

Aid and Persistence: Assessing the Effectiveness of Minnesota State Grants

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Context

- Higher Education Affordability
 - Perception that the financial pressures on students and families are increasing as a result of tuition and fees
- Severe constraint on state and federal appropriations & student financial aid
- Increased demand for evaluation and results-based budgeting
 - What is the impact of Minnesota State Grants on student enrollment, persistence, and completion? Are grants “worth” the investment?

Minnesota State Grants

Established in 1965 (Minnesota State Scholarship)

- Current award structure enacted in 1983

Eligibility is limited to:

- MN resident undergraduates enrolled in the first 120 credits

Awards vary by

- Tuition & Fees (capped) and a living allowance
- Enrollment level
- Program level (2-year or 4-year)
- Financial Need:
 - Parent Contribution (dependent students) or
 - Student Contribution (independent students)

Research Questions

1. What are the persistence rates for Minnesota State Grant applicants?
 - How do persistence rates vary over time?
 - By student demographics? institution type? program?
2. Are Minnesota State Grant recipients more likely to persist as compared to non-recipients?
3. Do Minnesota State Grant significantly increase the odds of student persistence?
 - For 2-year students? Independent students? Students of color?

Literature Review

Financial Aid & Price

- As Price \uparrow , Enrollment/persistence \downarrow
 - Heller (1997), Leslie and Brinkman (1987)
- Financial aid is critical, effect is probably small & indirect
 - St. John & Noell (1989), Heller (1997)
- Pell Grants reduce dropout probability
 - Bettinger, 2004

Student sensitivity to price and financial aid may be masked by college choice decisions

Literature Review

.... Meets Student Choice Theory

- Educational attainment is the end result of a series of student choices influenced by social/cultural, academic and financial contexts; multiple theories are needed
 - St. John (1994), Perna and Thomas (2006), Chen (2008)
- Subgroup analysis is needed to explore variations in dropout risks rather than just averages
 - *Chen (2008), Chen & DesJardins (2010)*

Using student choice theory one can examine the effect of public policies across the different student contexts and diversity of student outcomes (St. John, 1994).

Factors Related to College Success

Psychological	Social Forces	Economic	Organizational	Interactionist Factors	Interaction Effects
Personal characteristics, educational aspirations, internal ability and skills	Social attributes related to students, institutions & society	Price Responsiveness / Human Capital Investment	Institutional attributes	Dynamic interaction between individuals and the environment	Subgroup analysis
Degree Level	Age	Educational Costs (Tuition & Fees, full-time)	Institutional Control/Sector	Enrollment Level	Race x Income
Major	Gender	Grants & Scholarships	Institution size	Student Engagement	Race x Gender
Educational Aspiration	Race / Ethnicity	Employment	Faculty-student ratios	Work/Live on Campus	Income x Institution Control/Sector
High School Grades	Institutional prestige	Loans / Debt		Faculty-student interactions	

Data, Cohorts & Limits

State Grant applicant data:

- Academic years 2004-2005 to 2010-2011
- FAFSA elements, Professional Judgments, credits enrolled, withdrawals, institution, Pell Grant, State Grant
- Merged with MOHE fall term enrollment data: institution, degree level, major, race, gender
 - Match by Social Security Number or Name, Birthdate & Institution

Cohort definition

- Degree-seeking resident undergraduates who completed the FAFSA and were eligible for state financial aid
- Cohort size ranges from 34,156 (2004-2005) to 38,004 (2008-2009)

Limitations: Self selection bias & No grades!

What are the persistence rates for Minnesota State Grant applicants?

2004-2005: 70%

2005-2006: 68%

2006-2007: 79%

2007-2008: 78%

2008-2009: 81%

What happened in 2006-2007??

How do persistence rates vary by student demographics? institution type? program?

% Persisting to 2nd Year

By
gender?

Gender	% of Total	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Male	45%	69%	68%	78%	77%	78%
Female	55%	72%	69%	80%	80%	83%
Unknown	0.2%	22%	44%	47%	59%	35%

By age?

Age	% of Total	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Less than 24 Years	86%	73%	71%	81%	80%	82%
25-29	6%	55%	56%	67%	65%	71%
30-34	3%	57%	55%	70%	69%	75%
35+	6%	60%	54%	69%	66%	73%

By race/
ethnicity?

