

Essays on Admissions Matching and Associated Outcomes in the Market for Higher Education in the U.S.

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Outline

- Motivation
- For each study:
 - Literature Review
 - Theoretical Framework
 - Data and Methods
 - Results
- Conclusion

Motivation

- Higher Education Affordability and Access
- Institutional Resources
- Emerging Literature around Match Quality
 - Why?
 - Then what?

Literature Review

- Rich literature on differences in product characteristics and consumer preferences in other markets (Berry, Levinsohn, & Pakes, 1995; Goldberg, 1995; Nevo, 2001)
- One recent application to higher education (Jacob, McCall, & Stange, 2013)

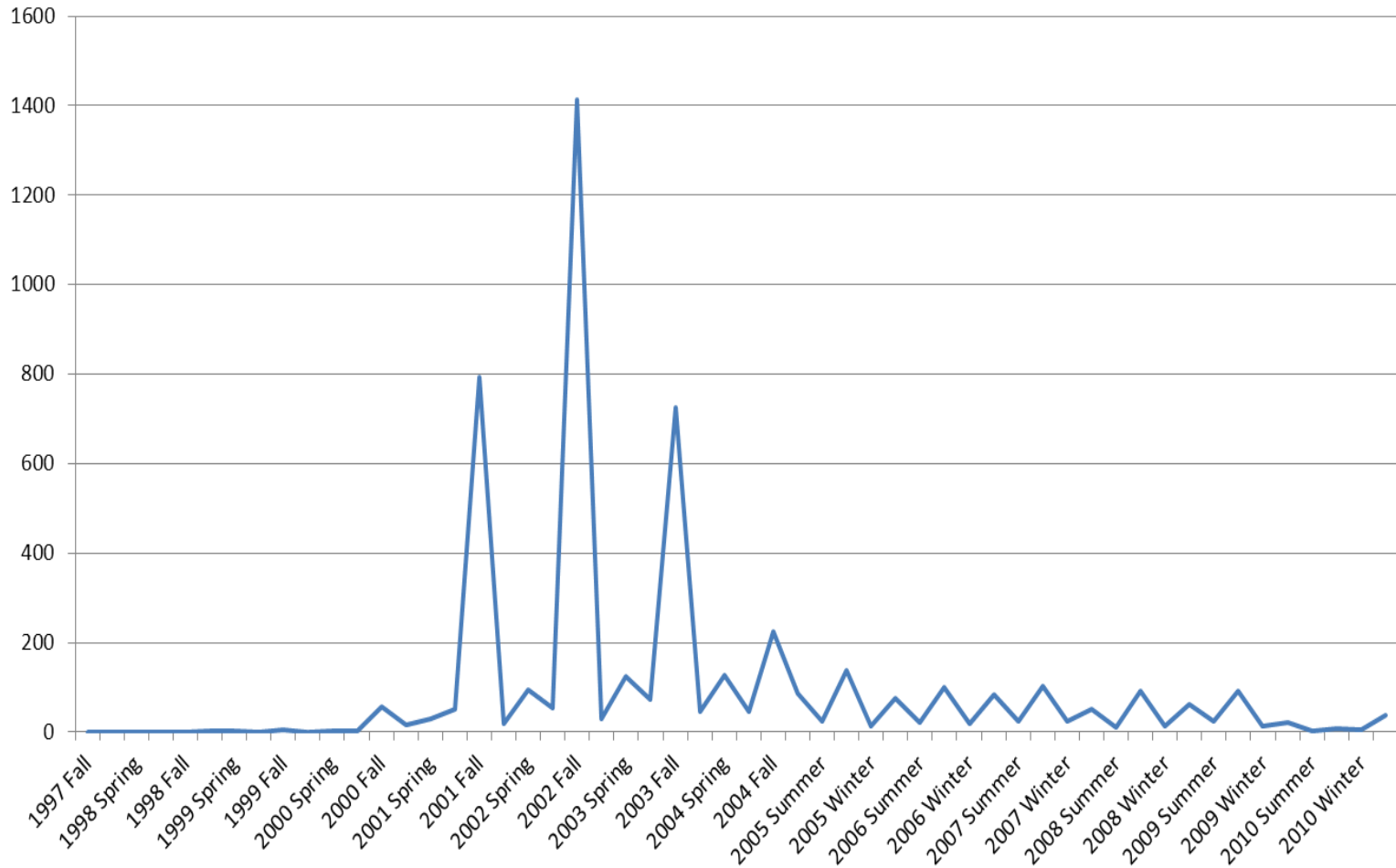
Theoretical Framework

- Inertia and lack of information as possible explanations for undermatching (Roderick et al., 2008; Bowen, Chingos, & McPherson, 2009)
- Possible differences in students' tastes for institutional characteristics
 - Tuition, financial aid and non-academic amenities as factors that may lead students to undermatch

