

Effective Use of National and Regional Survey Data in Evaluating Graduate Program Performance

SIZING THINGS UP

PROGRAM SIZE AND DEGREE COMPLETION:
A LOOK AT THE DATA

PRESENTATION FOR THE CGS 2011 ANNUAL MEETINGS
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The Graduate Degree Landscape:

- Roughly 950 Doctorate and Masters granting US institutions (Carnegie Classification)
- 222 Research Universities (doctoral granting)
- 96 RU/VH, including Tufts
- RU/VH enroll 2.4 million students, 13.5% of Higher Education Enrollment
- Average Enrollment at RU/VH is 25,000
- 2/3 of RU/VH are large public universities

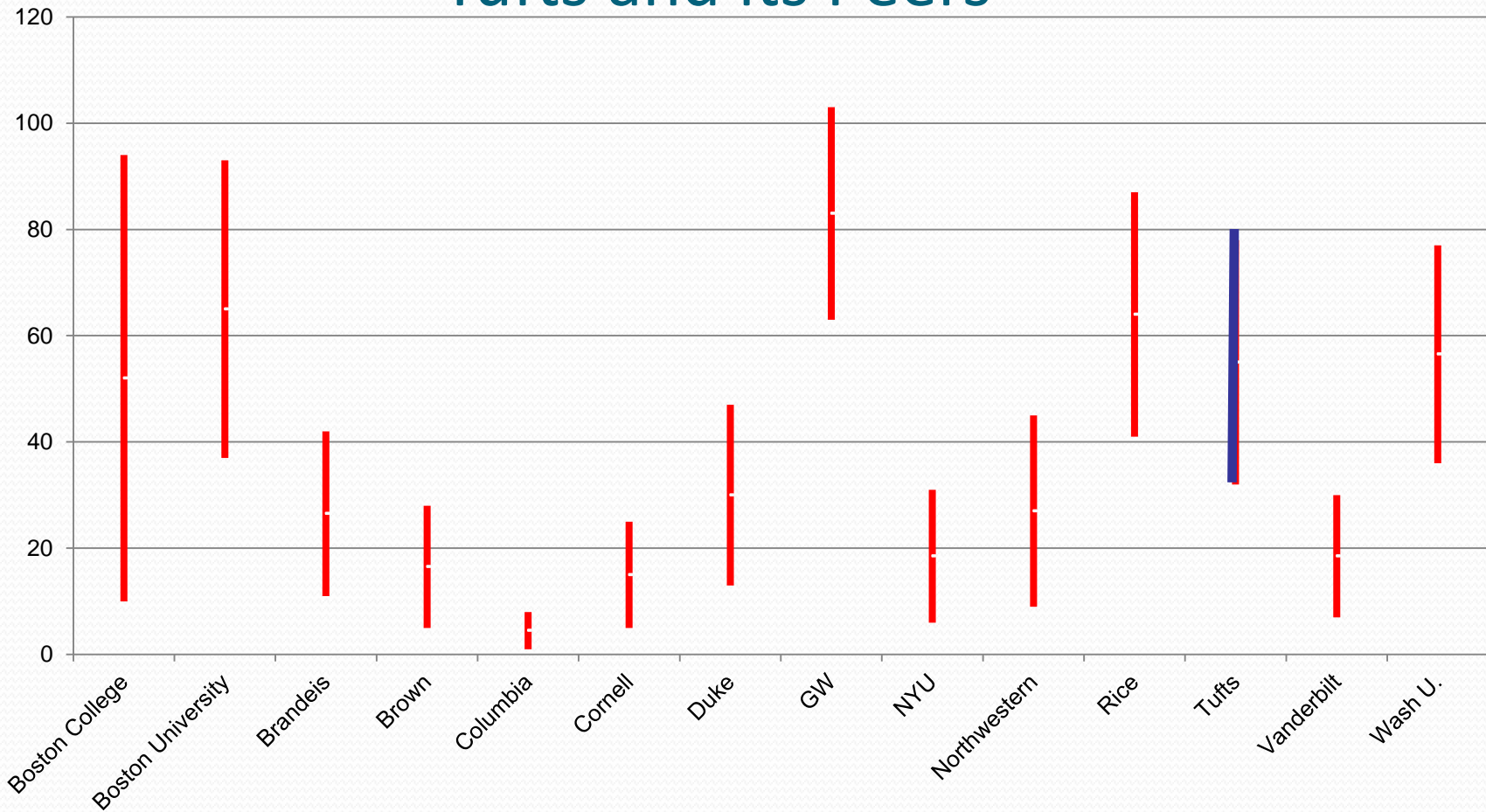
Tufts and its “neighborhood”:

- Tufts is a relatively small RU/VH
- Student Enrollment 9,658
- 5150 Undergraduates, 2534 Graduate Students and 1827 first Professional
- Liberal heart nested among Graduate and Professional schools
- Medical or Life Sciences footprint
- Characteristics define whose “close” or a Peer School

