

GAUGING EFFECTS ON FIRST-YEAR STUDENTS

TABLE 1. Variable Definition and Descriptive Statistics (N = 2,801)

	Mean	S. D.	Minimum	Maximum
<i>High school attributes</i>				
Student enrollment	1,906.942	659.584	101.00	3,509.00
Expenditure per student (constant \$2005)	5,419.353	1,161.438	1,119.63	11,899.05
Percent of not highly qualified teachers	19.944	15.354	0.00	70.40
Student dropout rate (%)	2.992	2.223	0.00	13.10
Annual number of violent, weapons, and drug incidents (per 100 students)	4.261	2.147	0.00	14.21
Percent of non-Asian minority student enrollment	23.949	13.138	6.10	74.00
Average class size	25.788	3.328	5.60	33.10
Percent of Asian American student enrollment	6.622	3.946	0.20	21.30
Percent of students with limited English proficiency	14.323	9.038	2.40	61.00
Urban location	0.820	0.384	0	1
<i>Individual student attributes: demographics and precollegiate</i>				
Male	0.437	0.496	0	1
Ethnicity/race unknown <sup>a</sup>	0.124	0.330	0	1
Black, Hispanic, or Native American <sup>a</sup>	0.106	0.307	0	1
Asian American <sup>a</sup>	0.075	0.264	0	1
Parent income unknown <sup>b</sup>	0.322	0.467	0	1
Parent income less than \$30K <sup>b</sup>	0.096	0.295	0	1
Parent income \$30-50K <sup>b</sup>	0.124	0.329	0	1
Parent income \$50-80K <sup>b</sup>	0.192	0.394	0	1
Residency outside local five county area (approx. 70 mi radius)	0.303	0.460	0	1
Academic preparation index	59.646	7.986	39.76	96.85
Advanced placement (AP) credits	2.550	5.109	0	51
Took ACT/SAT test as high school junior (instead of senior year)	0.392	0.488	0	1
<i>First-year college experience</i>				
Second-year retention	0.844	0.363	0	1
First-year cumulative GPA (x10)	28.678	8.229	0.00	40.00
Average grade awarded in classes taken	2.540	0.288	0.75	3.75
Received one class grade of I, W, D, or F <sup>c</sup>	0.112	0.315	0	1
Received two or more class grades of I, W, D, or F <sup>c</sup>	0.177	0.382	0	1
Took one science-based course <sup>d</sup>	0.275	0.446	0	1
Took two science-based courses <sup>d</sup>	0.204	0.403	0	1
Took more than two science-based courses <sup>d</sup>	0.284	0.451	0	1
Percent of courses taught by adjunct/non-regular faculty members	40.558	17.992	0.00	100.00
Percent of non-Asian ethnic/racial minority classmates	11.355	2.291	3.88	25.78
Percent of Asian ethnic/racial minority classmates	6.696	2.229	0.00	20.30
Percent of non-resident foreign classmates	1.686	0.862	0.00	12.16
Took at least one diversity course	0.183	0.386	0	1
Took 15 or more credits in first semester (instead of less)	0.531	0.499	0	1
Transferred credits during the first year	0.283	0.451	0	1
Retook a course	0.225	0.418	0	1
Declared academic program major (instead of undeclared)	0.676	0.468	0	1
Average room size of classes taken (hundreds of sq ft)	14.781	3.727	5.94	32.22
Lived on campus	0.454	0.498	0	1
Was employed on campus	0.126	0.331	0	1
Used on-campus recreation facilities	0.479	0.500	0	1
<i>First-year college financial aid</i>				
Received grant and/or scholarship (no loan) <sup>e</sup>	0.578	0.494	0	1
Received state-funded scholarship only <sup>e</sup>	0.150	0.357	0	1
Received aid package with loan(s) <sup>e</sup>	0.172	0.378	0	1
Financial need after all aid received and the EFC (\$1K)	1.374	2.941	0.00	17.38
Low-income federal grants (\$1K)	0.245	0.897	0.00	9.04
Low-income state grants (\$1K)	0.054	0.255	0.00	1.72
Low-income institutional grants (\$1K)	0.125	0.459	0.00	2.50
Other grants (\$1K)	0.172	0.701	0.00	7.41
Other merit-based aid (\$1K)	1.012	1.585	0.00	18.00
State-funded scholarship (\$1K)	1.609	0.854	0.00	3.77
Unsubsidized loans (\$1K)	0.485	1.897	0.00	17.18
Subsidized loans (\$1K)	0.267	0.809	0.00	4.84

