

THE IMPACT OF INSTITUTIONAL STUDENT SUPPORT ON GRADUATION RATES IN PhD PROGRAMMES

Thomas Bolli¹, Tommaso Agasisti² and Geraint Johnes¹

1. Lancaster University Management School, Lancaster LA1 4YX, United Kingdom.
2. Politecnico di Milano, School of Management, P.za Leonardo da Vinci, 32, 20133 Milano, Italy.

Introduction

Many universities have set up graduate schools which aim to provide an environment in which doctoral students have access to resources (training, support, facilities) that maximise their chances of successful on-time completion. While numerous studies have analysed the determinants of completion (Booth and Stachel, 1995; Ours and Ridden, 2003; Stock and Siegfried, 2006; Visser *et al.*, 2007; Groen *et al.*, 2008; Zhang, 2009; Stock *et al.*, 2009; Webber and Ehrenberg, 2010), this is the first to focus on the impact of the various resources offered by graduate schools.

Data

The data come from a survey conducted by the National Research Council (<http://www.nap.edu/rdp/>). This data set contains a wide range of information about US PhD programmes across a large number of universities. The sample contains information about 4477 programmes in 212 institutions across 6 broad discipline areas.

The variables about which we have information include entry qualifications of students, student composition (gender, nationality etc.), student funding, faculty (ie staff) composition (rank, gender etc.), publications records of faculty, scale of operation, ownership structure (ie private or public), plus a number of variables designed to capture graduate school activities. The latter are the focus of the research reported in this paper, and include binary variables indicating the presence of: induction events for international students; instruction in writing; instruction in statistical analysis; on-campus graduate student conferences; travel support; a programme of annual review; and dedicated workspace.

Methodology and Results

Our dependent variable is the proportion of students on a programme that complete on time. We have estimated numerous variants of our model – fixed effects and random effects models to account for unobserved heterogeneity across fields and institutions, and quantile regressions to explore differences in coefficients at various points of the distribution of completion rates. We have also experimented with a number of specifications that include nonlinear terms in key variables. A representative set of results is reported in Table 1, where we have a simple linear specification of the educational production function with a single fixed effect which captures broad field.

The signs on coefficients associated with the control variables are, in general, as we would expect. Numbers of tenured faculty per student and the number of publications per faculty member both contribute positively to doctoral completion rates at programme level. Relatively high concentrations of female students, foreign students and students on full grants tend to raise

completion rates, while having a high proportion of students employed as teaching assistants tends to lower completion rates (presumably because teaching commitments represent a drain on time). Completion rates are higher in the humanities and social sciences than in other disciplines, though this is significant only at 10%. Scale appears to have no significant effect on completion rates in the regression reported here, though the quantile regression suggests that large programmes are associated with higher completion rates at the lower end, and with lower completion rates at the higher end, of the distribution of completion rates. A surprising result is that a higher mean score on the Graduate Record Examinations (an entry qualification used by many US graduate schools) tends to result in lower completion rates at programme level – though the quantile regression results suggest that this result is confined to programmes at the top end of the completion rate distribution. We speculate that the most able students in the schools with highest completion rates might tend to take on more challenging projects that are difficult to complete on time.

Turning to the impact of activities run by graduate schools, a clear distinction is apparent across disciplines. The signs on the estimated coefficients on these binary variables indicate that many of the activities have a positive effect on completion rates, especially in the more technical subject areas; however, few of these coefficients are statistically significant. Those that are suggest that having an on-campus conference for graduate students serves to raise completion rates for students in technical fields, while, for other students, the guarantee of dedicated workspace serves to improve completion. A surprising result is that annual review has a significant negative coefficient for students in the arts, humanities and social sciences. Our quantile regressions suggest, however, that the absolute value of this coefficient declines as we move towards the bottom end of the distribution of completion rates – suggesting that any negative impact of annual review is confined to programmes which already have good records of completion. Indeed, for some disciplines, the coefficient on annual review turns positive at the lower end of the distribution, as we would expect.

Conclusion

The concept of the graduate school has gained increasing appeal in Europe in recent years. In the UK, the Roberts agenda and the work of organisations such as *vitae* have contributed to highlight the role that universities can play in organising support and activities for graduate students. This paper represents a first attempt, using US data, at evaluating which of these activities are most effective. The conclusions we reach are that different things matter for students in different disciplines.

While the data we use cover a large number of programmes in a large number of institutions, the ideal would be to analyse data collected at the level of the individual. This must remain a subject for further research.

Table 1

Variable	Coefficients		
Constant	42.463*		
GRE average	-0.020*		
Tenured faculty per student	3.566*		
Assistant profs per student	3.619		
Other faculty per student	-1.745		
Publications per faculty	0.439*		
Size (number of students)	-0.008		
Private	12.904		
Female faculty (proportion)	-0.007		
Female students (proportion)	0.087*		
Foreign students (proportion)	0.053*		
Full grant (proportion)	0.035*		
Teaching assistants (proportion)	-0.097*		
Humanities, social sciences	16.881		
<i>Facilities:</i>	<i>technical subjects</i>	<i>other subjects</i>	
International students orientation	1.015	-9.276	
Writing instruction	-1.012	-0.220	
Statistics instruction	1.237	-0.069	
Campus conference	3.320*	-1.628	
Travel support	-1.243	-4.659*	
Annual review	1.554	-9.084	
Workspace	0.405	5.612*	
R²	0.250		

Note: An asterisk denotes statistical significance at better than 5%.

References

- Booth, A. L., and S.E. Satchell (1995): The hazards of doing a PhD.: an analysis of completion and withdrawal rates of British PhD. students in the 1980s, *Journal of the Royal Statistical Society A*, 158(2), 297–318.
- Groen, J.A., G.H. Jakubson, R.G. Ehrenberg, S. Condie and A.Y. Liu (2008): Program design and student outcomes in graduate education, *Economics of Education Review*, 27, 111-124.
- Ours van, J.C. and G. Ridder (2003): Fast track or failure: a study of the graduation and dropout rates of PhD students in economics, *Economics of Education Review*, 22, 157-166.
- Stock, W.A., and J.J. Siegfried (2006): Time-to-degree for the Economics Ph.D. class of 2001-2002, *American Economic Review*, 96, 467-474.
- Stock, W.A., T.A. Finegan and J.J. Siegfried (2009): Completing an Economics PhD in five years: Let the data (literally) speak for themselves, *American Economic Review: Papers and Proceedings*, 99, 624-629.
- Visser, M.S., M. Luwel and H.F. Moed (2007): The attainment of doctoral degrees at Flemish Universities: A survival analysis, *Higher Education*, 54, 741-757.
- Webber, D.A. and R.G. Ehrenberg (2010): Do expenditures other than instructional expenditures affect graduation and persistence rates in American higher education?, *Economics of Education Review*, 29, 947-958.
- Zhang, L. (2009): Does state funding affect graduation rates a public four-year colleges and universities?, *Educational Policy*, 23, 714-731.

Word count: 976 including table, but excluding title, authors' names and affiliations, and references.