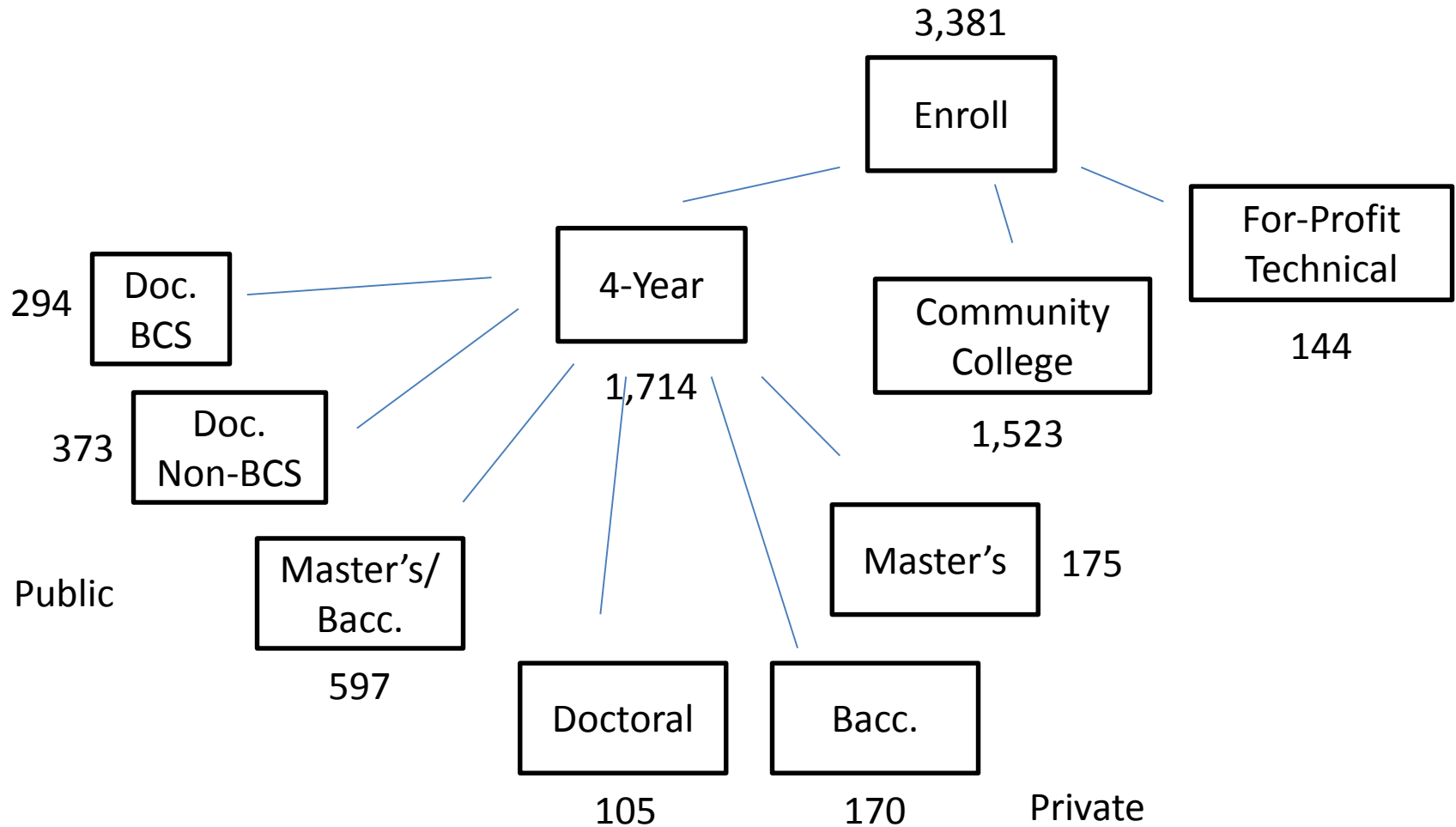
Data Sources

- Institutional characteristics: Integrated Postsecondary Education Data System (IPEDS)
- Household characteristics and college choices: 1997 National Longitudinal Survey of Youth (NLSY97)