Reference group: <sup>a</sup>White; <sup>b</sup>Parent income over \$80K; <sup>c</sup>Received no such grades; <sup>d</sup>Took no such course <sup>e</sup>Received no aid;

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TABLE 2. Parameter Estimates of Academic Preparation

	Advanced Placement (AP) Credits			Preparation Index		
	Estimate	S. E.	Sig.	Estimate	S. E.	Sig.
Intercept	2.618	0.257	***	59.456	0.343	***
<i>High school attributes</i>						
Student enrollment (increments of 100)	-0.023	0.051		0.048	0.071	
Expenditure per student (increments of \$100)	-0.027	0.019		-0.006	0.029	
Percent of not highly qualified teachers	-0.014	0.010		-0.007	0.016	
Student dropout rate (%)	0.067	0.093		0.114	0.139	
Violent, weapons, and drug incidents (per 100 students)	0.001	0.068		0.069	0.102	
Percent of non-Asian minority student enrollment	-0.031	0.019		-0.031	0.028	
Average class size (increments of 5)	-0.036	0.387		-0.676	0.573	
Percent of Asian American student enrollment	0.182	0.049	***	0.090	0.069	
Percent of students with limited English proficiency	0.043	0.018	*	0.014	0.029	
Rural location <sup>a</sup>	-1.055	0.622		0.558	0.863	

<sup>a</sup>Reference category: urban location; \*\*\* p ≤ .001; \*\*p ≤ .01; \*p ≤ .05

TABLE 3. Parameter Estimates of Academic Preparation and First-Year GPA

	Preparation Index			First-Year GPA (x10)		
	Estimate	Std. Error	Sig.	Estimate	Std. Error	Sig.
Intercept	63.1579	0.4807	***	28.8650	0.4688	***
<i>Individual student attributes</i>						
Female	-0.1259	0.3058		2.2284	0.3204	***
Took ACT/SAT test as high school senior <sup>a</sup>	-3.1249	0.3140	***	-1.6339	0.3285	***
Ethnicity/race unknown <sup>a</sup>	-0.2277	0.4628		-0.6910	0.4850	
Black, Hispanic, or Native American <sup>a</sup>	-2.4564	0.4978	***	-2.1416	0.5214	***
Asian American <sup>a</sup>	1.1059	0.5832	0.058	0.2526	0.6115	
Parent income unknown <sup>a</sup>	-2.6758	0.3969	***	-0.6398	0.4156	
Parent income less than \$30K <sup>a</sup>	-1.8205	0.5732	**	-0.7854	0.6006	
Parent income \$30-50K <sup>a</sup>	-1.1538	0.5216	*	-0.0533	0.5467	
Parent income \$50-80K <sup>a</sup>	-1.0451	0.4492	*	-0.2611	0.4706	
Academic preparation index				0.5382	0.0175	***
<i>High school attributes</i>						
Rural location <sup>a</sup>	0.1498	0.8188		0.8951	0.7453	
Student enrollment (increments of 100)	0.0040	0.0684		0.0071	0.0504	
Expenditure per student (increments of \$100)	-0.0120	0.0294		-0.0375	0.0240	
Percent of not highly qualified teachers	-0.0078	0.0166		0.0172	0.0137	
Student dropout rate (%)	0.0861	0.1372		0.0458	0.1122	
Number of violent, weapons, and drug incidents	0.0056	0.0055		0.0068	0.0044	
Percent of non-Asian minority student enrollment	-0.0262	0.0266		-0.0260	0.0212	
Average class size (increments of 5)	-0.6808	0.5513		-0.8950	0.4434	*
Percent of Asian American student enrollment	0.0744	0.0649		0.0612	0.0487	
Percent of students with limited English proficiency	0.0243	0.0285		-0.0364	0.0245	

