Academic Progress and Time to Degree: Evidence from Event History Analysis

2013 AIR Annual Conference
Long Beach, CA
May 21, 2013

HONGTAO YUE, RESEARCH ANALYST
XUANNING FU, PH.D. FORMER DIRECTOR
OFFICE OF INSTITUTIONAL EFFECTIVENESS
& PROFESSOR OF SOCIOLOGY, CSU FRESNO

Content

- **Introduction**
- **Literature Review**
- **Methodology**
  - ✓ Data
  - ✓ Tracking Students Over Time: Variables In Analysis
  - ✓ Methods: Event History Analysis (EHA)
- **Findings**
  - ✓ Descriptive Statistics
  - ✓ Impacts Of Time-Independent Variables
  - ✓ Impacts Of Time-Dependent Variables
  - ✓ Results from Statistical Models
- **Conclusion and Discussion**

Introduction

Two questions Higher Ed institutional researchers often ask:

After controlling student background characteristics,

- What factors affect retention and graduation?
- What factors affect the length of time to graduation?

While retention and graduation have received ample attention and become a yardstick for student success, time to graduation has not been fully examined.

Education is a dynamic and temporal process, and we need to understand factors that affect time to degree.

Introduction

Common barriers to studying time to degree:

- Data barrier: Lack of longitudinal data
- Methodological barrier: Unfamiliarity of statistical models that capture progress over time.

The purpose of this study is:

To overcome both barriers and answer this question:

Beyond students' demographic characteristics and academic preparation at entry, what aspects of their academic progress affect time to graduation?

Literature On Time-To-Degree

Definitions of Time to Degree:

Total Elapsed Time = Total Enrolled Time + Stop-Out Time

The current trend and issues:

- "Time to completion of the baccalaureate degree has increased markedly in the United States over the past three decades."

- The median time to earn a Bachelor's degree from public institutions in 2008:
  - ✓ **55 months** for all degree recipients (4.6 years).
  - ✓ **63 months** for graduates who started at a 2-year public institutions (5.3 years)
  - ✓ **80 months** for those who delayed entry into postsecondary education (6.7 years)

SOURCE: U.S. Department of Education, National Center for Education Statistics. (2011). 2008–09 Baccalaureate and Beyond Longitudinal Study (B&B:08/09): A First Look at Recent College Graduates (NCES 2011-236), Table 3.

Literature On Time-To-Degree

Factors affecting Time-to-Degree

- **At macro level**: Poor college preparedness, changing demographic composition of students, declines in collegiate resources in the less selective public sector, and increases in student employment

- **At micro level**: interest-major congruence, motivation, 1st-year academic performance, extracurricular activities, small course loads, changing majors, and living on campus .

DATA

The dataset:

For this study, our dataset includes 12,069 first time freshmen in five fall entering cohorts from fall 2002 to fall 2006, in a large state university in California.

The observation period:

- From fall 2002 to spring 2012 with a maximum of 20 terms.
- All students are tracked from the first to the last enrolled terms during the observation period.

DATA

Tracking students over time:

- The enrolled terms include the main terms of fall and spring terms.
- Right-censored data
- List of variables tracked across enrolled terms

Table 1 List of Time-dependent Variables

Variable name	Coding
Dependent variable	
Time to degree (The number of enrolled terms from the entering terms to the terms in which a student graduated with a bachelor's degree)	
Graduation status (1=Graduated with a bachelor's degree, 0 = otherwise)	
Time-dependent variables	
Enrollment pattern	
Term units enrolled	
Extra enrollment	having extra enrollment=1, otherwise=0
Major status	
Major declaration	Major declared=1, otherwise=0
Major change	Major changed=1, otherwise=0
Double Majors/Minors	Having a double major or minor=1, otherwise=0
Academic performance/progress	
Term GPA	
Cumulative GPA	
Cumulative units earned	

Methods

Event history analysis (EHA)

To analyze data obtained by observing individuals over time, EHA focuses on events occurring for the individuals. Time series data typically consist of time for the occurrence of events and the types of events that occur.

EHA applications

Basing their roots on biostatistics and epidemiology, EHA adopted different names across scientific disciplines, such as “event history analysis” (sociology), “duration models” (political science, economics), “hazard models” / “hazard rate models” (biostatistics, epidemiology), and/or “failure-time models” (engineering, reliability analysis).

Methods

Strengths of EHA

- Ability to examine the underlying causal mechanisms behind event occurrence.
- Ability to control for censored data.
- Ability to examine the impact of time-dependent covariates on outcome.

Two approaches

- Continuous time approach: Cox regression model
- Discrete time approach: Logit hazard model

Methods
Cox regression model

Continuous-time hazard:

Assessing the risk—at a particular moment—that an individual who has not yet done so will experience the event. It is a rate assessing the conditional probability of event occurrence

$$h(t_j) = \lim_{\Delta t \to 0} \left(\frac{Prob\{T \in (T_j, T_j + \Delta t) | T \geq T_j\}}{\Delta t} \right), \qquad h(t_j) >= 0$$

Cox regression model with time-dependent covariates:

$$\text{Log } h(t_j) = \text{Log } [h_0(t) * \text{EXP}(\alpha * X + \beta * t * X + \delta * Z_j)]$$
$$= \text{Log } [h_0(t)] + \alpha * X + \beta * t * X + \delta * Z_j$$

Or

$$h(t_j) = h_0(t) * \text{EXP}(\alpha * X + \beta * t * X + \delta * Z_j)$$

Assessing relative risk: hazard ratio

EXP(β) (for time-independent variables) or EXP(δ) (for time-dependent variables). For example, EXP(β) = 2.030 for gender (1=Female and 0=Male as the reference group). It means that the hazard of female students graduating is 2.062 times of that for male at the same point of time over time.

Methods
LOGIT HAZARD MODEL

Discrete-time hazard:

Conditional probability that an individual will experience the target event in the j-th time period j (T = j) given that s/he didn't experience it in any earlier time period (T >= j).

$$h(t_j) = \text{Prob}\{T = j | T \geq j\}, \quad 0 \leq h(t_j) \leq 1$$

General logit hazard model:

$$\text{Logit } h(t_j) = (\alpha_1 * D_1 + \alpha_2 * D_2 + \cdots + \alpha_J * D_J) + (\beta_1 * X * D_1 + \beta_2 * X * D_2 + \cdots + \beta_J * X * D_J) + (\delta_1 * Z_1 * D_1 + \delta_2 * Z_2 * D_2 + \cdots + \delta_J * Z_J * D_J)$$

Or

$$h(t_j) = \frac{1}{1+EXP[-Logit\ h(t_j)]}$$

Note: The model is equivalent to the series of logistic regression models run at each time period. In time period 1: Logit $h(t_1)$ = $\alpha_1 + \beta_1 * X + \delta_1 * Z_1$. In time period 2: Logit $h(t_2)$ = $\alpha_2 + \beta_2 * X + \delta_2 * Z_2$,…, and so on.

Assessing relative risk: Odds ratio

EXP(β) (for time-independent variables) or EXP(δ) (for time-dependent variables). For example, EXP(β_7) = 2.062 for gender (1=Female and 0=Male as the reference group). It means that the Odds of female students graduating in the 7th time period is 2.062 times of that for male.