Distribution of Applications in NLSY97



Nested Logistic Regression



Random Utility Maximization

Level: underrepresented status, HS curriculum type, region dummies

Type: SAT fit variables, expected earnings, net price (above and below \$75,000 income), amenities and size (with interactions), institution type dummies

Non-Academic Amenities

- Two principal components from a factor analysis
- Factor analysis of average auxiliary sales/student, average plant expenditures/student, average enrollment, share of urban institutions, % of NCAA Men's Basketball Tournament teams, % of NCAA Football bowl teams

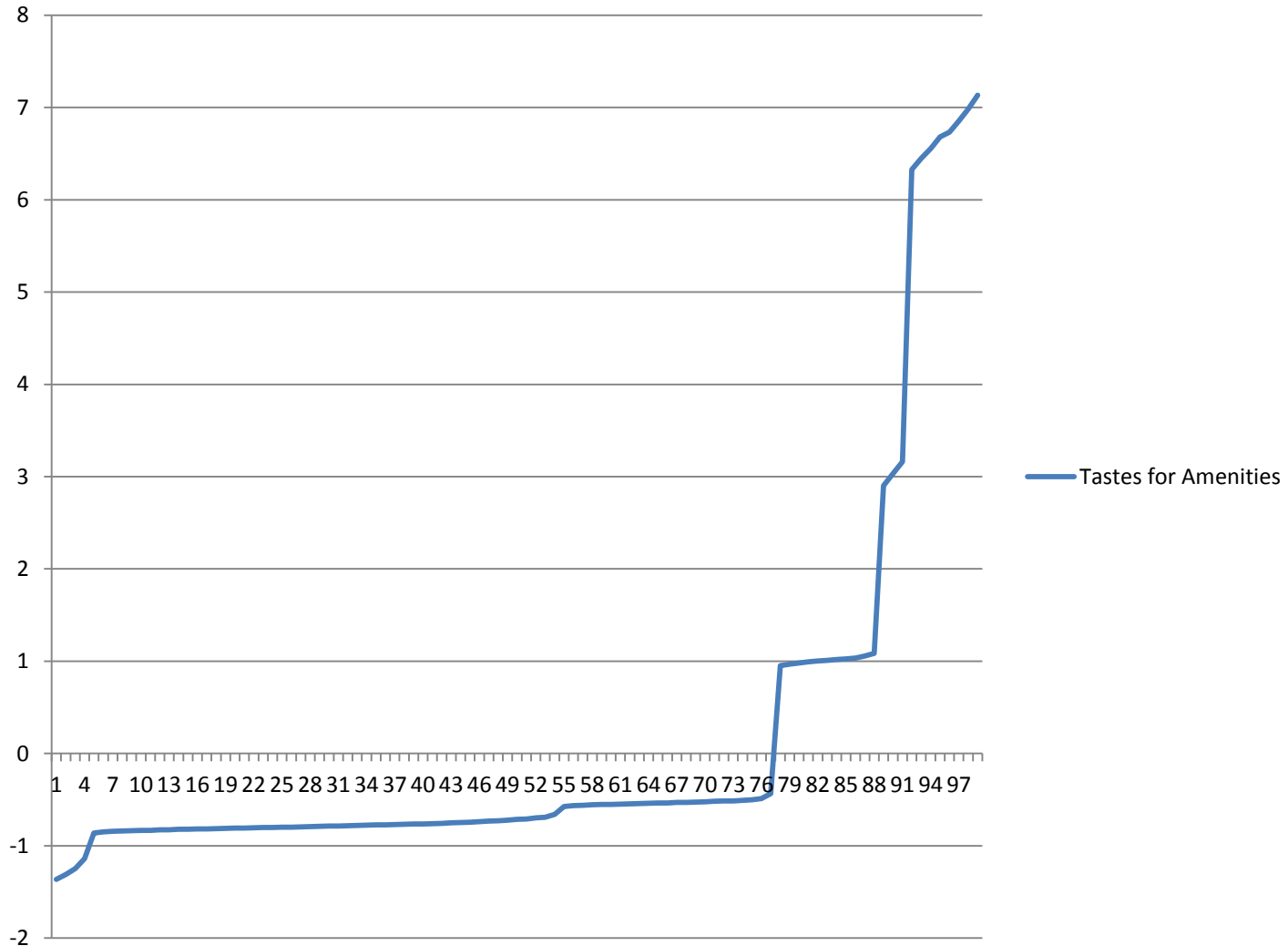
Regression Results

Variable	Coefficient	p-value	Variable	Coefficient	p-value
Verbal Over 75%	-0.007402	0.000			
Verbal Under 25%	0.0009405	0.546	Community Colleges		
Math Over 75%	-0.0075784	0.000	Underrep.	0.5338491	0.000
Math Under 25%	-0.0015124	0.269	Acad. Curr.	-1.149421	0.000
Expected Earnings	-0.0001018	0.015	NE Region	-0.3041658	0.015
Net Price (High Inc.)	-0.000234	0.000	SE Region	-0.0418274	0.697
Net Price (Lower In.)	-0.0002319	0.000	W Region	0.3019281	0.016
Amenities	2.217529	0.000			
Age * Amenities	-0.0341491	0.000	For-Profits		
Income * Amenities	5.38E-07	0.014	Acad. Curr.	1.58472	0.000
Size/Urbanicity	-2.949912	0.000	NE Region	-1.704942	0.000
Age * S/U	0.0816764	0.000	SE Region	0.1601987	0.543
Income * S/U	-1.31E-06	0.021	W Region	-0.3004829	0.242
Pub. Doc. BCS	-6.96723	0.000	Acad. Curr.	0.1692673	0.577
Pub. Doc. Non-BCS	-2.630796	0.000			
Priv. Master's	1.356161	0.000			
Pub. Mas./Bacc.	-1.139168	0.000			

Inclusive value term for four-year institutions = 0.7565

Likelihood ratio test for IIA: Prob > χ^2 = 0.0819