<sup>a</sup>Reference category: listed in Table 1; N = 2,632; \*\*\* p ≤ .001; \*\*p ≤ .01; \*p ≤ .05

Note: Student residential location excluded due to collinearity with high school location variable

**TABLE 4. Significant Student-Secondary School Attribute Interactions to Estimate First-Year College GPA (x10)**

	Estimate	Std. Error	Sig.
<i>Interaction terms</i>			
Parent income less than \$30K <sup>a</sup> with % of HS non-Asian minority enrollment	-0.0791	0.0346	*
Parent income less than \$30K <sup>a</sup> with % of HS students with limited English proficiency	-0.1580	0.0463	***
Parent income less than \$30K <sup>a</sup> with HS number of violent, weapons, and drug incidents	-0.4988	0.2211	*
Asian American <sup>a</sup> with HS expenditure per student (increments of \$100)	0.1199	0.0573	*

<sup>a</sup>Reference category: listed in Table 1; \*\*\* p ≤ .001; \*\*p ≤ .01; \*p ≤ .05

**TABLE 5. Parameter Estimates of First-Year GPA: Extended Model**

	Estimate	S.E.	Beta	t	Sig.	VIF
Intercept	7.987	1.897		4.21	***	
<i>Individual student attributes</i>						
Male	-.916	.229	-.056	-4.01	***	1.186
Ethnicity/race unknown <sup>a</sup>	-.275	.325	-.011	-0.85		1.049
Black, Hispanic, or Native American <sup>a</sup>	-.345	.375	-.013	-0.92		1.303
Asian American <sup>a</sup>	-.379	.449	-.012	-0.84		1.254
Parent income unknown <sup>b</sup>	.329	.287	.019	1.14		1.648
Parent income less than \$30K <sup>b</sup>	.158	.442	.006	0.36		1.618
Parent income \$30-50K <sup>b</sup>	.375	.401	.015	0.94		1.630
Parent income \$50-80K <sup>b</sup>	.302	.320	.015	0.94		1.493
Took ACT/SAT test as high school junior	.009	.222	.001	0.04		1.085
Academic preparation index	.315	.022	.304	14.35	***	2.764
Residency outside local area (approx. 70 mi radius)	.002	.265	.000	0.01		1.444
<i>Freshmen experience</i>						
Average grade awarded in classes taken	2.625	.394	.093	6.66	***	1.187
Took 15 or more credits in first semester	.799	.218	.049	3.67	***	1.097
Lived on campus	.070	.267	.004	0.26		1.642
Was employed on campus	1.170	.321	.048	3.64	***	1.061
Financial need after EFC and all aid received (\$1K)	-.056	.044	-.020	-1.27		1.592
Received grant and/or scholarship (no loan) <sup>c</sup>	.955	.381	.058	2.50	**	3.282
Received state-funded scholarship only <sup>c</sup>	.625	.461	.027	1.35		2.453
Received aid package with loan(s) <sup>c</sup>	-.206	.461	-.010	-0.45		2.918
Declared academic program major <sup>d</sup>	-.400	.231	-.023	-1.73		1.070
Used recreation facilities	.326	.234	.020	1.39		1.270
Average room size of classes taken (hundreds of sq ft)	.010	.031	.005	0.31		1.285
Transferred credits during the first year	-.212	.279	-.012	-0.76		1.430
Remedial freshmen passed first-year math 'C' or higher <sup>e</sup>	.580	.354	.026	1.64		1.589
Remedial freshmen failed to receive 'C' in first-yr math <sup>e</sup>	-4.201	.373	-.191	-11.25	***	1.766
Passed second-year math course with at least a 'B' <sup>e</sup>	1.901	.331	.092	5.74	***	1.570
Received < 'B' in second-year math <sup>e</sup>	-3.717	.415	-.126	-8.95	***	1.211
Received Incomplete/Withdrawal grade in math <sup>e</sup>	-5.810	.482	-.167	-12.05	***	1.179
Regular freshmen with < 'B' in second-semester English <sup>f</sup>	-6.878	.377	-.257	-18.25	***	1.216
Regular freshmen took first-semester English only <sup>f</sup>	-5.860	.439	-.185	-13.35	***	1.181
Remedial freshmen took second-semester English <sup>f</sup>	-1.008	.423	-.034	-2.38	*	1.282
Remedial fresh. took first-semester English 'B' + grade <sup>f</sup>	-.461	.371	-.020	-1.24		1.554
Took no English or only English transfer credits <sup>f</sup>	-2.906	.377	-.109	-7.71	***	1.224
Remedial freshmen < 'B' in first-sem English or I/W grade <sup>f</sup>	-8.162	.510	-.238	-16.01	***	1.356
Took one science-based course <sup>g</sup>	-.112	.303	-.006	-0.37		1.684
Took two science-based courses <sup>g</sup>	-.851	.347	-.042	-2.45	*	1.814
Took three or more science-based courses <sup>g</sup>	-1.749	.384	-.097	-4.55	***	2.769
<i>First-year diversity experience</i>						
Percent of non-Asian ethnic/racial minority classmates	-.157	.054	-.044	-2.93	**	1.384
Percent of Asian ethnic/racial minority classmates	.033	.060	.009	0.55		1.647
Percent of non-resident foreign classmates	-.253	.129	-.027	-1.96	.051	1.142
Took a diversity course <sup>g</sup>	.559	.277	.027	2.02	*	1.075