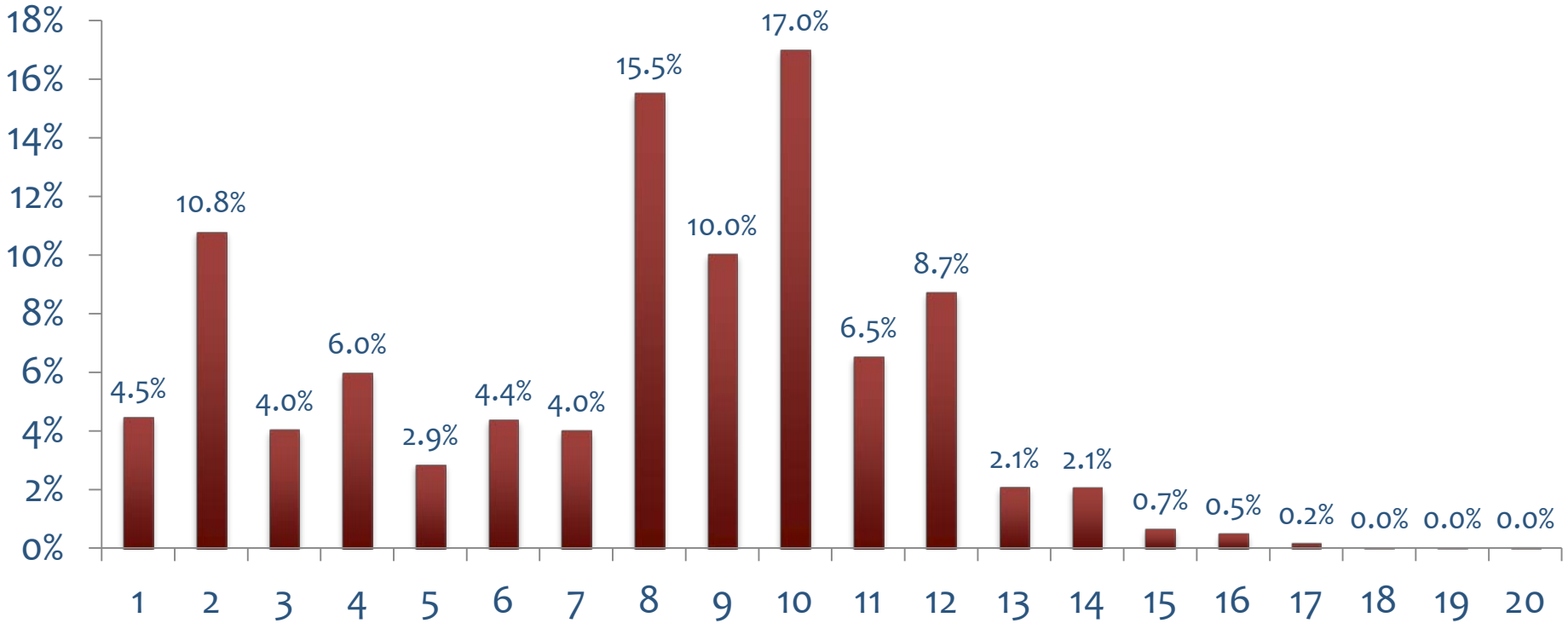
DESCRIPTIVE STATISTICS

STUDENT BACKGROUND CHARACTERISTICS

Total HC	12,069
Gender (Female %)	59%
African American (%)	7%
American Indian (%)	1%
Asian (%)	16%
Pacific Islander (%)	1%
Hispanic (%)	30%
White (%)	35%
Other/ Unknown (%)	8%
Non-Resident Alien (%)	2%
URM status (URM %)	**55%**
First-generation status (FGS %)	**60%**
Pell grant eligibility (Pell %)	46%
Avg. HS GPA	3.29
Avg. SAT COMP	944
English/Math remediation status (REM %)	**70.0%**
Pre-college experience (PreColl %)	22%