Distribution of Tastes for Amenities



Marginal Effects

	Private Doc.	Pub. Doc. BCS	Pub. Doc. Non	Priv. Bacc.	Priv. Master's	Pub. Bac./Mas.	Public 2-Year	For-Profit
1	-87.8E-07	15.0E-07	14.7E-07	7.43E-07	6.30E-07	20.2E-07	21.7E-07	2.96E-07
	-65.1E-07	8.03E-07	9.47E-07	4.24E-07	4.51E-07	14.5E-07	22.3E-07	2.54E-07
2	15.0E-07	-251E-07	47.0E-07	23.4E-07	20.0E-07	66.1E-07	71.4E-07	8.52E-07
	8.00E-07	-174E-07	27.3E-07	11.8E-07	12.9E-07	42.8E-07	66.0E-07	6.76E-07
3	14.7E-07	47.0E-07	-309E-07	26.9E-07	24.3E-07	87.8E-07	100E-07	9.02E-07
	9.44E-07	27.3E-07	-244E-07	15.8E-07	18.0E-07	63.7E-07	102E-07	8.66E-07
4	7.42E-07	23.5E-07	27.0E-07	-157E-07	11.6E-07	39.7E-07	44.0E-07	4.41E-07
	4.24E-07	11.8E-07	15.8E-07	-109E-07	7.53E-07	25.9E-07	40.7E-07	3.68E-07
5	6.29E-07	20.1E-07	24.4E-07	11.6E-07	-147E-07	37.9E-07	43.6E-07	3.91E-07
	4.51E-07	12.9E-07	18.1E-07	7.53E-07	-126E-07	30.3E-07	49.0E-07	4.15E-07
6	20.0E-07	65.9E-07	87.5E-07	39.4E-07	37.6E-07	-431E-07	167E-07	13.2E-07
	14.4E-07	42.6E-07	63.5E-07	25.7E-07	30.1E-07	-367E-07	178E-07	13.9E-07
7	21.5E-07	70.6E-07	99.1E-07	43.5E-07	43.0E-07	166E-05	-488E-07	39.4E-07
	21.9E-07	65.1E-07	101E-07	40.2E-07	48.3E-07	176E-05	-518E-07	58.4E-07
8	2.95E-07	8.51E-07	9.01E-07	4.40E-07	3.90E-07	13.2E-07	39.9E-07	-81.5E-07
	2.53E-07	6.74E-07	8.64E-07	3.66E-07	4.14E-07	13.9E-07	59.1E-07	-98.1E-07

Literature Review

- Extensive emerging literature related to prevalence of match quality issues (especially undermatching) but less related to consequences (Bowen et al., 2009; Roderick et al., 2008)
- More literature on the relationship between selectivity and student outcomes (Light & Strayer, 2000; Dale & Krueger, 2002; Long, 2008)

