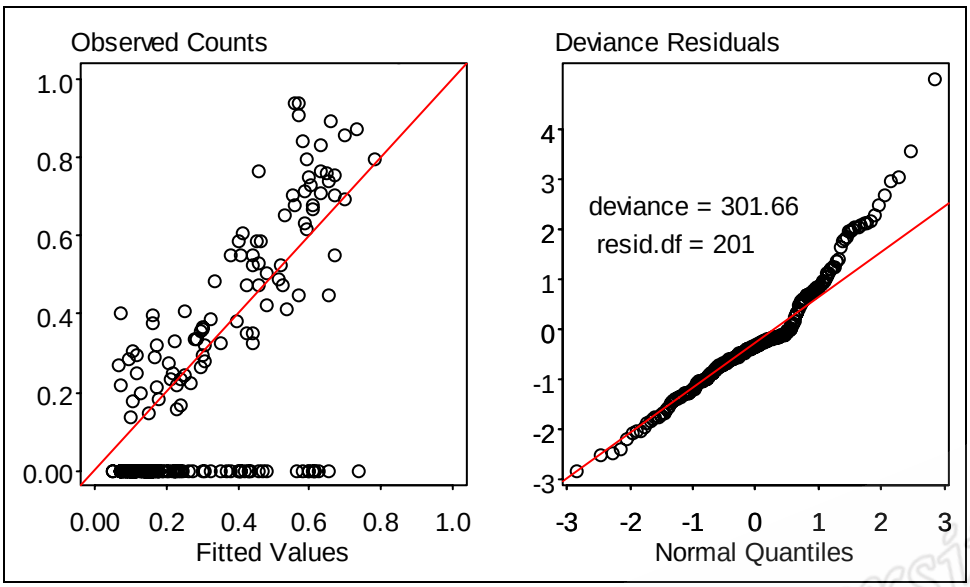

Figure 4.1: Observed and fitted plots (on left panel) and deviance residuals plot (on right panel) after fitting a logistic regression model to the data

Table 4.1 shows coefficients, standard errors and p-values based on the logistic regression model. The numbers of parameter in this model (*m*) are 26 corresponding to the constant plus 14 categories of combined faculty-religion-gender variable, nine categories of year of admission and two categories of duration of study. The coefficients with statistically significant p-values ($p < 0.05$) are shown. The results show the evidence of the difference between faculty-religion-gender, year of admission and duration of study.

The results clearly show that Muslim male and the non-Muslim female students from the faculty of Humanities and Social Sciences, and Muslim male students from the College of Islamic studies were more likely to transfer major than the other faculty-religion-gender group. Student admitted in 2004, 2006 and 2007 had significantly higher transfer than all other years combined, while students who admitted in 2005 had significantly lower transfer their major.

Determinants		**Coefficient**	**Std. Error**	***p-value***
	Constant	-3.8533	0.0993	< **0.0001**
Faculty-Religion-Gender:	11:Edu.Muslim.Male	-0.5211	0.4949	0.2924
	12:Edu.Other.Male	-0.4372	0.3535	0.2160
	13:Edu.Muslim.Female	-0.1880	0.2509	0.4534
	14:Edu.Other.Female	0.3685	0.1707	**0.0307**
	21:Hum.Muslim.Male	1.2345	0.1669	**<0.0001**
	22:Hum.Other.Male	0.6947	0.1743	**<0.0001**
	23:Hum.Muslim.Female	0.5761	0.1567	**0.0002**
	24:Hum.Other.Female	0.8272	0.1272	**<0.0001**
	31:Sci.Muslim.Male	-0.5374	0.3337	0.1073
	32:Sci.Other.Male	-1.4518	0.2960	**<0.0001**
	33:Sci.Muslim.Female	-0.7677	0.3030	**0.0112**
	34:Sci.Other.Female	-1.4553	0.2424	**<0.0001**
	41:Isl.Muslim.Male	0.9782	0.2086	**<0.0001**
	43:Isl.Muslim.Female	0.6792	0.1634	**0.0030**
Year of Admission:	1999	-0.2228	0.1890	0.2386
	2000	-0.4024	0.1959	**0.0399**
	2001	-0.3776	0.1614	**0.0193**
	2002	0.0324	0.1304	0.8037
	2003	-0.4718	0.1547	**0.0022**
	2004	0.9114	0.1347	**<0.0001**
	2005	-1.3693	0.1409	**<0.0001**
	2006	0.8416	0.3512	**0.0165**
	2007	1.0585	0.3589	**0.0005**
Duration of Study:	2-3 years	-2.1702	0.0970	**<0.0001**
	4+ years	2.1702	0.1462	**<0.0001**

Table 4.1: Coefficients, standard errors and p-values from logistic regression model

Note: Edu = Faculty of Education, Hum = Faculty of Humanities and Social Sciences, Sci = Faculty of Science and Technology and Isl = College of Islamic Studies

Students who had been studying for 4 or more years were more likely to transfer than students who had been studying for 2-3 years.

4.2 Graphical Displays

95% confidence interval graphs of transfer rates for each factor based on logistic regression model using sum contrasts are shown in Figures 4.2-4.3. From the model, we constructed confidence interval for each factor adjusted for other factors. Figure 4.2 shows 95% confidence interval of transferring major students for faculty-religion-gender. The dotted line on the graph represents the overall percentage of transfer (3.6%). The faculty-religion-gender codes are described as in Table 4.1. The result from this model show that the highest of transfer students was for Muslim male students from the faculty of Humanities and Social Sciences. The students from the faculty of Science and Technology were the students with the lowest percentage of transfer.