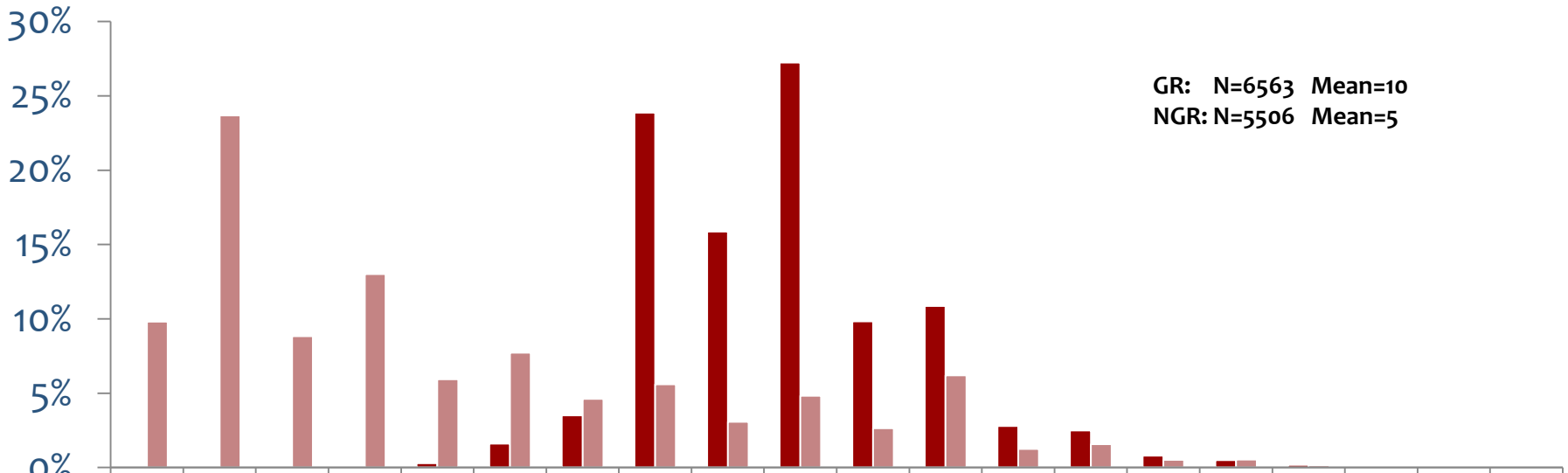
Descriptive Statistics

Distribution of Total Enrolled Terms



DESCRIPTIVE STATISTICS

DISTRIBUTION OF ENROLLED TERMS BY GRADUATION STATUS

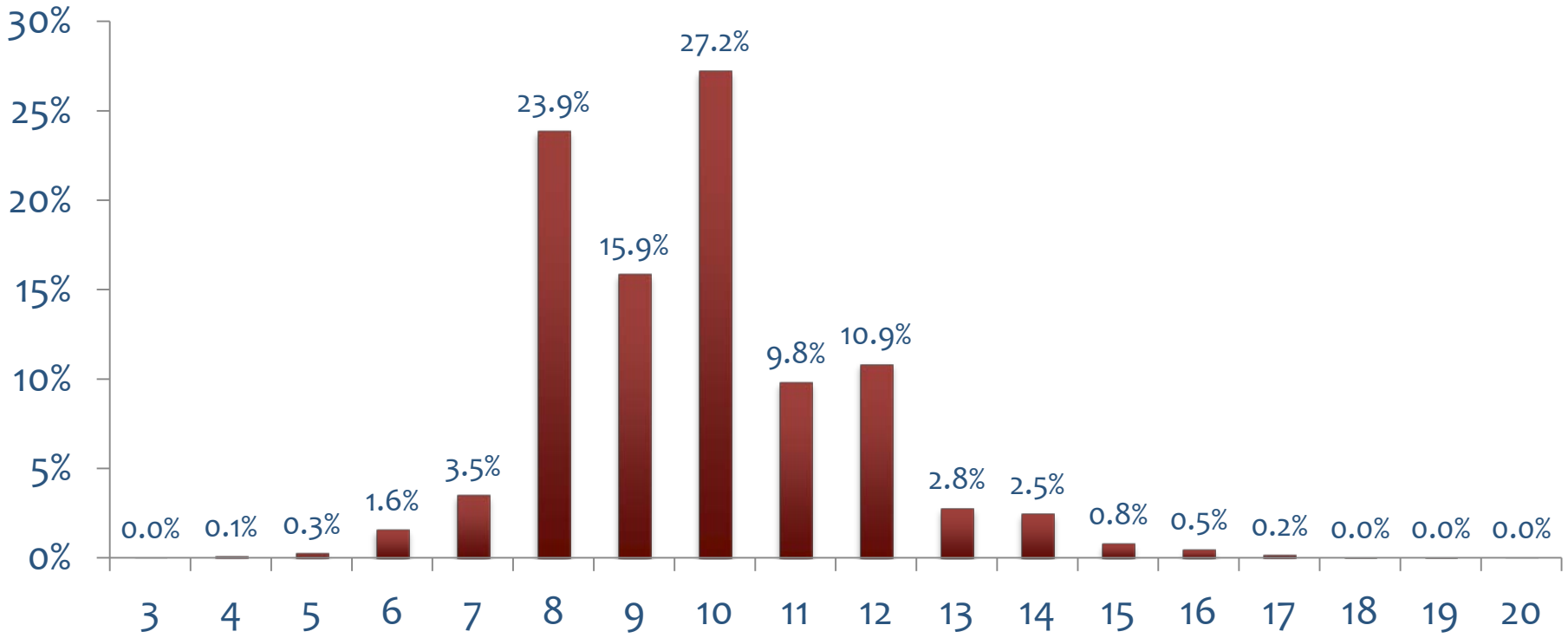


	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
GR			0.0%	0.1%	0.3%	1.6%	3.5%	23.9	15.9	27.2	9.8%	10.9	2.8%	2.5%	0.8%	0.5%	0.2%	0.0%	0.0%	0.0%
NGR	9.8%	23.7	8.8%	13.0	5.9%	7.7%	4.6%	5.6%	3.1%	4.8%	2.6%	6.2%	1.3%	1.6%	0.5%	0.5%	0.2%		0.0%	0.0%

DESCRIPTIVE STATISTICS

TIME TO DEGREE (TD):

The total number of enrolled terms (spring and fall) from entry to graduation



Impacts of Time-Independent Variables

FINDINGS

Graduation and Time to Degree for Time-Independent Variables

	Total HC	Graduation %	Time to degree			
			Graduated HC	Mean	Median	SD
Grand Total	**12069**	**54.4%**	**6563**	**9.8**	**10**	**1.9**
Gender						
Male	4914	49.7%	2441	10.0	10	1.9
Female	7155	57.6%	4122	9.6	10	1.8
Ethnicity						
African American	856	39.4%	337	9.9	10	1.7
American Indian	80	52.5%	42	10.0	10	1.5
Asian	1935	51.6%	999	10.2	10	2.0
Hispanic	3650	50.6%	1846	10.2	10	1.9
Non-Resident Alien	242	52.1%	126	9.8	10	2.1
Other/ Unknown	966	58.3%	563	9.6	9	2.0
Pacific Islander	64	35.9%	23	9.7	10	1.5
White	4276	**61.4%**	2627	9.3	9	1.6
URM status						
Non-URM	5484	**60.5%**	3316	9.4	9	1.7
URM	6585	49.3%	3247	10.2	10	1.9

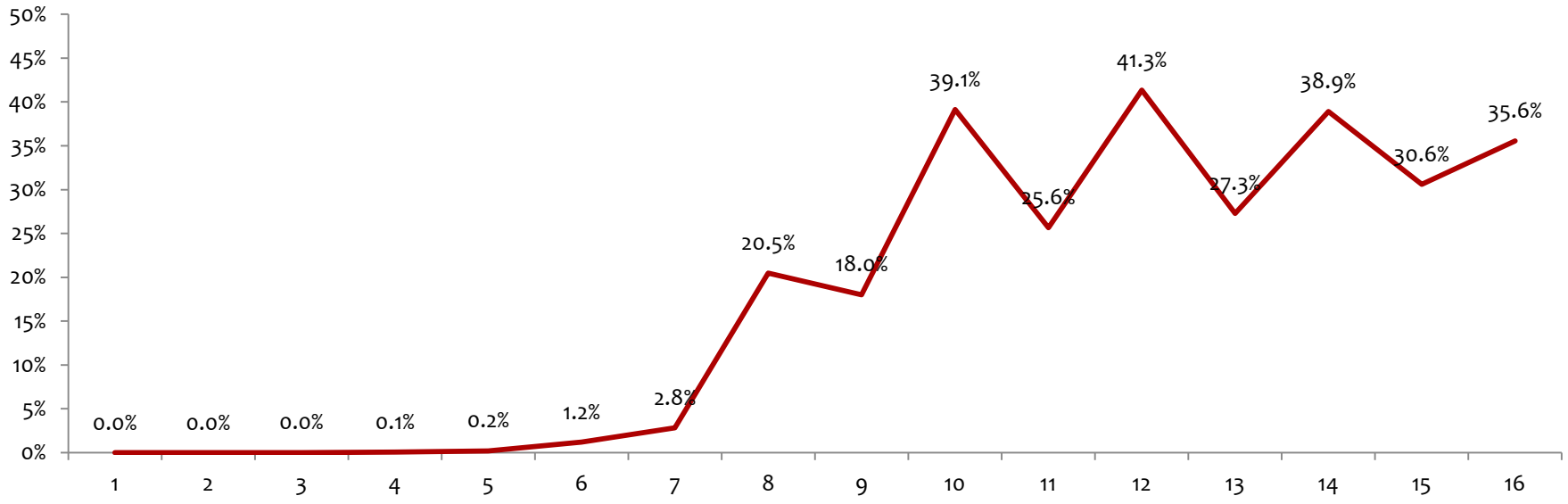
Impacts of Time-Independent Variables

Graduation and Time to Degree for Time-Independent Variables

	Total HC	Graduation %	Time to degree			
			Graduated HC	Mean	Median	SD
First-generation status						
CGS	4853	**60.5%**	2935	9.4	9	1.8
FGS	7216	50.3%	3628	10.0	10	1.9
Pell grant eligibility						
Not eligible	6507	**59.1%**	3846	9.4	9	1.7
Eligible	5562	48.8%	2717	10.2	10	1.9
HS GPA group						
1.86-2.99	2950	38.0%	1122	10.2	10	1.9
3.00-3.26	3041	48.1%	1463	10.0	10	1.9
3.27-3.62	3047	**58.1%**	1770	9.9	10	1.9
3.63+	3031	**72.8%**	2208	9.3	9	1.7
English/Math remediation status						
Required	8454	50.1%	4234	10.1	10	1.9
Nor required	3615	**64.4%**	2329	9.2	9	1.7
Pre-college experience						
Not having	9428	51.2%	4825	9.9	10	1.8
Having	2641	**65.8%**	1738	9.4	9	1.9

