THE ECONOMIC JOURNAL

The Economic Journal, **124** (*August*), F534–F564. Doi: 10.1111/ecoj.12105 © 2013 The Authors. The Economic Journal published by John Wiley & Sons Ltd on behalf of Royal Economic Society. Published by John Wiley & Sons, 9600 Garsington Road, Oxford OX4 2DQ, UK and 350 Main Street, Malden, MA 02148, USA.

HERDING CATS? MANAGEMENT AND UNIVERSITY PERFORMANCE*

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Using a tried and tested measure of management practices that has been shown to predict firm performance, we survey nearly 250 departments across 100+ UK universities. We find large differences in management scores across universities and that departments in older, research-intensive universities score higher than departments in newer, more teaching-oriented universities. We also find that management matters in universities. The scores, particularly with respect to provision of incentives for staff recruitment, retention and promotion are correlated with both teaching and research performance conditional on resources and past performance. Moreover, this relationship holds for all universities, not just research-intensive ones.

> 'There is a lot of difference in managing a group of employees in a plant and (managing) faculty members,… Trying to manage faculty members is like herding cats'
>
> 'The reason why disputes in academia are so bitter is because the stakes are so low'

The publication of the latest national and international university league tables typically makes UK newspaper headlines. The performance of universities, in both research and teaching, matters. Higher education is a strategically important sector and there is evidence that investments in research-type education pay-off in areas, which are close to the world technological frontier (Acemoglu, 2006; Aghion *et al.*, 2010). In a number of countries, government funding for universities is explicitly linked to performance metrics, including research outputs (in the UK) and negotiated performance targets (in the Netherlands). Many universities now compete in global markets for both students and staff, who are likely to pay close attention to how different institutions perform.

This raises the important question of what contributes to universities' success. Beyond the obvious importance of resources, Aghion *et al.* (2010) identified the external environment, as measured by the degree of competition and autonomy from central government control of decision-making, faced by universities in the US and Europe as an important driver of performance in world rankings. In this article, we

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This research was funded by The Economic and Social Research Council through the Centre for Market and Public Organisation. Thanks to two anonymous referees and the editor and to Nick Bloom, Clare Callender, Wendy Larner for helpful comments, to the student interviewers (Eloise Pollard, Kamahl Hoque, Rob Cole, Doris Flores, Eric Larson, Alice Chester–Master), to Salomo Hirvonen for research assistance and to all the university managers who gave us their time.

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focus on the internal environment – arguably something that universities can better control – and examine whether the quality of management within universities affects their performance.

This follows a growing body of research that has demonstrated that good management practices improve firm performance (for a recent summary see Bloom *et al.*, 2012). The underlying premise is that there are universally 'good' and 'bad' management practices and that these practices matter in a meaningful way for how an organisation performs. This has been supported by empirical findings showing that there is a wide dispersion in the quality of management practices and that differences in (measured) managerial practices can explain part of the long-standing heterogeneity between organisations in performance (Black and Lynch, 2001; Bloom and Van Reenen, 2007, 2010; Bloom *et al.*, 2010). In this article, we examine whether the same assumption is true of universities.

There is a commonly expressed view – illustrated by the quotes above – that managing academics is, like herding cats, either impossible or pointless. Academics are seen as differing from workers in most other organisations in ways that may make management tools less effective. One difference is that academics are thought to have a high degree of intrinsic motivation in relation to their work (i.e. they care directly about their research and/or teaching). Besley and Ghatak (2005) and Bénabou and Tirole (2006) have emphasised that sharp incentives may not be as important or effective when agents are motivated.[1] Even when it comes to extrinsic motivations among academics, many of these (such as academic status) are determined by a wider peer group in the academic community, rather than being determined by an academic's department, faculty or university managers. This may make internal management tools less effective. These perceived differences motivate our interest in looking directly at management and performance in universities.

To collect information on management practices, we adopt the same tried and tested survey tool originally developed by Bloom and Van Reenen (2007). We use this tool to examine the relationship between management scores and a number of externally collected measures of performance, covering both research and teaching. Our focus is on a single country, the UK, to control the cross-country differences in the institutional context. The UK provides a good 'test bed' for several reasons. First, the university sector is important in the UK in terms of revenue, exports and contribution to innovation.[2] While US universities dominate global league tables, UK institutions perform well compared to those outside the US. In the recent Academic Ranking of World Universities (ARWU) ranking, 11 of the top 100 universities were in the UK, compared to 58 in the US but only three in France and five in Germany. At the very top of the international league table, the top 10 universities are split eight to two between the US and the UK. This performance is, in spite of the fact that in the UK (private plus

[1] Delfgaauw *et al.* (2011) find that management practices in not-for-profit organisations typically score lower than management in comparable for-profit organisations in the social care sector and management is less important in driving performance in not-for-profits.

[2] The direct value of the sector to the economy has been estimated at £59 billion, this figure excluding the huge potential contribution from research and innovation. Higher education is among the top 20 most valuable export products in the UK generating around £2.2 billion in non-EU student tuition fees and an estimated further £2.3 billion in off-campus expenditure.