<sup>a</sup>Reference category: <sup>a</sup>White; <sup>b</sup>greater than \$80K; <sup>c</sup>received no aid; <sup>d</sup>undeclared; <sup>e</sup>Regular freshmen with 'C'+ in first-year math; <sup>f</sup>Regular freshmen with 'B'+ in second-semester English; <sup>g</sup>Took no such course. Note: First-year GPA multiplied by 10 to ease interpretation of effect size.

Model summary: Adjusted R<sup>2</sup> = .544; \*\*\* p ≤ .001; \*\*p ≤ .01; \*p ≤ .05

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TABLE 6. Parameter Estimates of Second-Year Enrollment Persistence

	Precollege Model			First-Year Experience Model				
	Estimate	S.E.	Sig.	Δ - p	Estimate	S.E.	Sig.	Δ - p
Intercept	-0.723	0.532			1.517	0.906		
<i>Individual student attributes</i>								
Female	0.093	0.112			-0.391	0.131	**	-5.26%
Ethnicity/race unknown <sup>a</sup>	-0.310	0.157	*	-4.17%	-0.216	0.175		
Black, Hispanic, or Native American <sup>a</sup>	-0.017	0.171			0.128	0.191		
Asian American <sup>a</sup>	0.542	0.261	*	7.28%	0.560	0.283	*	7.53%
Parent income unknown <sup>b</sup>	0.120	0.147			-0.076	0.165		
Parent income less than \$30K <sup>b</sup>	-0.094	0.203			-0.020	0.248		
Parent income \$30-50K <sup>b</sup>	0.105	0.194			0.280	0.241		
Parent income \$50-80K <sup>b</sup>	-0.020	0.164			0.039	0.186		
Took ACT/SAT test as high school senior	-0.055	0.114			-0.052	0.126		
Academic preparation index	0.050	0.008	***	0.67%	-0.047	0.012	***	-0.63%
Residency outside local five county area (approx. 70 mi radius)	-0.565	0.114	***	-7.59%	-0.767	0.151	***	-10.31%
<i>Freshmen experience</i>								
Percent of courses taught by adjunct/non-regular faculty members	-0.008	0.003	*	-0.10%	-0.003	0.004		
First-year cumulative GPA (x10)					0.104	0.009	***	1.39%
Average grade awarded in classes taken					0.194	0.225		
Took 15 or more credits in first semester					0.428	0.126	***	5.75%
Lived on campus					0.075	0.156		
Was employed on campus					0.310	0.207		
Financial need after EFC and all aid received (\$1K)					-0.022	0.024		
Received grant and/or scholarship (no loan) <sup>c</sup>					-0.025	0.225		
Received state-funded scholarship only <sup>c</sup>					-0.180	0.249		
Received aid package with loan(s) <sup>c</sup>					-0.399	0.254		
Declared academic program major <sup>d</sup>					0.113	0.130		
Used recreation facilities					0.153	0.135		
Average room size of classes taken (hundreds of sq ft)					-0.022	0.017		
Transferred credits during the first year					0.293	0.175		
Received one class grade of I, W, D, or F <sup>e</sup>					-0.449	0.173	**	-6.04%
Received two or more class grades of I, W, D, or F <sup>e</sup>					-0.354	0.184	0.0549	-4.75%
Took one science-based course <sup>f</sup>					0.281	0.162		
Took two science-based courses					0.356	0.186	0.0557	4.79%
Took three or more science-based courses					0.486	0.203	*	6.53%