IMPACTS OF TIME-INDEPENDENT VARIABLES

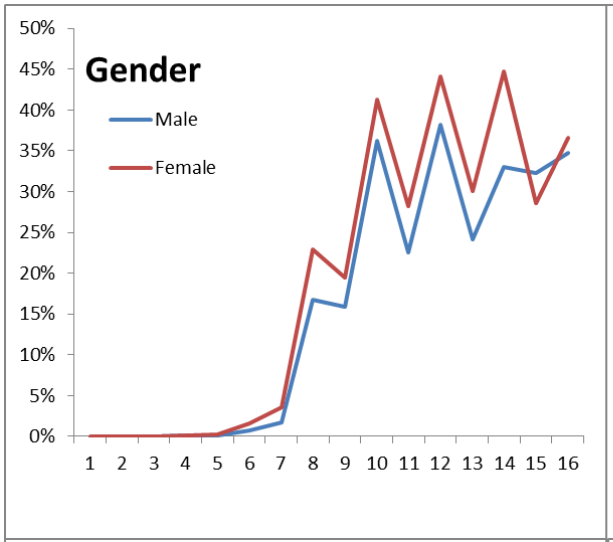
CHART 4 PERCENTAGES* OF GRADUATED STUDENTS ACROSS ENROLLED TERMS - OVERALL PATTERN

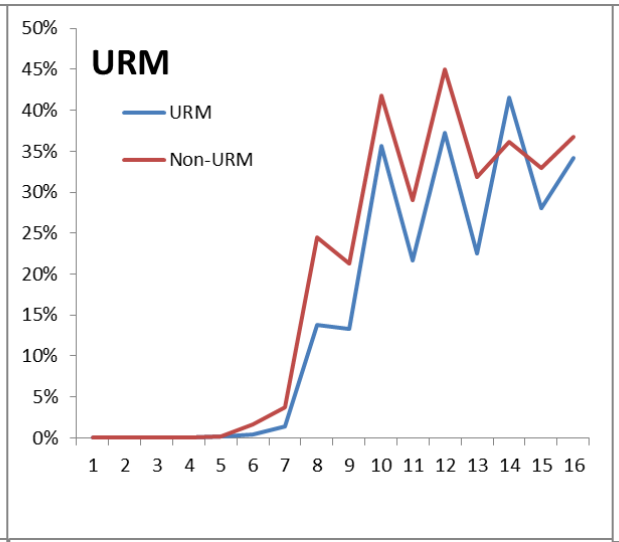


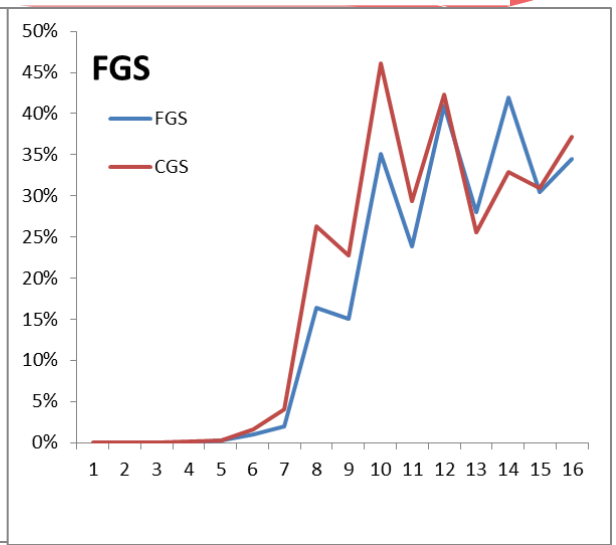
* Percentage = the total number of students who enrolled divided by the number of students who graduated in the given enrolled terms, which is the estimated conditional probability of graduating in the enrolled term given they didn't graduate in the earlier terms.

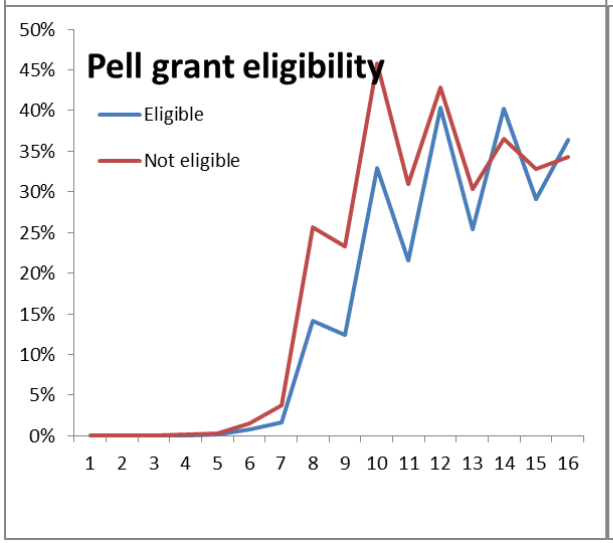
Impacts of Time-Independent Variables

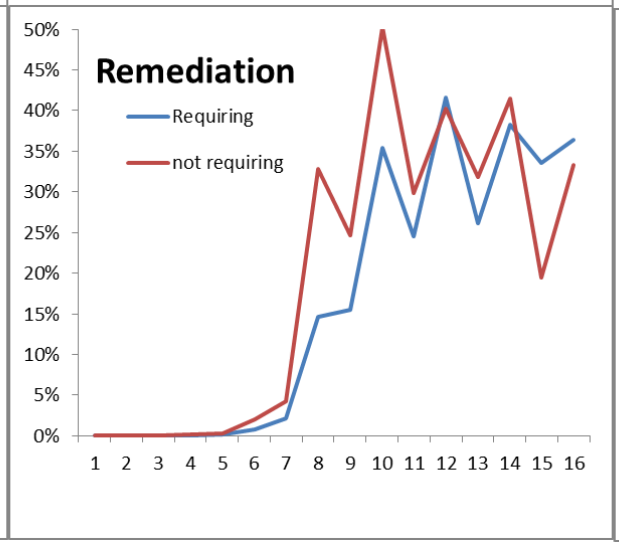
Chart 5 Percentages* of graduated students across enrolled terms by Subgroups