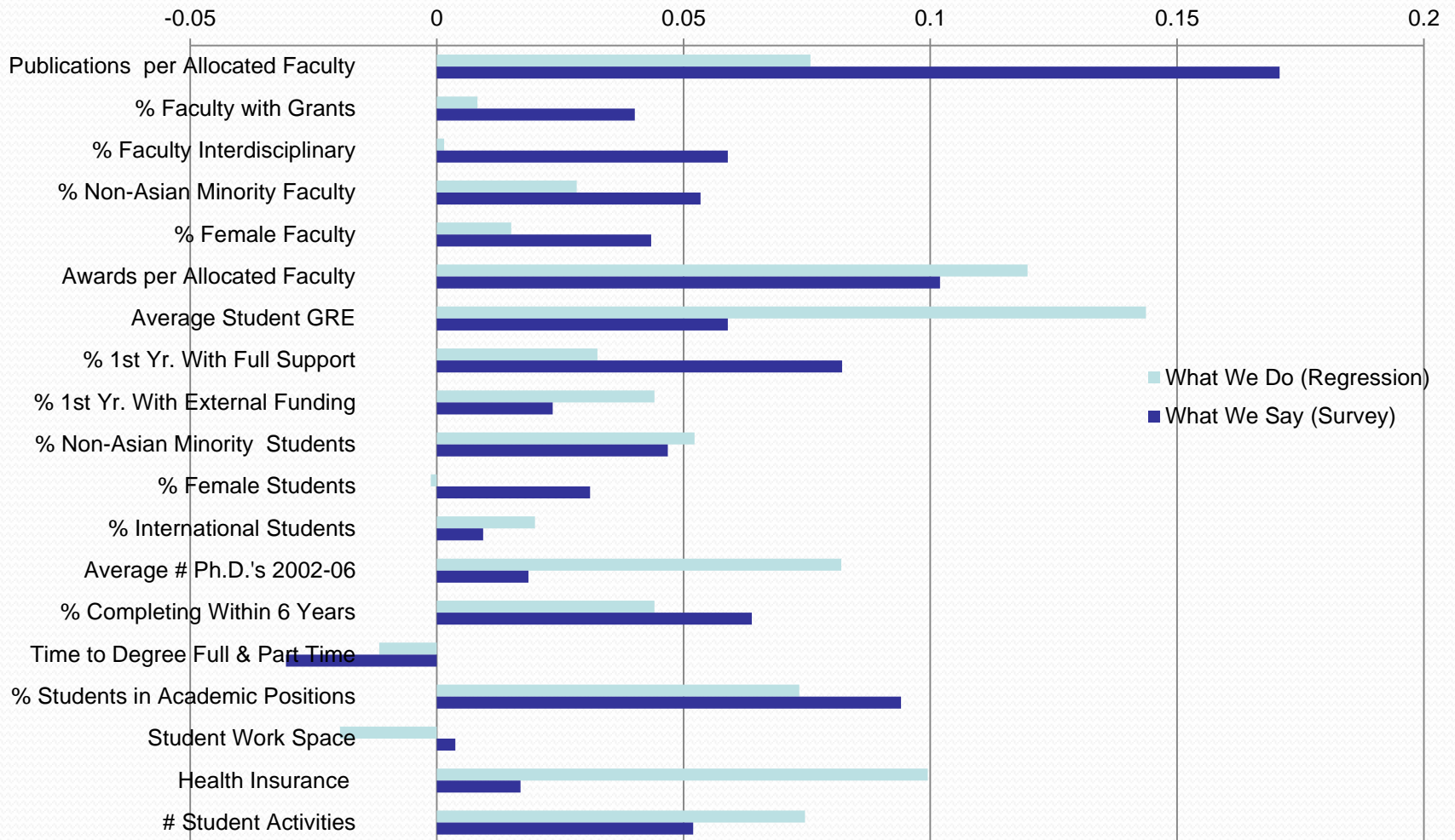
An NRC look at our neighbors:

- In 2010 GSAS identified for each Doctoral Program a list of Peer Schools
- Prepared Analysis of how each one of our Doctoral Programs compared to its Peers based on NRC data
- Reviewed the R and S Methodologies
- Difference in Weights Generated by R and S

R-Ranking Range of English Doctoral Programs: Tufts and its Peers



NRC Mean Weighting Factors: English



2011 Focus: Program Size and Degree Completion

- NRC data: 5,000 doctoral programs in 62 fields at 212 universities in the U.S
- Fields grouped into 6 broad Categories:
 - Agricultural Science
 - Biological and Health Sciences
 - Engineering
 - Humanities
 - Physical and Mathematical Sciences
 - Social and Behavioral Sciences

NRC Variables for Study:

- **Degree completion:** Average Completion Rate for cohorts entering Doctoral Programs from AY1997-2001 (AY 1997-1999 for Humanities) who completed in 6 years or less (8 years or less)
- **Program Size:** Total number of Students Enrolled in Fall 2005
- **Faculty Productivity:** Grants: percent of Faculty whose work is currently (2005-06) supported by Extramural Grant or contract
- **Student Quality:** Average GRE score: verbal for Humanities, quantitative for all others (AY2004-6 scores)

Relationship investigated:

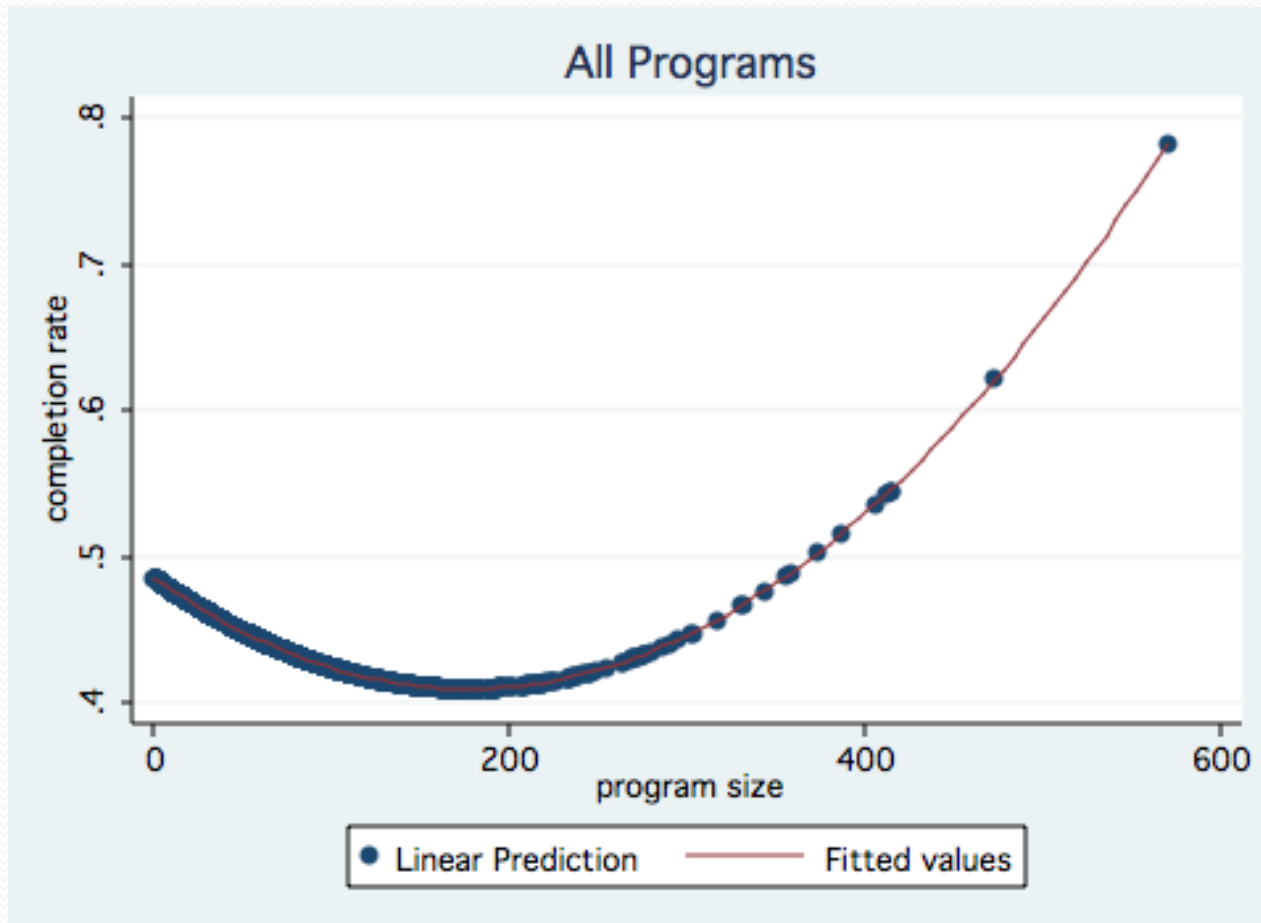
- Regress Degree Completion on:
- Program Size
- Program Size Squared
- Conditional on: Measures of Faculty Productivity and Student Quality
- Why non linear or scale effects: mentoring, specialization, peer cohort