<sup>a</sup>Reference category: <sup>a</sup>White; <sup>b</sup>greater than \$80K; <sup>c</sup>received no aid; <sup>d</sup>undeclared; <sup>e</sup>no such grades; <sup>f</sup>no such courses; \*\*\* p ≤ .001; \*\*p ≤ .01; \*p ≤ .05

First-Year experience model summary: Nagelkerke R<sup>2</sup> = .26; Hosmer-Lemeshow sig. > .05; Correct classification rate = 76.2% yes, 66.7% no

TABLE 7. Parameter Estimates of Second-Year Enrollment Persistence: Diversity Effect

	Precollege Model			First-Year Experience Model		
	Estimate	S.E.	Sig.	Estimate	S.E.	Sig.
Intercept	1.817	0.430	***	1.115	1.042	
<i>First-year diversity experience</i>						
Percent of non-Asian ethnic/racial minority classmates	-0.010	0.027	0.720	0.028	0.032	0.377
Percent of Asian ethnic/racial minority classmates	0.029	0.030	0.339	-0.027	0.036	0.452
Percent of non-resident foreign classmates	0.018	0.067	0.794	0.115	0.083	0.166
Took a diversity course <sup>a</sup>	0.216	0.148	0.145	0.169	0.164	0.303

<sup>a</sup>Took no such course; \*\*\* p ≤ .001; \*\*p ≤ .01; \*p ≤ .05

First-Year experience model summary: Nagelkerke R<sup>2</sup> = .26; Hosmer-Lemeshow sig. > .05; Correct classification rate = 76.2% yes, 65.3% no

Note: Each model includes all variables listed in Table 6

TABLE 8. Parameter Estimates of Second-Year Persistence: Significant Interaction Effects