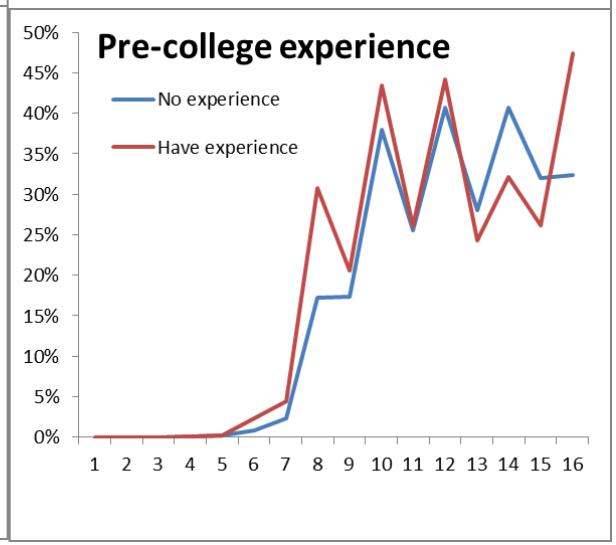












FINDINGS

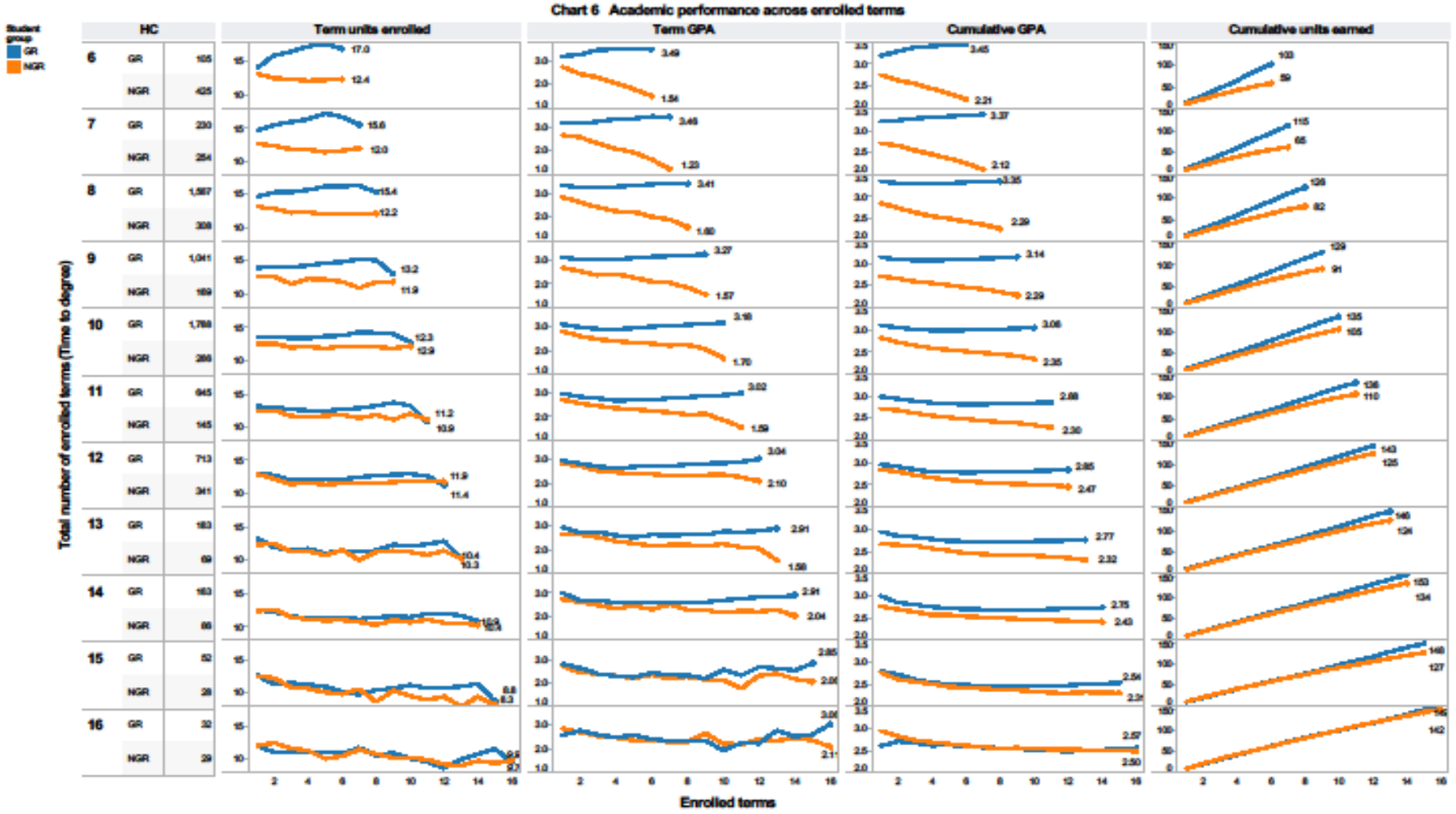
Impacts of Time-Dependent Variables

Graduation and Time to Degree for Time-Dependent Variables

	Total HC	Graduation %	Summary of Time to degree			
			Graduated HC	Mean	Median	SD
Grand Total	**12069**	**54.4%**	**6563**	**9.8**	**10**	**1.9**
Major Change						
Didn't change	6933	39.2%	2720	9.6	9	1.9
Changed	5136	**74.8%**	3843	9.9	10	1.8
Double Majors/Minors						
Didn't have	10370	49.5%	5136	9.7	10	1.8
Had	1699	**84.0%**	1427	9.9	10	1.9
Major Declaration						
Didn't declare	651	0.0%				
Less than half time	258	46.9%	121	10.6	10	2.2
More than half time	11160	57.7%	6442	9.7	10	1.8
Extra Enrollment						
Didn't have	9862	48.4%	4777	9.8	10	1.8
Had	2207	**80.9%**	1786	9.6	10	1.9
Avg Term units enrolled group						
Less than 6	22	0.0%				
6-11	2567	30.4%	781	12.2	12	1.9
12-17	9237	60.9%	5626	9.5	10	1.6
18 or more	243	64.2%	156	7.6	8	1.2
Avg Term GPA group						
Less than 2.0	2723	0.7%	18	12.9	13	2.7
2.00-2.99	5025	58.0%	2913	10.5	10	1.9
3.00 or above	4321	**84.1%**	3632	9.1	9	1.6
Avg Cumulative GPA group						
Less than 2.0	1838	1.0%	18	10.8	11	2.6
2.0-2.99	5770	51.4%	2967	10.5	10	1.9
3.0 or above	4461	**80.2%**	3578	9.2	9	1.6