Race/Ethnicity	% of Total	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Black or African American	6%	62%	57%	71%	71%	73%
American Indian or Alaska Native	2%	54%	47%	57%	52%	55%
Asian or Pacific Islander	5%	73%	70%	80%	79%	81%
Hispanic or Latino	3%	67%	65%	74%	73%	77%
White	65%	72%	70%	81%	80%	82%
Unavailable	19%	54%	54%	72%	71%	79%

How do persistence rates vary by student demographics? institution type? program?

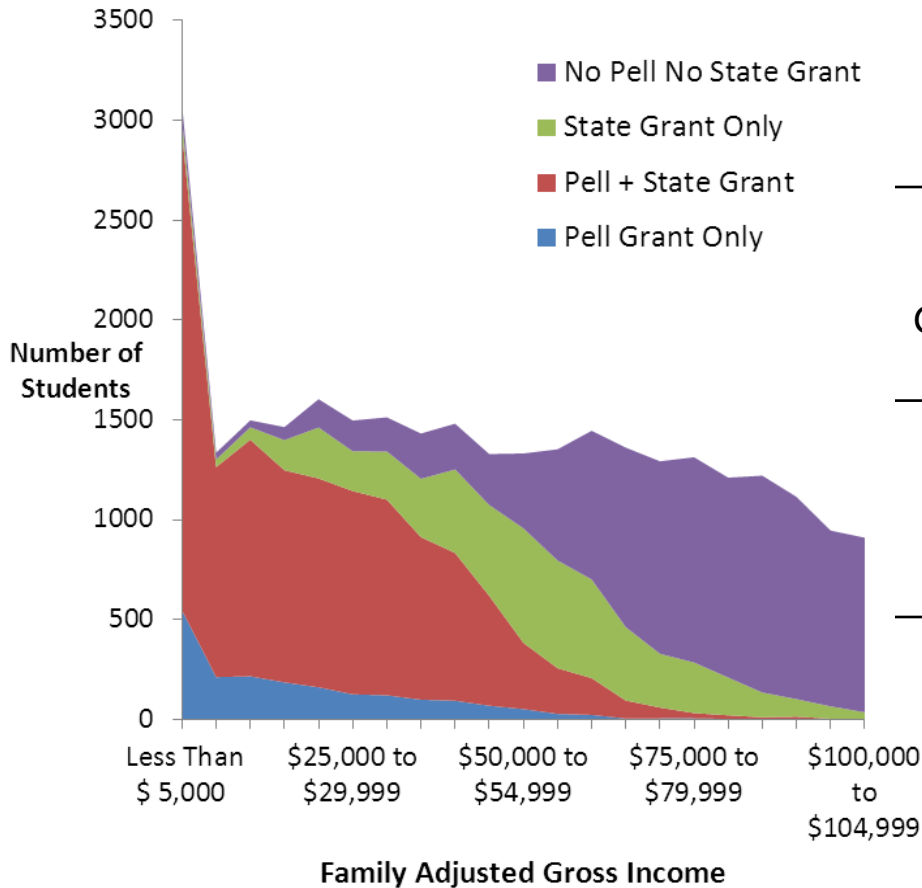
		% Persisting to 2nd Year					
		% of total	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
By Institution type?	Institution Type						
	Public Two-Year	46%	61%	59%	69%	68%	72%
	Public Four-Year, State Universities	16%	86%	86%	88%	88%	89%
	Public Four-Year, U of Minnesota	15%	85%	84%	94%	95%	96%
	Private Not-for-Profit Two-Year	1%	69%	58%	66%	62%	75%
	Private Not-for-Profit Four-Year	14%	83%	83%	93%	92%	93%
	Private For-Profit Two-Year	3%	18%	30%	49%	54%	44%
Private For-Profit Four-Year	5%	44%	47%	77%	71%	77%	
By degree level?	Degree Level						
	Sub-baccalaureate award < 1 year	2%	35%	32%	58%	52%	48%
	Sub-baccalaureate award 1-2 years	10%	51%	48%	63%	79%	65%
	Associate Degree	39%	63%	61%	71%	64%	73%
	Bachelor's degree	38%	84%	83%	92%	69%	94%
	Unavailable	10%	77%	71%	82%	93%	81%
By enrollment?	Enrollment Level						
	Annual credits less than 24	26%	45%	45%	57%	57%	61%
	Annual credits greater than 24	74%	79%	77%	86%	86%	88%

Aid Recipients

- Minnesota calculates a “combined Pell plus State Grant award”, so 4 possible groups of Aid Recipients
 - Pell Grant only
 - Pell plus State Grant
 - State Grant only
 - No grants
- Awards vary based on institution type, family type, enrollment level and parent contribution / student contribution