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public) spending on tertiary education as a percentage of GDP (1.3%) is below the OECD average (1.6%) and half the level that it is in the US (2.6%). Second, in comparison to many European universities, those in the UK compete highly for both students and research funding (Aghion *et al.*, 2010) and there are ongoing major reforms to funding for many of the UK Universities, which are only likely to increase the degree of competition between institutions. Third, the performance of UK universities has been subject to a high degree of external measurement and benchmarking for nearly two decades. Performance measures cover both research and student satisfaction and these measures are widely disseminated across producers and consumers and are linked to public funding. Fourth, there is considerable diversity in the type of provider within the university sector in the UK, a by-product of successive government's attempts to expand the uptake of higher education to lower income individuals.

To date, there has been relatively little quantitative evidence on university management practices.[3] A number of papers have looked at the cost efficiency of administration in universities (Casu and Thanassoulis, 2006; Lu, 2012; Bayraktar *et al.*, 2013). Aghion *et al.* (2010) examine autonomy in decision making from local or central government control but, in their cross-national sample, cannot separate this out from competition. Moreover, their focus is on the external environment rather than the internal organisation. Possibly closest to this study, Goodall (2006, 2009*a, b*) explores the role of leaders in universities and, in particular, that of expert leaders. She finds evidence that the appointment of strong academics at the top of the organisation is associated with improved research performance at the university level. We do not rule out the potential importance of leadership but our focus is on a set of core operations-oriented management practices (monitoring of performance, setting targets and use of incentives). We examine the academic discipline (departmental) level, which enables us to examine variation in management practice scores both across and within universities and look at how the scores correlate with external measures of teaching and research performance, controlling for resources and past performance.

Our survey data reveal a number of interesting findings. We find a very low degree of correlation in management practice scores across departments, compared to other multi-plant firms and hospitals that have been studied. In other words, management practices appear to be relatively heterogeneous within universities, although we find no significant differences by academic discipline. When looking at the relationship with performance, we find that management scores at the department level are more important than management scores at the university level. We find clear differences across universities, particularly by university type (older, research-intensive compared to newer, more teaching-oriented). Management structures vary by type, particularly in the degree to which management practices are decentralised, and management scores vary by university type. Departments in older and more research-intensive universities tend to be better managed than departments in newer and more teaching-focused universities. The biggest difference is in managerial practices with respect to incentives for recruitment and retention of staff.

[3] Bloom *et al.* (2010) find that high school management is associated with better performance and at the level of higher education, Aghion *et al.* (2010) provides descriptive evidence that university autonomy and competition are associated with better outcomes in terms of research rankings.

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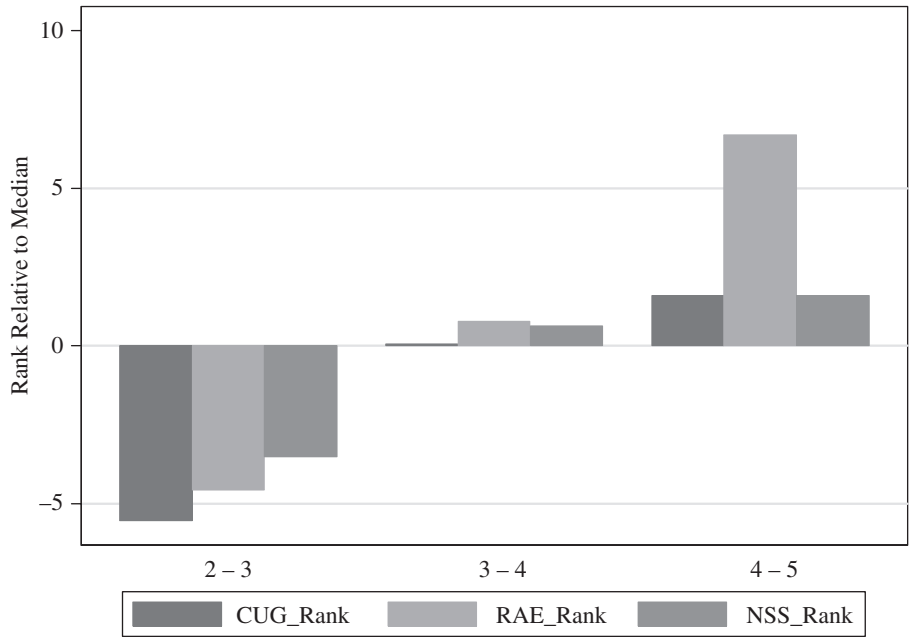


Fig. 1. *Mean Performance (Research and Teaching) by Management Score*
Notes. CUG_rank refers to the department's Combined University Guide ranking (reversed such that a higher number indicates a better ranking). RAE_rank refers to the department's ranking in the Research Assessment Exercise (reversed such that a higher number indicates a better ranking). NSS_rank refers to the department's ranking in the National Student Survey (reversed such that a higher number indicates a better ranking). The *x*-axis measures the department's overall management score (aggregating 17 individual indicators). The overall management score is from 1–5; no department scored less than 2.