Summary Data:

Field	Completion			Size			Grant		
	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min
All	45.3%	1	0	50	570	0	.616	1	0
PhyMaSci	42.8%	1	0	61	412	1	.749	1	0
SocBehSci	36.8%	1	0	52	218	0	.440	1	0
BioHeaSci	49.3%	1	0	48	219	0	.818	1	0
Engineering	50.5%	1	0	56	570	1	.804	1	0
Humanities	42.4%	1	0	43	286	3	.146	.67	0

Program Size and Degree Completion Rates

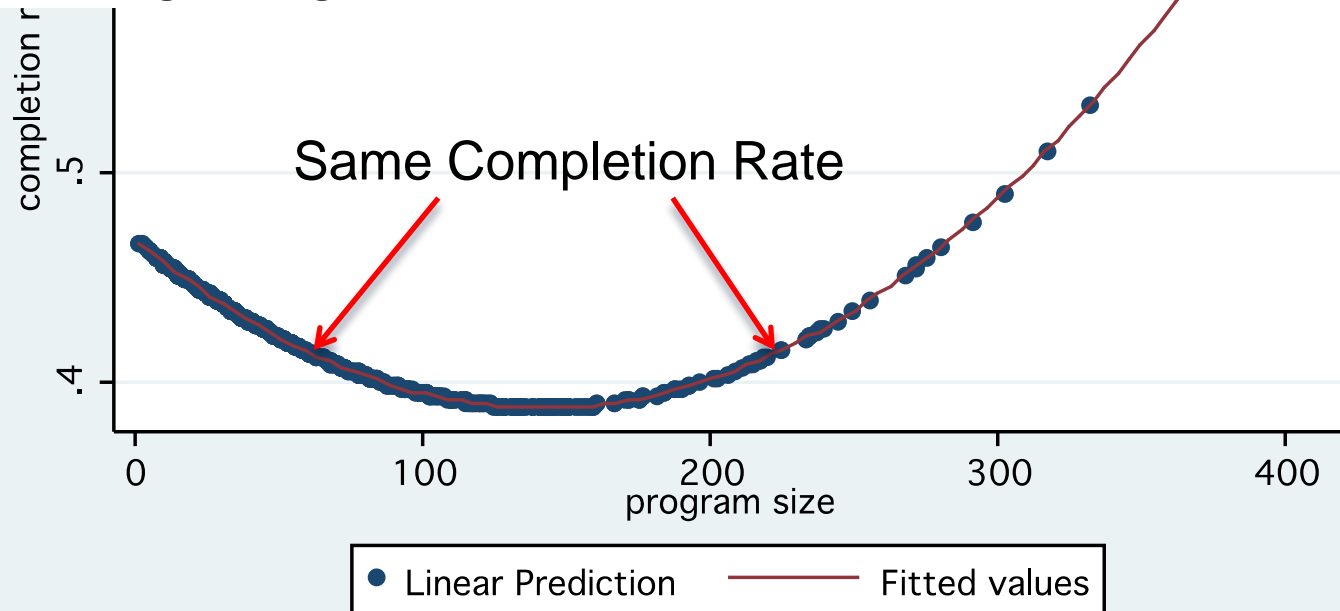
Does this relationship between completion rate and size characterize all programs? Or does it reflect just a few?