Awarding Policy Complications

Number of Students by Aid Receipt by Income
2008-2009



2008-2009 Cohort (medians)	Pell Grant Only	Pell + State Grant	State Grant only	No Pell No State Grant
Adjusted Gross Income	\$15,163	\$20,988	\$53,716	\$91,437
Pell Grant	\$4,731	\$4,180	\$0	\$0
State Grant	\$0	\$1,000	\$1,620	\$0
Combined Grant	\$4,731	\$5,128	\$1,620	\$0

Is Combined Grant Award aid correlated with persistence?

2008-2009		Persist	State Grant (\$1000)	Pell Grant (\$1000)	Combined Grant (\$1000)	Income (\$1000)
Persist	Pearson Correlation	1	.089**	-.148**	-.064**	.136**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	38004	38004	38004	38004	35649
State Grant (\$1000)	Pearson Correlation	.089**	1	.233**	.692**	-.299**
	Sig. (2-tailed)	.000		0.000	0.000	0.000
	N	38004	38004	38004	38004	35649
Pell Grant (\$1000)	Pearson Correlation	-.148**	.233**	1	.863**	-.547**
	Sig. (2-tailed)	.000	0.000		0.000	0.000
	N	38004	38004	38004	38004	35649
Combined Grant (\$1000)	Pearson Correlation	-.064**	.692**	.863**	1	-.566**
	Sig. (2-tailed)	.000	0.000	0.000		0.000
	N	38004	38004	38004	38004	35649
Income (\$1000)	Pearson Correlation	.136**	-.299**	-.547**	-.566**	1
	Sig. (2-tailed)	.000	0.000	0.000	0.000	
	N	35649	35649	35649	35649	35649

Do the aid groups persist at different rates?

T-tests		Means									
		Variable = Persist									
Cohort		2004-2005		2005-2006		2006-2007		2007-2008		2008-2009	
N		33485		34312		35777		36635		38004	
		Mean	F	Mean	F	Mean	F	Mean	F	Mean	F
Pell Grant Only		0.48***	649	0.43***	381	0.43***	517	0.59***	643	0.62***	1484
Pell + State Grant		0.69***	500	0.65***	869	0.65***	1712	0.72***	2135	0.77***	1123
State Grant only		0.76***	9	0.75***	25	0.75***	68	0.81***	28	0.84**	938
No Pell No State Grant (reference group)		0.75		0.74		0.74		0.83		0.85	

***. Correlation is significant at the 0.01 level (2-tailed).

**. Correlation is significant at the 0.05 level (2-tailed).

Our Model

Psychological	Social Forces	Economic	Organizational	Interactionist Factors	Interaction Effects
Personal characteristics, educational aspirations, internal ability and skills	Social attributes related to students, institutions & society	Price Responsiveness / Human Capital Investment	Institutional attributes	Dynamic interaction between individuals and the environment	Subgroup analysis
Degree Level (reference group = BA)	Age (reference group = 18-24)	Educational Costs (full-time, \$1000 increments)	4-Year Institution (0,1)	Enrollment Level (Dummy, 1= 24+ credits in year)	Race
	Gender (0= Male, 1=Female)	Pell Grant (\$1000 increments)	Private Institution (0,1)		Income
	Race / Ethnicity 6 Dummy variables Coded 0,1 if Black American Indian Asian Hispanic White Unknown	State Grant (\$1000 increments)	For-Profit Institution (0,1)		Degree Level
		Combined Grants (\$1000 increments)			Dependency Status
		Income (\$1000 increments)			