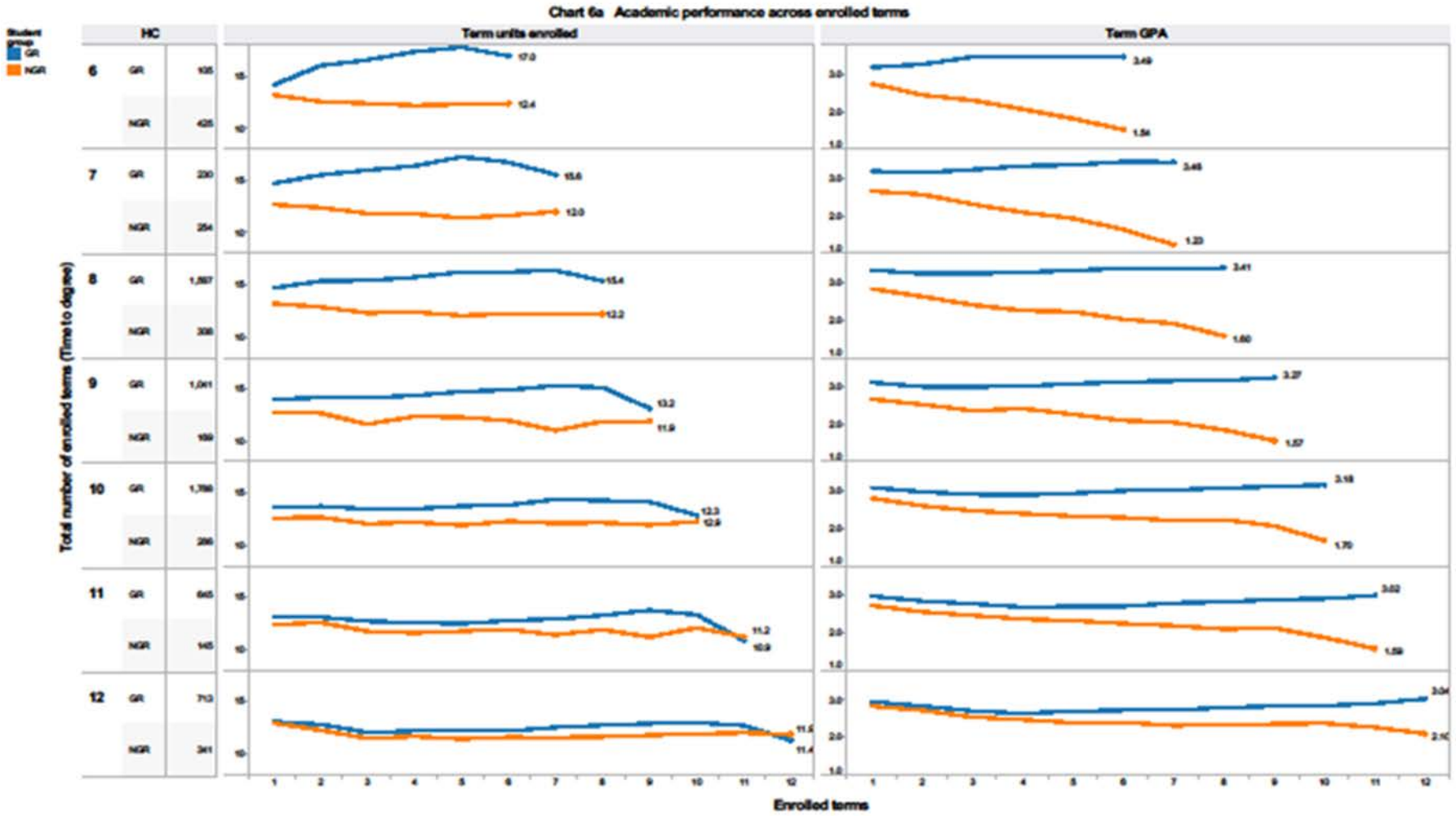
IMPACTS OF TIME-DEPENDENT VARIABLES

ACADEMIC PERFORMANCE ACROSS ENROLLED TERMS (SEE HANDOUT #1)



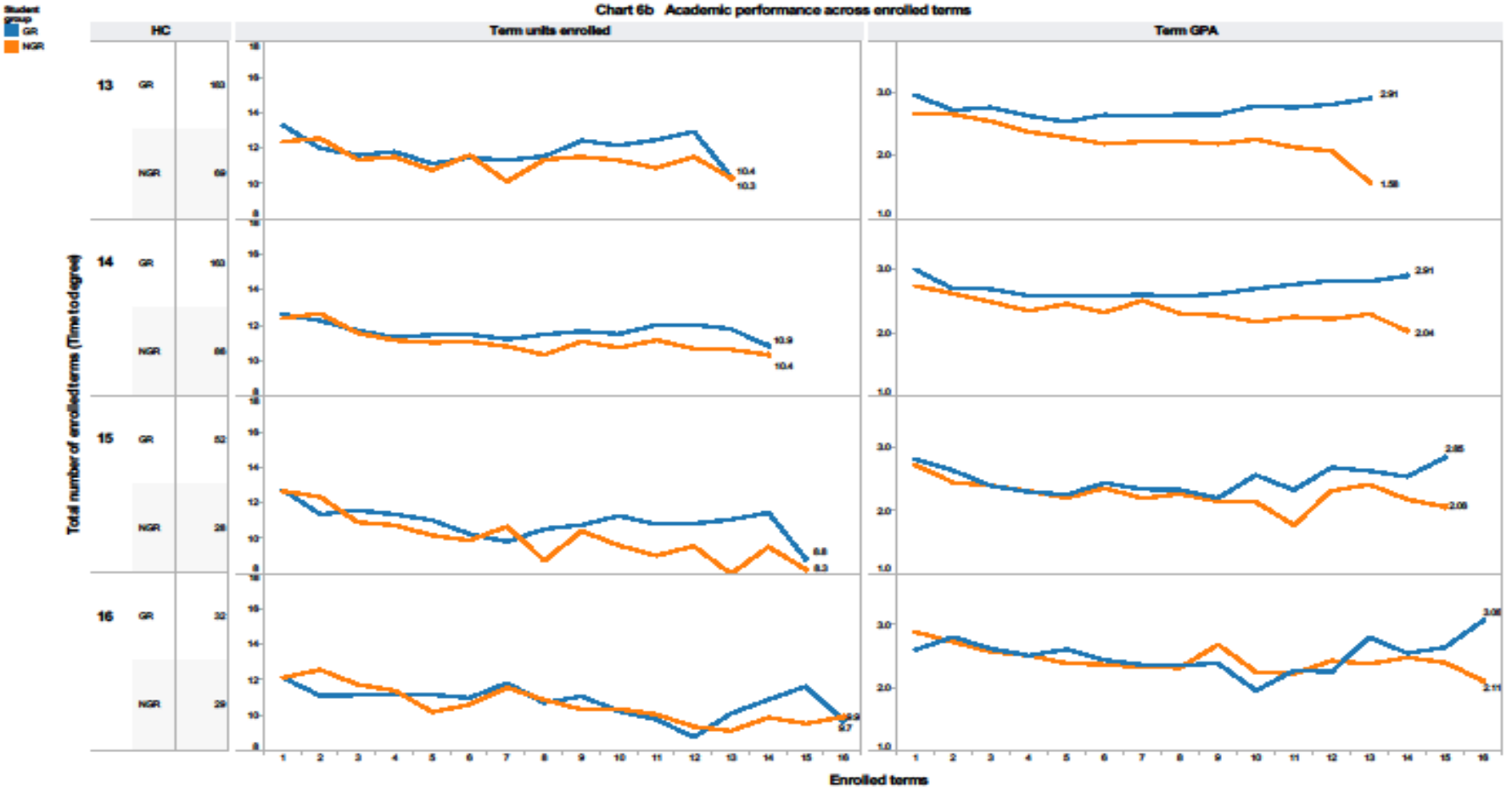
IMPACTS OF TIME-DEPENDENT VARIABLES

ACADEMIC PERFORMANCE ACROSS ENROLLED TERMS (SEE HANDOUT #1)



IMPACTS OF TIME-DEPENDENT VARIABLES

ACADEMIC PERFORMANCE ACROSS ENROLLED TERMS (SEE HANDOUT #1)



FINDINGS (SEE HANDOUT #2)