Program Size and Degree Completion Rates

Physical and Mathematical Sciences

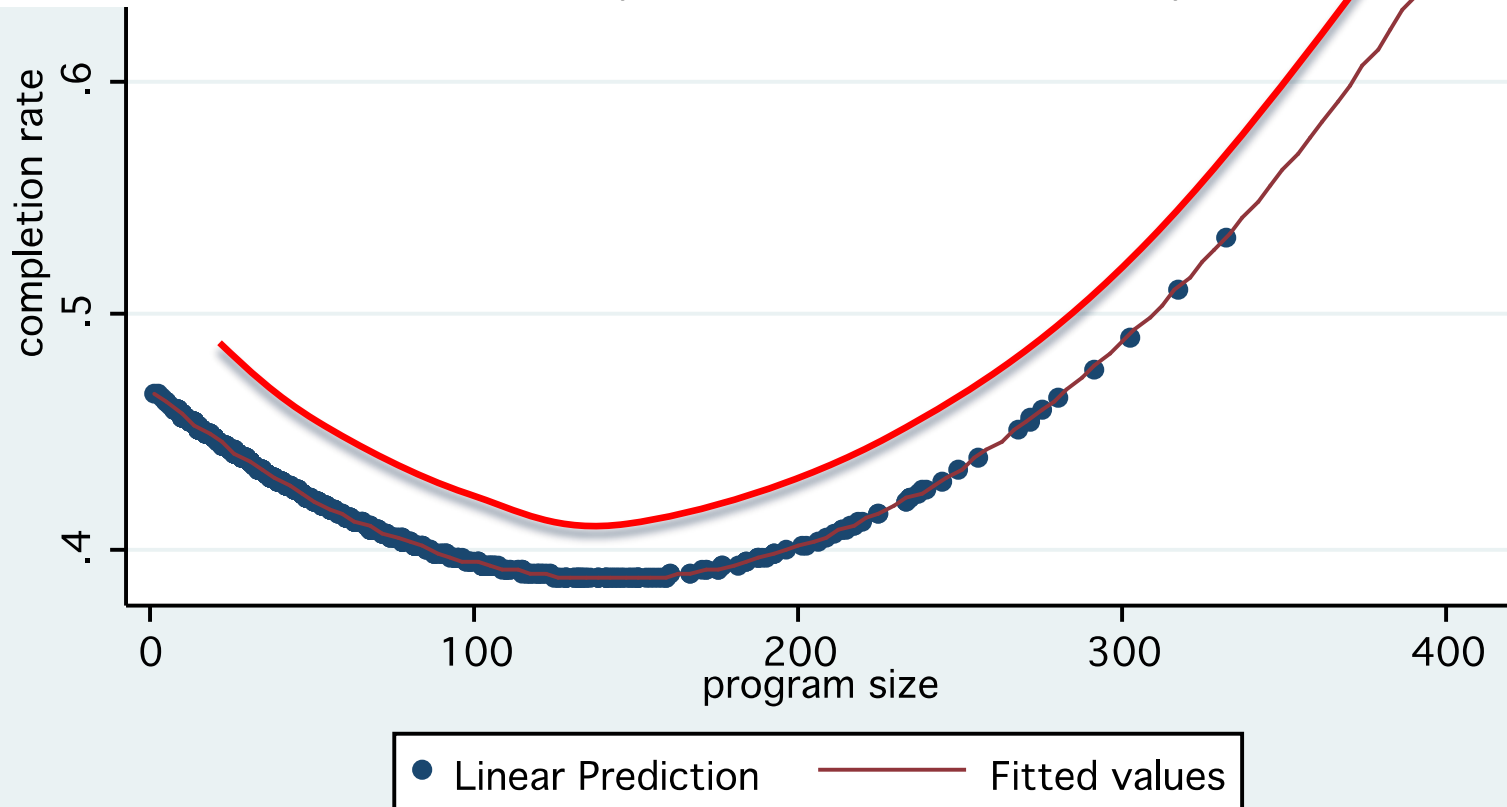
There are Potentially Important Scale Effects in the Physical & Mathematical Sciences. Programs on the order of 225 Achieve the same Completion Rates as the Typical Program (Size = 60), and Larger Programs Do Much Better



The Marginal Impact of Grants On Completion Rates

Physical and Mathematical Sciences

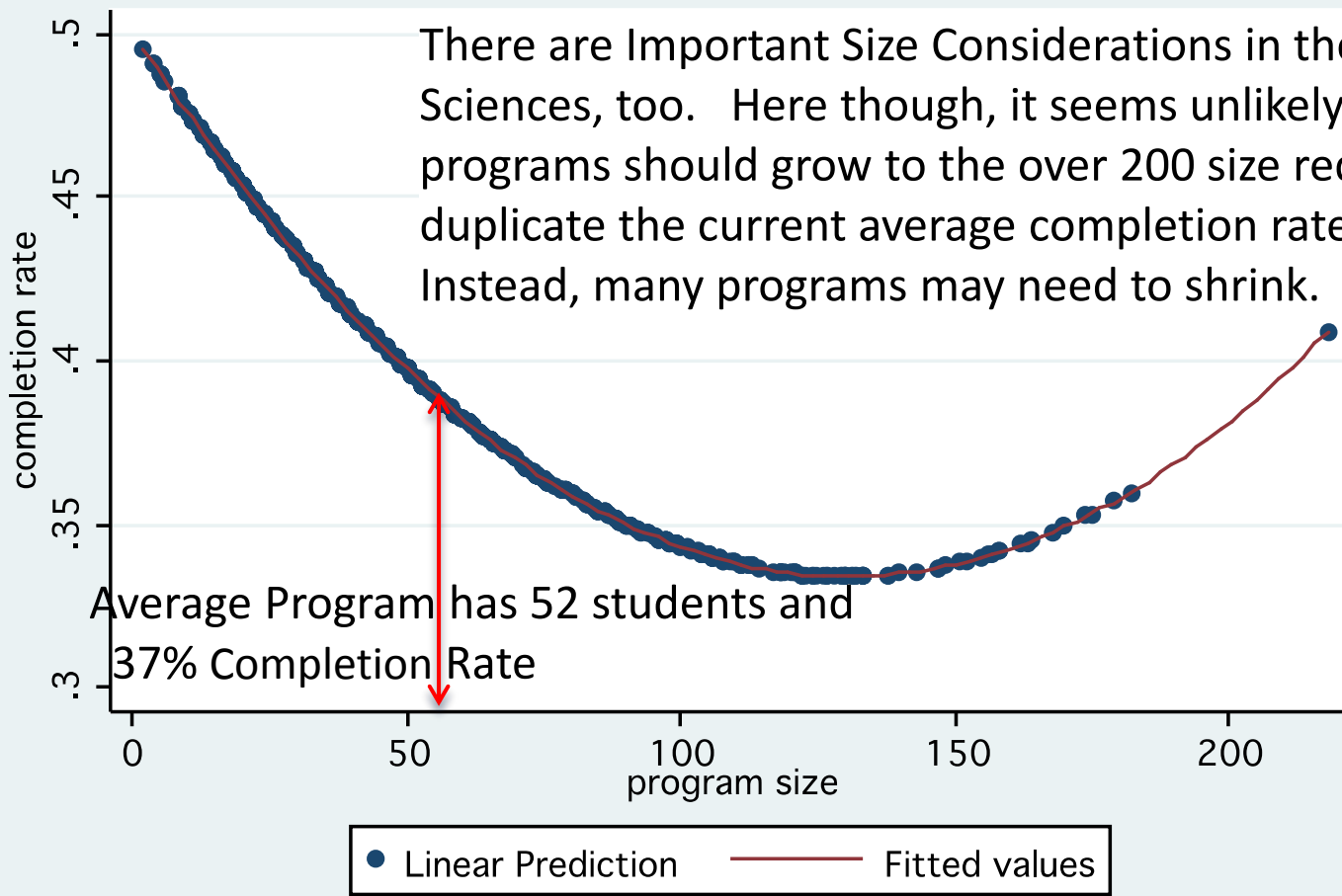
There is also a Significant if Small Role for Grants. If the Proportion of Faculty Receiving Grants Increased by 20% (Current Mean =75%) the Completion Rate would Rise by 2.8%