Figure 4.3 shows 95% confidence intervals of students who transferred in their major for particular year of admittance (left panel) and study period (right panel). The students admitted in 2004 have higher percentage of transferring their major than the overall percentage of transfer. The lowest percentage of transfer was for those admitted in 2005 and the students admitted between 1999 and 2003 were lower percentage of transferring their major than the overall percentage of transfer. The students who had been studying for 4 or more years had higher percentage of transfer than students who had been studying for 2-3 years.

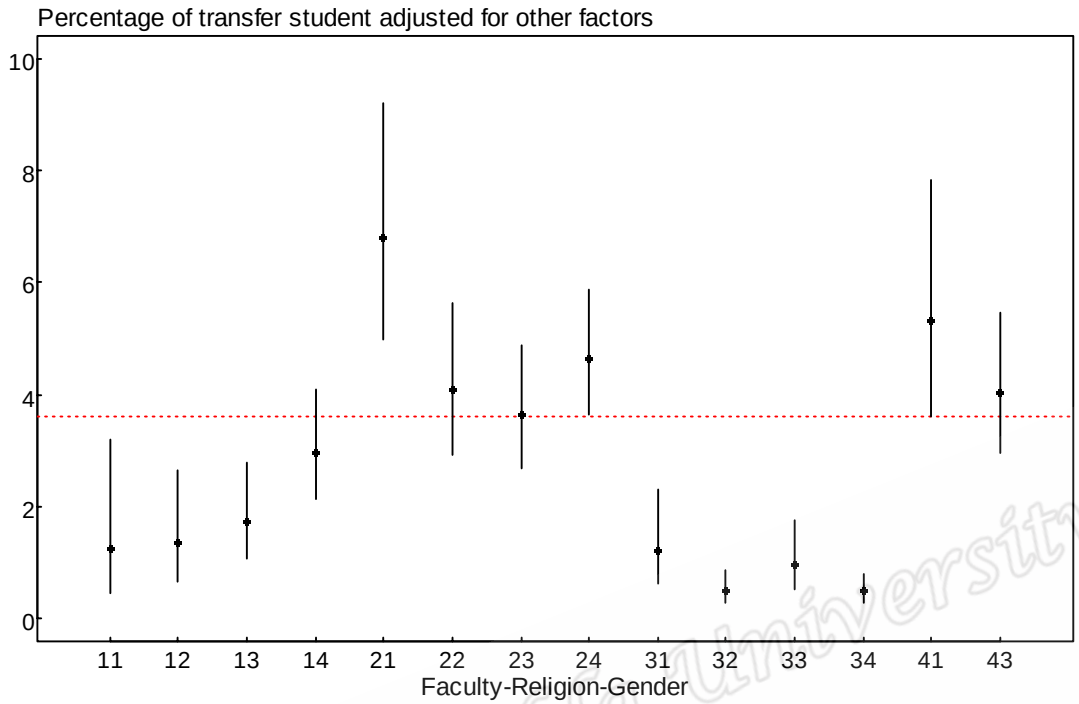

Figure 4.2: 95% Confidence intervals for transfer percentage by faculty-religion-gender

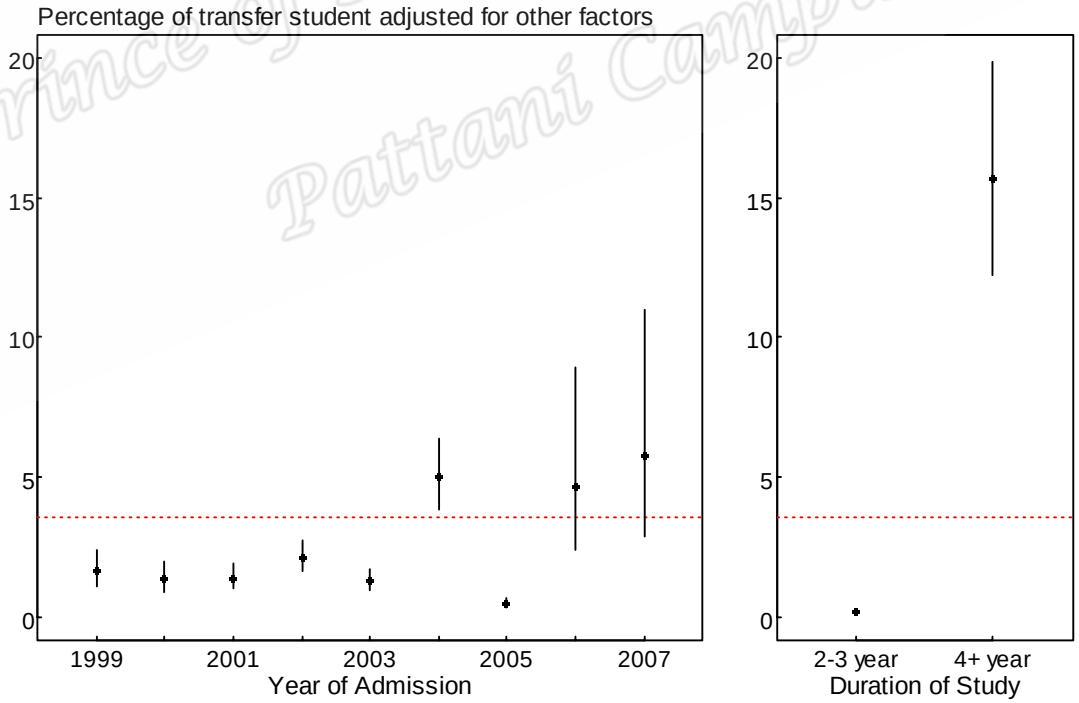

Figure 4.3: 95% Confidence intervals for transfer percentage by year of admission and duration of study