COX REGRESSION MODEL WITH TIME-DEPENDENT COVARIATES

	Model A					Model B					Model C				
	B	Wald	df	Sig.	Exp(B)	B	Wald	df	Sig.	Exp(B)	B	Wald	df	Sig.	Exp(B)
Block 1: Entering time-independent variables (Method = Enter)															
Gender	0.238	83.169	1	0.000	1.269	0.744	27.658	1	0.000	2.105	0.708	24.868	1	0.000	2.030
URM	-0.264	83.057	1	0.000	0.768	-0.865	28.925	1	0.000	0.421	-0.473	8.345	1	0.004	0.623
FGS	-0.114	17.104	1	0.000	0.892	-0.575	14.813	1	0.000	0.563	-0.363	5.823	1	0.016	0.695
PELL	-0.215	50.641	1	0.000	0.807	-0.597	12.965	1	0.000	0.550	-0.232	1.905	1	0.167	0.793
HS GPA	0.401	173.159	1	0.000	1.494	0.939	32.043	1	0.000	2.557	0.273	2.682	1	0.101	1.314
Rem	-0.189	42.872	1	0.000	0.828	-0.842	26.762	1	0.000	0.431	-0.591	12.775	1	0.000	0.554
Pre-College Experience	0.139	23.209	1	0.000	1.150	0.840	28.628	1	0.000	2.317	0.379	5.623	1	0.018	1.461
Block 2: Entering interactions of time-independent variables with Time (Method = Enter)															
T_COV_Gender						-0.053	13.828	1	0.000	0.949	-0.054	14.264	1	0.000	0.948
T_COV_URM						0.062	14.799	1	0.000	1.064	0.037	4.849	1	0.028	1.037
T_COV_FGS						0.048	10.207	1	0.001	1.050	0.037	5.979	1	0.014	1.038
T_COV_PELL						0.038	5.261	1	0.022	1.039	0.012	0.522	1	0.470	1.012
T_COV_HS GPA						-0.001	11.701	1	0.001	0.999	0.000	5.971	1	0.015	1.000
T_COV_REM						0.070	17.395	1	0.000	1.072	0.070	16.818	1	0.000	1.072
T_COV_Pre College Experience						-0.074	21.237	1	0.000	0.928	-0.036	4.837	1	0.028	0.965
Block 3: Entering time-dependent variables (Method = Enter)															
Term Units enrolled															
Term GPA															
Cumulative Units earned											0.033	**1754.487**	**1**	**0.000**	**1.034**
Cumulative GPA											0.500	**179.844**	**1**	**0.000**	**1.649**
Extra Enrollment											-0.322	20.092	1	0.000	0.725
Major Change											-0.667	51.827	1	0.000	0.513
Double majors or Minors											-0.469	**170.738**	**1**	**0.000**	**0.625**
Major declaration											-0.172	1.640	1	0.200	0.842
Goodness-of-fit															
Block 0: Beginning Block (baseline model), -2 Log Likelihood = 108748.485															
-2 Log Likelihood		107815.317					107631.965					104295.993			
Change From Previous Block	Chi-square	933.168					183.352					3335.972			
	df	7					7					6			
	Sig.	0.000					0.000					0.000			
Model comparison															
AIC		107829.317					107659.965					104335.993			
BIC		107879.945					107761.221					104480.645			

FINDINGS (SEE HANDOUT #2)

COX REGRESSION MODEL WITH TIME-DEPENDENT COVARIATES

	Wald	Sig.	Exp(B)		Wald	Sig.	Exp(B)
Final model with cumulative performance (Model C: -2LL = 104295.993, Chi-square =3335.972, df = 6, P-value <0.000)							
Time-independent variables				**Time-dependent variables**			
Gender	24.868	0.000	2.030	Cumulative Units earned	**1754.487**	**0.000**	**1.034**
URM	8.345	0.004	0.623	Cumulative GPA	**179.844**	**0.000**	**1.649**
FGS	5.823	0.016	0.695	Extra Enrollment	20.092	0.000	0.725
PELL	1.905	0.167	0.793	Major Change	51.827	0.000	0.513
HS GPA	2.682	0.101	1.314	Double majors or Minors	**170.738**	**0.000**	**0.625**
Rem	12.775	0.000	0.554	Major declaration	1.640	0.200	0.842
Pre-College Experience	5.623	0.018	1.461				
Interactions of time-independent variables with Time							
T_COV_Gender	14.264	0.000	0.948				
T_COV_URM	4.849	0.028	1.037				
T_COV_FGS	5.979	0.014	1.038				
T_COV_PELL	0.522	0.470	1.012				
T_COV_HS GPA	5.971	0.015	1.000				
T_COV_REM	16.818	0.000	1.072				
T_COV_Pre College Experience	4.837	0.028	0.965				

Note: -2LL for the null model = 108748.485. See the handout for the detailed results.

FINDINGS

LOGIT HAZARD MODELS

Time-varying effects*

(Estimated EXP(B) from the results of fitting logit hazard model)

	4th term	5th term	6th term	7th term	8th term	9th term	10th term	11th term	12th term	13th term	14th term	15th term	16th term
Final model with cumulative performance (-2 Log likelihood = 22351.299, Cox & Snell R Square = 0.682, Nagelkerke R Square = 0.909)													
Time-independent variables													
Gender	2.233	3.725	2.086	2.062	1.521	1.369	1.311	1.376	1.199	1.344	1.516	.755	1.954
URM	.586	1.404	.522	.908	.787	.784	.933	.784	.704	.809	1.609	.660	.402
FGS	.141	1.291	1.288	.806	1.011	.988	.894	.986	.989	1.290	1.367	1.142	.803
PELL	1.592	.500	1.131	.862	1.000	.745	.860	.768	1.022	.807	.975	.806	2.255
HS GPA	.545	.416	.577	.688	.695	.778	.688	1.069	1.011	.797	.696	1.055	.184
REM	.956	1.370	1.398	1.345	1.055	1.158	1.001	1.109	1.571	1.025	.883	3.225	.960
Pre-college experience	.437	.865	1.232	1.136	1.276	.926	.952	.883	1.056	.871	.735	.855	2.813
Time-dependent variables													
Cumulative Units earned	1.123	1.082	1.096	1.073	1.101	1.063	1.076	1.047	1.045	1.032	1.040	1.024	1.044
Cumulative GPA	.509	.972	2.536	2.001	3.121	2.030	2.485	1.366	2.087	2.251	2.771	1.179	1.704
Extra enrollment	1.740	.000	.505	7.069	.340	1.496	.654	2.088	.608	1.169	1.292	.000	1.091
Major change	.000	.000	.275	.376	.306	.445	.441	.354	.857	.282	.653	1.556	.000
Double majors or Minors	1.039	.992	.279	.504	.566	.463	.456	.408	.496	.430	.469	.490	.084
Major declaration	961978	1434738	3342982	1.097	2.567	.510	.664	.469	.691	.488	.630	.948	.383

- Yellow-highlighted means that the effect is statistically significant at the level of significance of 0.05.

Note: -2LL for the null model = 128887.946.

Conclusion

Cox regression:

- **Time-independent variables:** All time-independent variables affect time to degree except for Pell eligibility and HS GPA. The top two predictors are *gender* and *remediation*. Female students are twice as likely to graduate as male students. Students needing remediation are half as likely to graduate as those who don't need remediation.

- **Time-dependent variables:** When controlling for time-independent variables, *earned units*, *GPA* and whether one has *double major or a minor* are the top three predictors of time to degree.

- **Summary:** Time-dependent variables are more powerful predictors of time to degree than time-independent variables. The most powerful predictor is *earned units*. The first four predictors by strength are all time-dependent.

Conclusion

Logit hazard regression:

- Most of factors don't have significant effects in the first five enrolled terms and after the 12th term. Between the 6^{th} and 12^{th} terms, the variables in the study differentiate our students.

- Cumulative units earned and cumulative GPA have consistently significant effects. Gender effect is decreasing from the 6^{th} to 12 terms, and disappeared after the 12^{th} term.

- **Summary:** Characteristics students bring with them to college (gender, race, HS performance, etc.) no longer differentiate who will graduate after 6 years in school.

Further Discussion

- **What can we tell students?** Not much. The two most powerful predictors of time to degree are *earned units* and *GPA*. They are in fact the dependent variables if we aim students in our study.

- **What can we tell policy makers?** Time to degree is heavily affected by the type of students an institution serves, and the definition of graduation rate by *elapsed years* cannot be fairly used across universities.

Further Discussion

- *Elapsed years, enrolled years and FTE years* are three measures of time to degree. In the CSU system for most degrees, a FTE year =120 units.

- We propose using FTE year as the measure of time to degree. The ratio of attempted to earned units can be used as a measure of student success in progress.

Further Discussion

- **What can we tell university presidents, provosts, faculty and student service professionals?** Attention needs to be directed to *how to ensure students pass their required courses.* Measures such as *Course Redesign* and *Supplementary Instruction* are examples.