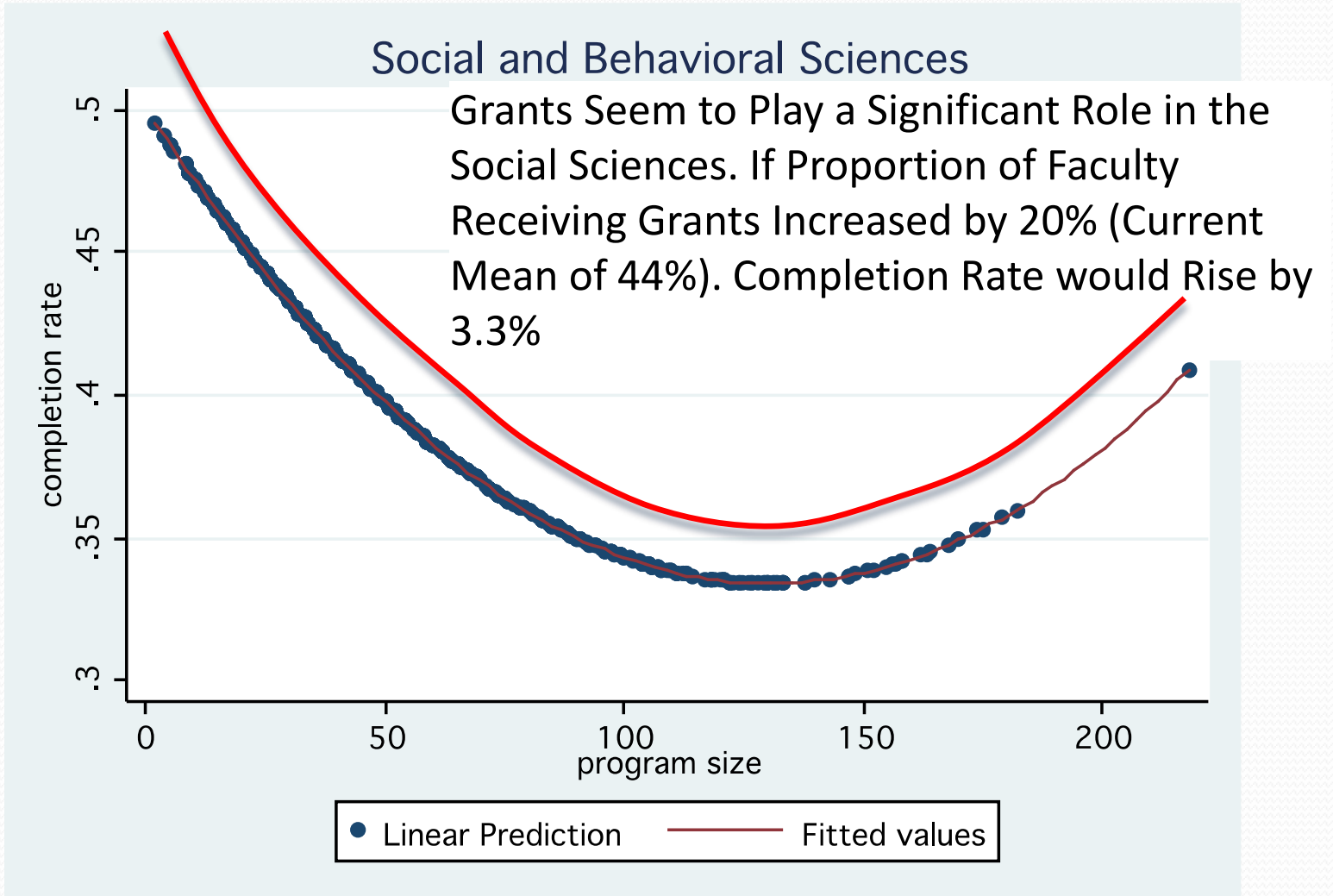
Program Size and Degree Completion Rates

Social and Behavioral Sciences

There are Important Size Considerations in the Social Sciences, too. Here though, it seems unlikely that programs should grow to the over 200 size required to duplicate the current average completion rate (37%). Instead, many programs may need to shrink.