	Estimate	S.E.	Exp(B)	Sig.	% $\Delta$ - p
<b>A</b>					
<i>Model fit: <math>X^2</math> difference significant at 0.05</i>					
(1) Residency outside local five county area (approx. 70 mi radius)	-0.799	0.152	0.450	***	-10.73
(2) Percent of non-Asian ethnic/racial minority classmates	0.065	0.038	1.068		
Interaction (1) x (2)	-0.115	0.058	0.891	*	-12.28
Intercept	2.028	0.726		**	
<b>B</b>					
<i>Model fit: <math>X^2</math> difference significant at 0.05</i>					
(1a) Ethnicity/race unknown	-0.192	0.176	0.826		
(1b) Black, Hispanic, or Native American	-0.393	0.254	0.675		-5.28
(1c) Asian American	0.652	0.308	1.919	*	
(2) Percent of non-Asian ethnic/racial minority classmates	0.064	0.048	1.066		
Interaction (1a) x (2)	-0.023	0.083	0.977		
Interaction (1b) x (2)	0.237	0.092	1.267	**	-2.10
Interaction (1c) x (2)	0.073	0.148	1.076		
Intercept	1.897	0.730		**	
<b>C</b>					
<i>Model fit: no improvement</i>					
(1a) Academic preparation: 25-50%tile	-0.502	0.170	0.605	**	
(1b) Academic preparation: 50-75%tile	-0.520	0.191	0.595	**	
(1c) Academic preparation: top quartile	-0.676	0.253	0.509	**	-9.08
(2) Percent of non-resident foreign classmates	0.160	0.084	1.173	0.058	
Interaction (1a) x (2)	-0.026	0.191	0.974		
Interaction (1b) x (2)	0.057	0.209	1.059		
Interaction (1c) x (2)	0.484	0.242	1.622	*	-2.58
Intercept	1.720	0.816		*	
<b>D</b>					
<i>Model fit: no improvement</i>					
(1a) Parent income unknown	-0.016	0.165	0.984		
(1b) Parent income less than \$30K	-0.055	0.286	0.946		-0.74
(1c) Parent income \$30-50K	0.276	0.253	1.318		
(1d) Parent income \$50-80K	0.069	0.192	1.071		
(2) Percent of courses taught by adjunct/non-regular faculty members	-0.007	0.004	0.993		
Interaction (1a) x (2)	-0.003	0.009	0.997		
Interaction (1b) x (2)	-0.028	0.013	0.972	*	-1.12
Interaction (1c) x (2)	-0.006	0.013	0.994		
Interaction (1d) x (2)	0.005	0.010	1.005		
Intercept	1.506	0.830		*	

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TABLE 8. (continued)

<b>E</b>	Estimate	S.E.	Exp(B)	Sig.	% Δ - p
<i>Model fit: X<sup>2</sup> difference significant at 0.05</i>					
(1) Male	0.528	0.152	1.696	***	7.10
(2) First-year cumulative GPA (x10)	0.108	0.010	1.114	***	
Interaction (1) x (2)	0.029	0.014	1.029	*	7.48
Intercept	1.754	0.851		*	
<b>F</b>					
<i>Model fit: X<sup>2</sup> difference significant at 0.01</i>					
(1a) Academic preparation: 25-50%tile	-0.617	0.229	0.540	**	
(1b) Academic preparation: 50-75%tile	-0.892	0.246	0.410	***	-11.98
(1c) Academic preparation: top quartile	-1.214	0.299	0.297	***	-16.32
(2) Lived on campus	0.079	0.159	1.083		
Interaction (1a) x (2)	0.260	0.316	1.296		
Interaction (1b) x (2)	0.829	0.338	2.290	*	-0.85
Interaction (1c) x (2)	1.105	0.370	3.019	**	-1.47
Intercept	-1.520	0.872			
<b>G</b>					
<i>Model fit: X<sup>2</sup> difference significant at 0.05</i>					
(1) Male	0.302	0.139	1.353	*	4.05
(2) Was employed on campus	0.612	0.281	1.844	*	
Interaction (1) x (2)	1.288	0.558	3.625	*	21.37
Intercept	-1.335	0.874			
<b>H</b>					
<i>Model fit: no improvement</i>					
(1a) Parent income unknown	0.040	0.178	1.041		
(1b) Parent income less than \$30K	0.179	0.307	1.197		2.41
(1c) Parent income \$30-50K	0.291	0.264	1.338		
(1d) Parent income \$50-80K	0.130	0.209	1.139		
(2) Took a diversity course	0.110	0.183	1.116		
Interaction (1a) x (2)	-0.358	0.423	0.699		
Interaction (1b) x (2)	-1.245	0.551	0.288	*	-14.31
Interaction (1c) x (2)	-0.063	0.625	0.939		
Interaction (1d) x (2)	-0.361	0.495	0.697		
Intercept	1.140	1.044			

\*\*\* p ≤ .001; \*\*p ≤ .01; \*p ≤ .05

Note: Model fit based on omnibus chi-square difference due to addition of interaction term to all variables in Tables 6 and 7; all continuous variables are centered around mean; % change in *p* for the interaction term is based on the multiplicative factor by which the odds ratio comparing the predicted odds for the significant group versus the reference group changes given a one-unit change in the other variable (see Jaccard, 2001).