Factor Analysis – 2005 example

Rotated Component Matrix^{a,b}

	Family Type	Financial	Institutional	Program	Race and Gender				
	1	2	3	4	5	6	7	8	9
Has Children	0.798	0.12	0.006	-0.13	0.069	0.025	-0.065	0.03	0.094
Married	0.798	-0.051	-0.055	0.014	-0.003	0.037	0.01	0.026	-0.018
Independent	0.779	0.194	0.047	-0.264	0.179	0.009	-0.032	0.031	0.066
Age	0.855	0.046	0.007	-0.148	0.131	-0.022	-0.008	0.01	0.056
State Grant Amount (\$1000)	-0.126	0.748	0.123	0.384	-0.09	0.012	0.045	0.017	-0.014
Pell Grant Amount (\$1000)	0.179	0.748	-0.011	-0.197	0.233	0.138	-0.063	0.02	0.059
State +Pell Grant Amount (\$1000)	0.035	0.958	0.071	0.119	0.092	0.096	-0.012	0.024	0.029
Income (\$1000)	-0.126	-0.754	0.064	0.254	-0.111	-0.049	0.009	-0.024	-0.03
Private institution	0.021	0.013	0.887	0.226	0.018	-0.014	-0.037	0.008	-0.027
For-profit institution	0.037	0.077	0.673	-0.386	-0.061	0.004	0.086	-0.014	0.042
Costs (Tuition & Fees + Standard Living Allowance)	-0.046	-0.01	0.792	0.48	0.023	0.019	-0.051	0.011	-0.043
4 year institution	-0.156	-0.045	0.362	0.645	-0.127	0	0.041	-0.018	-0.025
Degree level Less than 1 Year	-0.021	-0.04	0.127	0.753	0.012	0.056	-0.054	-0.004	-0.032
Full Time Enrollment	-0.258	0.086	-0.063	0.505	-0.238	-0.114	0.156	-0.038	0.04
African-American	0.02	0.094	-0.002	-0.017	0.954	0.002	-0.001	-0.014	0.002
Asian	-0.035	0.058	-0.028	0.047	-0.039	0.959	-0.05	-0.059	-0.06
White	-0.017	-0.095	-0.01	0.003	-0.547	-0.644	-0.309	-0.329	-0.253
Race Unknown	0.056	0.003	0.105	-0.093	-0.078	0.128	0.864	0.055	0.095
Female	0.064	0.042	0.143	-0.124	-0.173	0.193	-0.477	0.113	0.225
Hispanic	-0.001	0.004	-0.012	0.01	0.002	-0.01	-0.018	0.99	-0.023
American Indian	0.013	-0.006	-0.035	0.047	0.028	-0.02	-0.012	-0.022	0.965

Do Minnesota State Grants significantly increase the odds of student persistence?

Model Fit

Year	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Number of cases	31049	31429	33508	34136	35645
Baseline <i>p</i>	73.4%	70.7%	79.4%	79.4%	80.5%
% Correctly Predicted	77.7%	76.1%	80.1%	80.6%	81.6%
Hosmer and Lemeshow Goodness of Fit	12.956	31.238	86.071	16.727	29.782
- 2 Log L	30092.214	31729.108	28374.384	2883.659	28789.984
Cox & Snell R Square	.173	.181	.157	.158	.164
Nagelkerke R Square	.252	.258	.247	.247	.262
Degrees of Freedom	22	22	23	23	24

Logistic Regression Results

Economic Variables

Year	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009		
Overall predictive capability	77.70%			76.00%			80.10%			80.60%			81.60%		
PREDICTORS	B	SE	Odds	B	SE	Odds	B	SE	Odds	B	SE	Odds	B	SE	Odds
Pell Grant Amount (\$1000)	-.207**	0.020	0.448	-.241***	0.019	0.44	-.128***	0.019	0.468	-.109**	0.019	0.473	-.078***	0.019	0.481
Combined State + Pell Grant Amount (\$1000)	.154**	0.016	0.538	.160***	0.014	0.54	.057***	0.014	0.514	.042**	0.015	0.510	0.025	0.016	0.506
Income (\$1000)	.003**	0.000	0.501	0.000	0.000	0.5	.002***	0.000	0.5	.001**	0.000	0.5	.001***	0.000	0.5