REFERENCES

- **Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence, Judith D. Singer and John B. Willett, Oxford University Press, March, 2003.**

- **Applied Survival Analysis: Regression Modeling of Time to Event Data, David W. Hosmer, Stanley Lemeshow, Susanne May. – 2nd ed.**

Handout #1

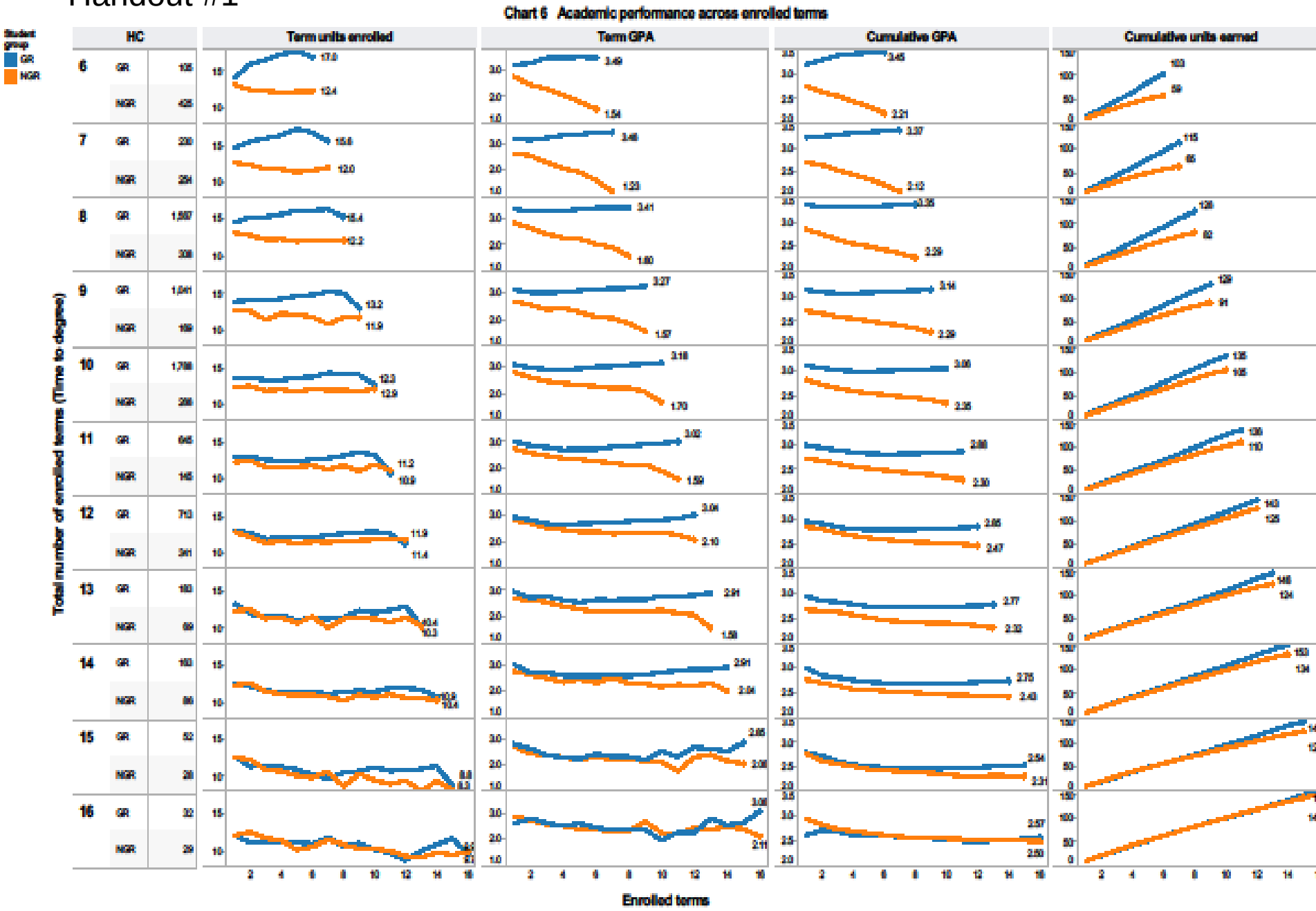


Chart 6 Academic performance across enrolled terms
Student group
GR
NGR
HC
Term units enrolled
Term GPA
Cumulative GPA
Cumulative units earned
Total number of enrolled terms (Time to degree)
Enrolled terms

Handout #2

Table 5 Results of fitting Cox regression models with time-dependent cavariates

	Model A					Model B					Model C				
	B	Wald	df	Sig.	Exp(B)	B	Wald	df	Sig.	Exp(B)	B	Wald	df	Sig.	Exp(B)
Block 1: Entering time-independent variables (Method = Enter)															
Gender	0.238	83.169	1	0.000	1.269	0.744	27.658	1	0.000	2.105	0.708	24.868	1	0.000	2.030
URM	-0.264	83.057	1	0.000	0.768	-0.865	28.925	1	0.000	0.421	-0.473	8.345	1	0.004	0.623
FGS	-0.114	17.104	1	0.000	0.892	-0.575	14.813	1	0.000	0.563	-0.363	5.823	1	0.016	0.695
PELL	-0.215	50.641	1	0.000	0.807	-0.597	12.965	1	0.000	0.550	-0.232	1.905	1	0.167	0.793
HS GPA	0.401	173.159	1	0.000	1.494	0.939	32.043	1	0.000	2.557	0.273	2.682	1	0.101	1.314
Rem	-0.189	42.872	1	0.000	0.828	-0.842	26.762	1	0.000	0.431	-0.591	12.775	1	0.000	0.554
Pre-College Experience	0.139	23.209	1	0.000	1.150	0.840	28.628	1	0.000	2.317	0.379	5.623	1	0.018	1.461
Block 2: Entering interactions of time-independent variables with Time (Method = Enter)															
T_COV_Gender						-0.053	13.828	1	0.000	0.949	-0.054	14.264	1	0.000	0.948
T_COV_URM						0.062	14.799	1	0.000	1.064	0.037	4.849	1	0.028	1.037
T_COV_FGS						0.048	10.207	1	0.001	1.050	0.037	5.979	1	0.014	1.038
T_COV_PELL						0.038	5.261	1	0.022	1.039	0.012	0.522	1	0.470	1.012
T_COV_HS GPA						-0.001	11.701	1	0.001	0.999	0.000	5.971	1	0.015	1.000
T_COV_REM						0.070	17.395	1	0.000	1.072	0.070	16.818	1	0.000	1.072
T_COV_Pre College Experience						-0.074	21.237	1	0.000	0.928	-0.036	4.837	1	0.028	0.965
Block 3: Entering time-dependent variables (Method = Enter)															
Cumulative Units earned											0.033	1754.487	1	0.000	1.034
Cumulative GPA											0.500	179.844	1	0.000	1.649
Extra Enrollment											-0.322	20.092	1	0.000	0.725
Major Change											-0.667	51.827	1	0.000	0.513
Double majors or Minors											-0.469	170.738	1	0.000	0.625
Major declaration											-0.172	1.640	1	0.200	0.842
Goodness-of-fit															
Block 0: Beginning Block (baseline model), -2 Log Likelihood = 108748.485															
-2 Log Likelihood		107815.317				107631.965					104295.993				
Change From Previous Block	Chi-square	933.168				183.352					3335.972				
	df	7				7					6				
	Sig.	0.000				0.000					0.000				
Model comparison															
AIC		107829.317				107659.965					104335.993				
BIC		107879.945				107761.221					104480.645				