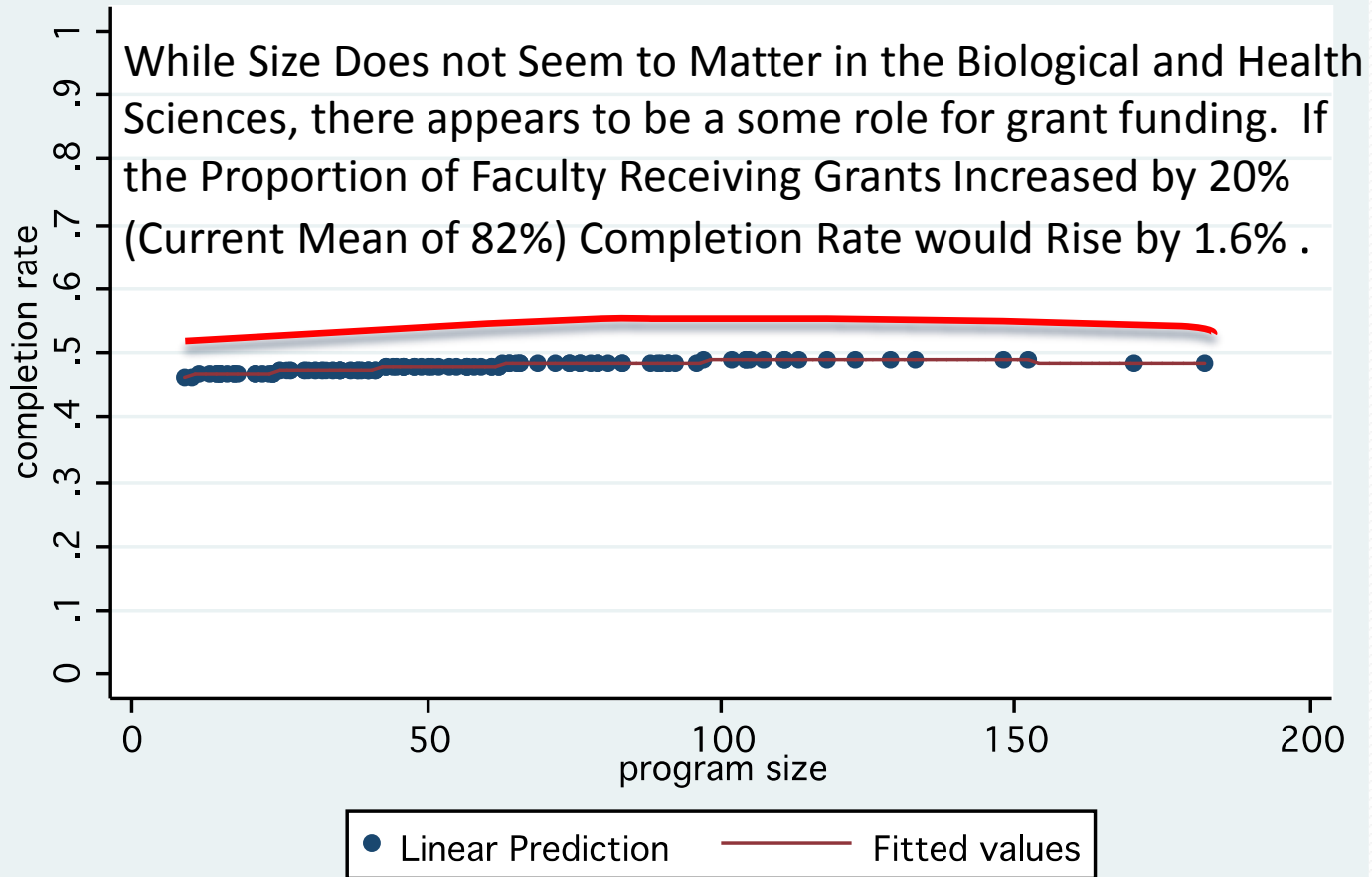


The Marginal Impact of Grants On Completion Rate

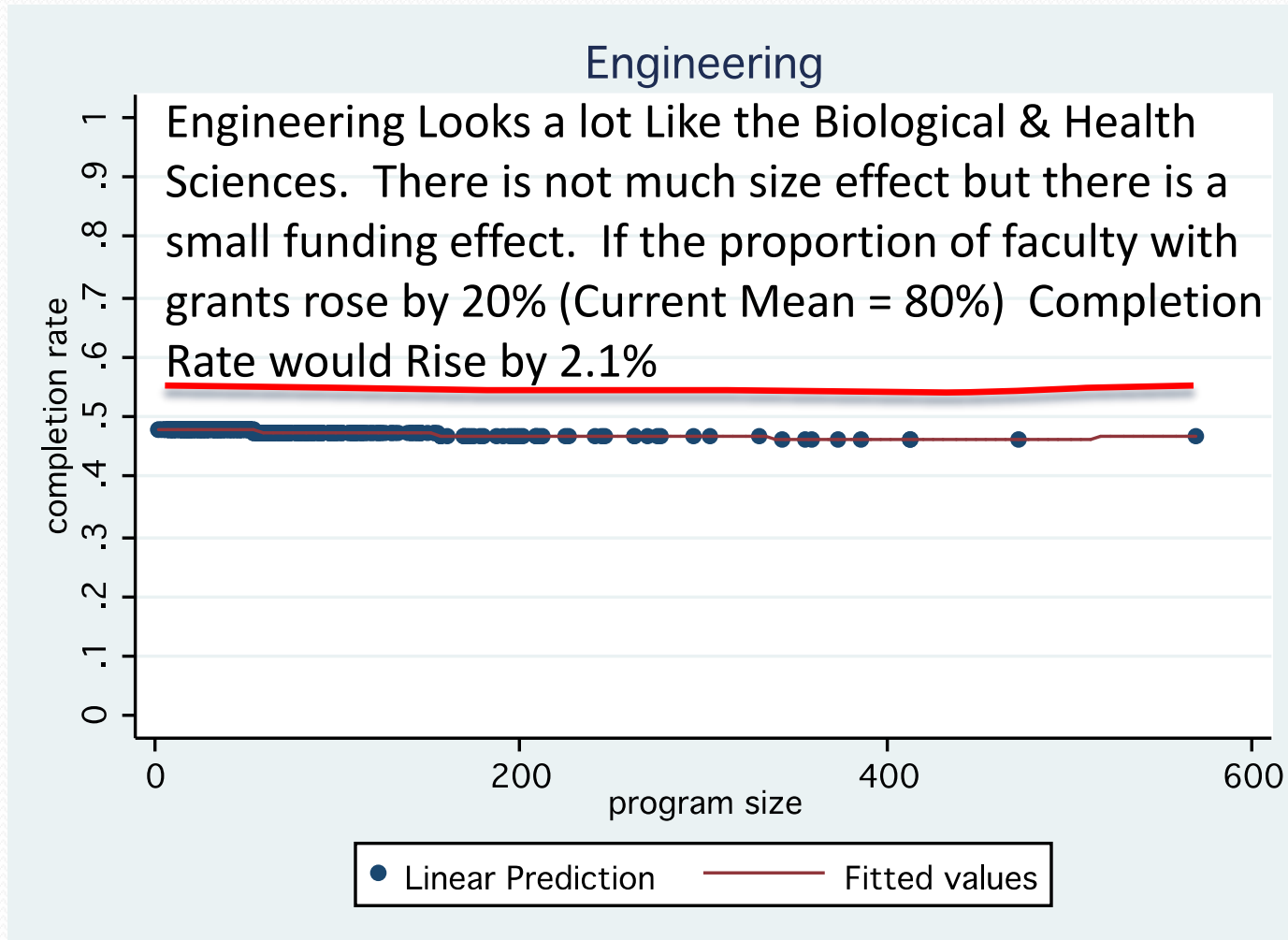


Program Size and Degree Completion Rates