Theoretical Framework

- Importance of unobserved student characteristics (Dale & Krueger, 2002)
- Multiple measures of institutional quality (Zhang, 2005)
- Testing Dale & Krueger's approach with multiple outcomes (Long, 2008)

Data Sources

- Student Information: 1997 National Longitudinal Survey of Youth (NLSY97) –
- Institution Information: Integrated Postsecondary Education Data System (IPEDS)

Data

- Entrants by 2004 to 2- or 4-year institutions, working full-time in 2009: 2,165
- Degrees completed/entrants in NLSY97: 1,633/4,649

Methods

- Wages – OLS with Fixed Effects
- Degree Completion – Logit with Fixed Effects

Predicting Match Quality

(1) Observe students' applications and their outcomes (accepted or rejected)

(2) Run probit regression of application outcomes on GPA and SAT for each selectivity level

(3) Predict each student's probability of admission at each level

(4) Assign predicted eligibility to each student with a 90% admission probability at each level

Match Quality Definitions

- Compare each student's predicted eligibility with selectivity of institution actually attended
 - Create indicator variables for predicted undermatch and overmatch
- Examine student's choice relative to available set of acceptances
 - Create indicator variable for observed undermatch

Distribution of Matches

	Very Sel.	Selective	Some. Sel.	Nonsel.	Two-Year	None
Very Sel.	25.8%	28.0%	20.5%	11.7%	10.7%	3.3%
Selective	9.0%	18.9%	23.5%	19.9%	19.5%	9.3%
Some. Sel.	2.5%	8.2%	17.1%	12.6%	29.6%	29.9%
Nonsel.	1.2%	2.5%	6.2%	11.1%	30.2%	48.8%
Two-Year	2.0%	4.4%	7.7%	8.3%	21.2%	56.3%
Total	3.8%	7.6%	12.1%	11.1%	24.2%	41.2%

7,780 unweighted observations (shares based on NLSY97 sample weights)

Distribution of Average Wages

	Very Sel.	Selective	Some. Sel.	Nonsel.	Two-Year
Very Sel.	\$64,828.11	\$53,361.79	\$61,332.12	\$52,286.47	\$49,787.23
Selective	\$72,491.16	\$47,600.08	\$43,016.46	\$44,238.60	\$42,520.35
Some. Sel.	\$49,377.30	\$52,418.02	\$45,714.81	\$41,408.94	\$37,890.22
Nonsel.	\$86,565.90	\$40,753.65	\$40,104.24	\$33,893.76	\$40,482.53
Two-Year	\$57,984.79	\$48,948.67	\$43,641.43	\$39,070.46	\$39,477.38
Total	\$62,849.59	\$50,177.93	\$45,507.98	\$41,589.95	\$39,638.51

1,740 unweighted observations (shares based on NLSY97 sample weights)

Distribution of Completion Rates

	Very Sel.	Selective	Some. Sel.	Nonsel.	Two-Year
Very Sel.	63.6%	67.4%	66.0%	78.0%	47.2%
Selective	68.1%	68.6%	61.4%	66.4%	26.3%
Some. Sel.	61.6%	55.5%	56.8%	44.9%	16.9%
Nonsel.	60.3%	35.6%	48.1%	24.7%	7.6%
Two-Year	79.2%	58.3%	51.8%	32.3%	12.1%
Total	67.6%	60.2%	56.4%	44.6%	15.1%

3,990 unweighted observations (shares based on NLSY97 sample weights)

Wages – Observed Fixed Effects

Variable	Coefficient
Very Selective	.195**
Selective	.113
Somewhat Selective	.013
Nonselective	-.007
Predicted Undermatch	-.028
Predicted Overmatch	.049

Completion – Observed Fixed Effects

Variable	Coefficient
Very Selective	7.61***
Selective	6.67***
Somewhat Selective	6.81***
Nonselective	4.23***
Predicted Undermatch	1.07
Predicted Overmatch	1.07

Next Steps

- Future Work: including non-enrollers
- Research Directions: variation in experiences within institutions, variation in outcomes from different match qualities

Implications

- Thinking about differential impacts of price changes or resource investments on the student profile at an institution
- Thinking about experiences of students of all backgrounds at each institution

Discussion

Thank you! You can reach me at
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References and working papers are available for
both essays.