**p < .05

***p < .01

Logistic Regression Results

Demographic Variables

Year	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009		
PREDICTORS	B	SE	Odds	B	SE	Odds	B	SE	Odds	B	SE	Odds	B	SE	Odds
Independent Student	-.161**	0.069	0.46	-.139**	0.067	0.465	-0.099	0.068	0.475	-.134**	0.066	0.466	-0.018	0.066	0.495
Married	.241***	0.068	0.56	.251***	0.067	0.562	.242***	0.069	0.56	.315***	0.070	0.578	.164**	0.070	0.541
Has Children													.619**	0.137	0.65
Age: 25-29	.251**	0.082	0.562	.315***	0.081	0.578	0.16	0.081	0.54	0.173	0.082	0.543	0.154	0.081	0.538
Age: 30-34	.457***	0.098	0.612	.375***	0.097	0.593	.280**	0.098	0.569	.346**	0.099	0.586	.375***	0.096	0.593
Age:35+	.590***	0.087	0.643	.347***	0.083	0.586	0.123	0.084	0.531	.195**	0.086	0.549	.206**	0.085	0.551
Female	.317***	0.029	0.579	.232***	0.029	0.558	.270***	0.031	0.567	.301***	0.03	0.575	.361***	0.031	0.589
African American	.791***	0.093	0.688	0.162	0.085	0.54	0.113	0.057	0.528	.140**	0.057	0.535	0.066	0.054	0.517
American Indian	0.044	0.131	0.511	-.485***	0.126	0.381	-.724***	0.105	0.326	-.814***	0.103	0.307	-.775***	0.104	0.315
Asian	.807***	0.099	0.692	.321**	0.093	0.579	0.132	0.070	0.533	0.129	0.068	0.532	0.092	0.066	0.523
Hispanic	.590***	0.128	0.643	0.182	0.115	0.545	-0.071	0.101	0.482	-0.189	0.090	0.453	-0.016	0.085	0.496
White	.623***	0.074	0.651	.229**	0.068	0.557									
Race_Unknown							-0.304	0.072	0.425	-0.062	0.072	0.484	0.061	0.075	0.515

**p < .05

***p < .01

Logistic Regression Results

Program and Institutional Variables

Year	2004-2005			2005-2006			2006-2007			2007-2008			2008-2009		
PREDICTORS	B	SE	Odds	B	SE	Odds	B	SE	Odds	B	SE	Odds	B	SE	Odds
Degree Level Unknown	-.217***	0.06	0.446	-.325***	0.055	0.419	-.220**	0.075	0.445	-.306***	0.064	0.424	-.443***	0.064	0.391
Sub-baccalaureate award < 1 year	-.543***	0.129	0.367	-.857***	0.113	0.298	-.325**	0.105	0.419	-.597***	0.109	0.355	-1.113***	0.116	0.247
Sub-baccalaureate award 1-2 years	-.275**	0.096	0.432	-.658***	0.072	0.341	-.352***	0.086	0.413	-.399***	0.081	0.402	-.733***	0.082	0.324
Associate Degree	.389***	0.087	0.596	0.108	0.064	0.527	0.129	0.077	0.532	-0.049	0.069	0.488	-.254***	0.068	0.437
Full-Time Annual Enrollment	1.475***	0.033	0.814	1.363***	0.032	0.796	1.298***	0.034	0.786	1.34***	0.033	0.793	1.388***	0.033	0.800
4 year institution	1.050***	0.083	0.741	.825***	0.058	0.695	1.055***	0.069	0.742	.858***	0.062	0.702	.838***	0.059	0.698
Private institution	-.214***	0.052	0.447	-.151**	0.049	0.462	-.622***	0.104	0.349	-1.027***	0.113	0.264	-.320**	0.108	0.421
For-profit institution	-1.650***	0.096	0.161	-1.458***	0.069	0.189	-.846***	0.081	0.3	-.417***	0.084	0.397	-1.227***	0.080	0.227
Costs							.059***	0.008	0.515	.078***	0.008	0.52	.036***	0.007	0.509
Constant	-1.460***	0.122	0.189	-.594***	0.096	0.356	-.767***	0.126	0.317	-.814***	0.125	0.307	-0.098	0.120	0.476

**p < .05

***p < .01

What does all this mean?

- Combined Minnesota State Grants and Pell Grants are significantly correlated with persistence for all years; the aid groups do persist at different rates
- Pell Grants decrease the odds of persistence
- Combined Pell and State Grants increase the odds with persistence in most years
- More logistic regressions are needed!

Next Steps

1. Model changes

- Income categories! Interaction effects!
- Other variables (credit thresholds, completion, transfer)

2. Subgroup Analysis

- Students of Color – compared to – White
- Independent students – compared to – Dependent students
- Low income students – compared to – Upper Middle Income
- Students at 1-2 year degree programs -- compared to 4 year

Next Steps

3. Can multi-level modeling provide additional explanatory value in understanding the impact of Minnesota State Grants on student persistence?
 - Exploring Options for controls at the Institution-level for:
 - Academic quality (median ACT score)
 - Size & Selectivity (total enrollment, % applicants admitted)
 - Engagement (NSSE, CCSSE)
 - Mean Institutional grant amount to new students
 - Composition (% students of color, % Pell, % 18-24 years old)
 - Limits the types of institutions we can analyze (no missing data allowed)

Questions?

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