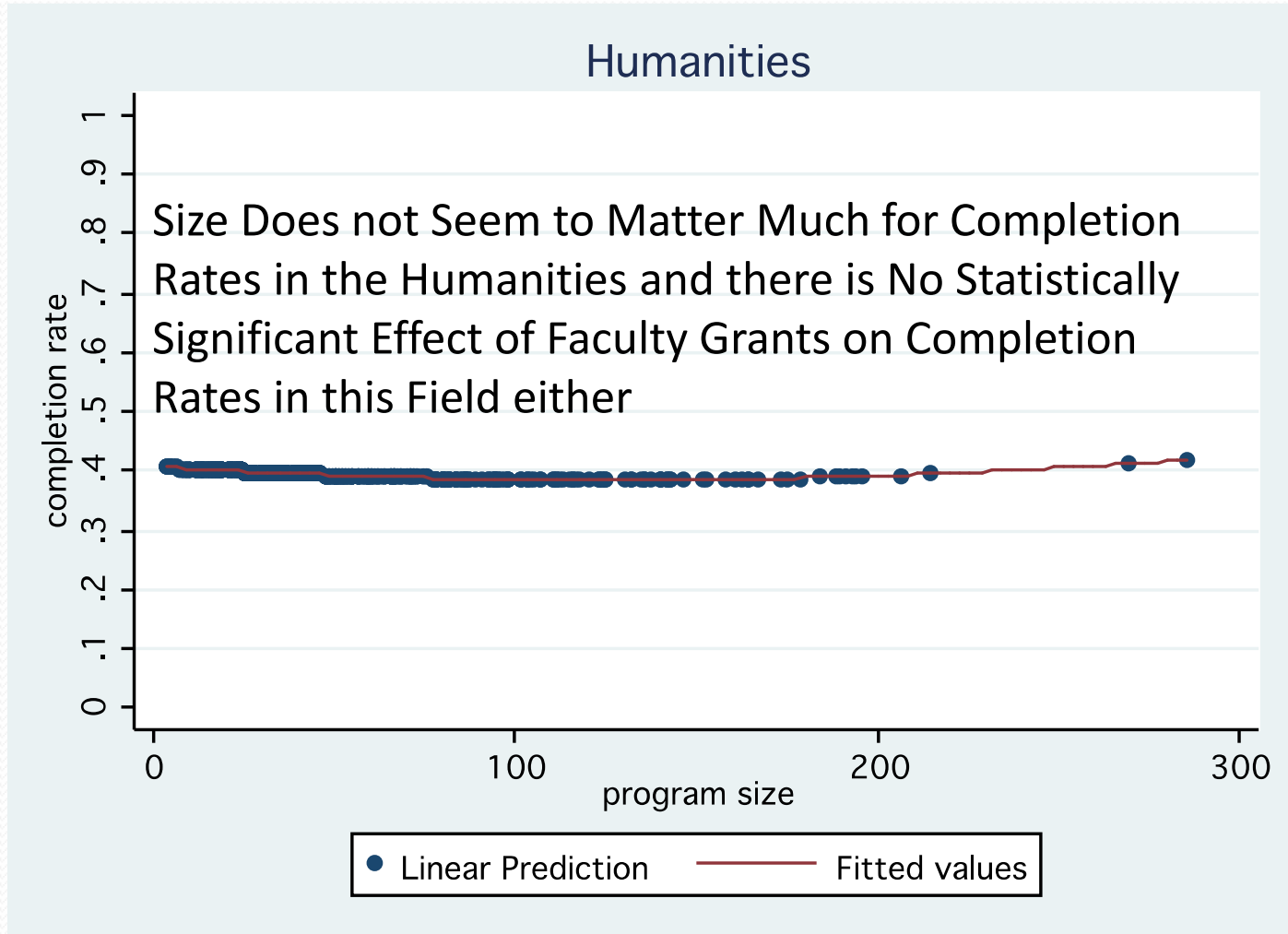
Biological and Health Sciences



The Effect of Program Size on Completion Rates



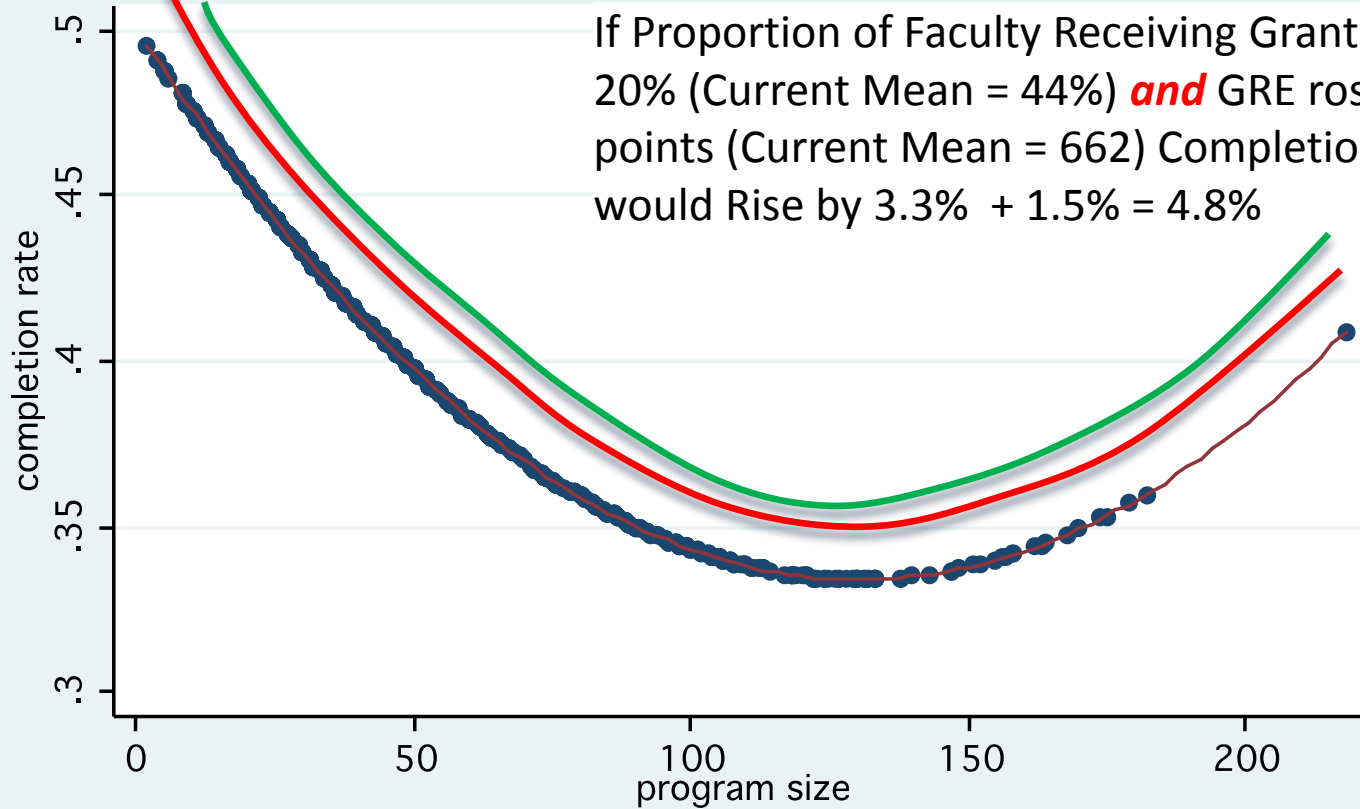
The Effect of Program Size on Completion Rates



GRE Scores Statistically Significant In Influencing Completion Rates

Social and Behavioral Sciences

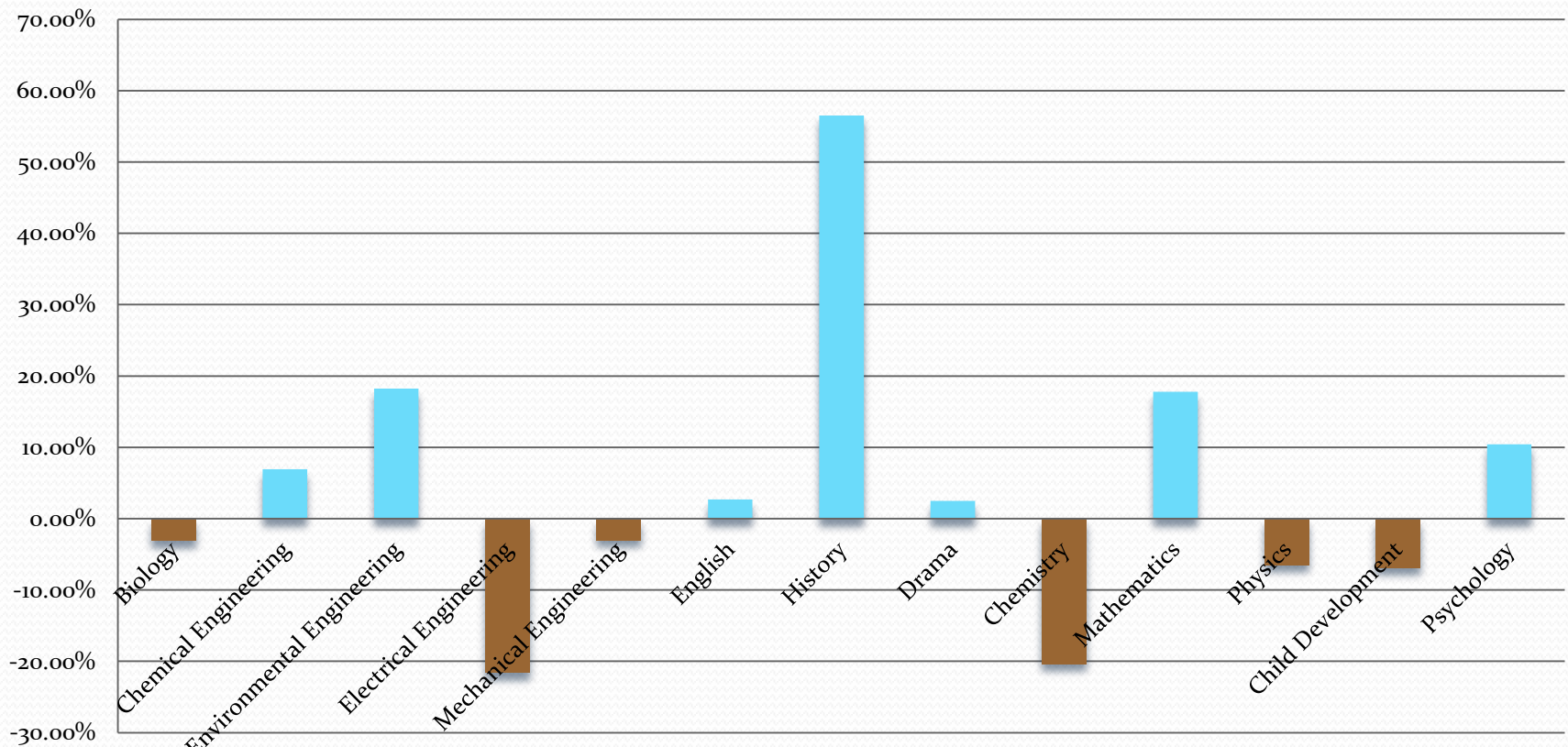
If Proportion of Faculty Receiving Grants Rose by 20% (Current Mean = 44%) **and** GRE rose by 50 points (Current Mean = 662) Completion Rate would Rise by 3.3% + 1.5% = 4.8%



● Linear Prediction — Fitted values

Comparing Outcomes at Tufts

Difference in Predicted and Actual Tufts Completion Rates



Some Concluding Thoughts

- Suggestive Relationship between Program Size and Degree Completion
- Depends on how Knowledge is Created Across Disciplines
- In most STEM disciplines: Scale Effects
- Small Impact of Grants in the Biological & Health Sciences and in Engineering may Result from the Fact that Funding is already High and Very Common
- A Goldilocks Size—Need Cost Data
- Small scale: niche, specialized program, mentoring
- Large scale: training, specialization
- The Findings May also Be Useful as a Starting Point for thinking about Programs *Given* Their Size and Funding—How Do Programs Compare with Programs of Similar Scale & Grants