We also find that the management scores are strongly positively correlated with externally assessed measures of performance in both research and teaching. This is clearly shown in Figure 1, which summarises performance rankings (relative to the median) by management score for an overall measure of performance (CUG), research performance (RAE) and measure of student satisfaction (NSS). For all three measures, a higher management score is correlated with better performance. In our analysis, we show that these correlations are robust to including a number of controls including those for the level of resources and past performance. We cannot rule out that both management and current performance (conditional on past performance) are related to some unobservable event but we can rule out anything that might affect all aspects of management as the relationship with performance is driven primarily by the quality of management practices on one dimension: with respect to provision of incentives. Universities with high incentive scores perform well in terms of both research and teaching but performance management and, in particular, targets are not related to measured outcomes.

Finally, we find that the relationship between management scores and performance holds for both research-intensive and newer, more teaching-focused universities. We surmise that one reason why newer universities do not adopt the research-intensive universities' model may be limited competition between university types.

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We describe our sample and survey methodology in Section 1. Section 2 presents some preliminary descriptive statistics, while Section 3 contains the main results on the relationship between management and performance. Section 4 concludes.

1. Institutional Setting, Sample and Methodology

1.1. *The Institutional Setting*

The UK university sector comprises 158 institutions that have degree-awarding powers. Most of these are not-for-profit.[4] All undertake both research and teaching but the balance between these activities varies. The main divide is between 'old universities' (founded pre-1992) which are typically more research focused and 'new universities', granted university status post-1992 as part of a government drive to increase participation in degree-level education. However, there is also arguably a further divide between the 24 most research-intensive older universities (known as 'the Russell Group',[5] which account for around 15% of the sector but 75% of all research income) and other older universities, and also between newer universities that were former polytechnics (which offered higher diplomas and degrees, often in more technical subjects, that were governed and administered at the national level) and those that were previously further education colleges.

Our analysis, therefore, separates four groups of universities. These are:

(*i*) The 'Russell Group';
(*ii*) 'Other old' universities, founded before 1992;
(*iii*) 'Former polytechnics';
(*iv*) 'Other new' universities (primarily former further and higher education colleges and specialist colleges).

We show below that there are meaningful differences across the four groups. Full details of the institutions in our sample and the four groupings are given in Table A1 in the Appendix.

In an international comparison, Aghion *et al.* (2010) identified UK universities as having a high level of autonomy from government over budgets and hiring and a high level of competition for funding for both research and teaching. Going forward, this level of competition is set to increase. Recent reforms have allowed UK universities to charge differential fees and at the same time reduced the student-based subsidies provided to universities and eased the caps on (UK resident) undergraduate student numbers.[6] Arguably, however, the nature of the competition varies across universities. Responses to our survey reveal that the research-intensive universities see themselves competing in international and national markets (for staff and students) while newer universities focus more on local markets.

[4] Formally, most universities are charities although they are not regulated by the Charity Commission. Private sector institutions include the University of Buckingham and, more recently, the College of Law and BPP, providers of legal training that have recently been granted university status.
[5] So called because the first informal meetings of the group took place in Russell Square in London.
[6] Postgraduate student numbers are not capped.

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Undergraduate degrees in the UK typically involve three years' full-time study (four in Scotland) across all these university types. Currently, around 35% of UK resident individuals attend university. Attendance at university is not a right for all individuals who complete high school but is conditional on performance in national exams taken at age 18 (17 in Scotland).[7] In common with the US but in contrast to much of Continental Europe, many UK resident students study away from home. Entry standards vary considerably between universities and competition for places is very strong, particularly at the elite research-orientated universities. Students from outside the UK make up a significant proportion of the student body (around 14% of undergraduates and over 60% of postgraduates, UKCISA) and competition for these students is worldwide.

1.2. *Our Sample*

The population for this study consisted of universities that made a submission to the most recent Research Assessment Exercise (RAE) carried out in 2008. This RAE involved (the latest in a series of) peer-review assessments of the research outputs of academic staff within a department, designed to produce a quality profile of the department for the purposes of allocating research funding (more details in subsection 1.4). Our selection of only RAE-submitting institutions was to provide an external performance measure relating to research. It will tend to bias our sample to universities with at least some research-active staff relative to the full population of institutions with degree-awarding powers but, as shown in Table 1, our relevant population covers all four types of universities (Russell Group, other old, former polytechnics and other new).

UK universities are generally organised into faculties covering broad groups of related academic disciplines (for example, medicine, sciences, social sciences, arts) and, within this, departments, which contain discipline-specific academics. Interviews were carried out with heads of departments. We selected heads of departments as their key responsibilities include recruitment and retention of staff and deployment of staff and other resources.

Rather than spreading our sample thinly across a large number of different academic departments with relatively few observations for each, we deliberately focused on four academic subjects – psychology, computer science, business & management and English. These were chosen to cover the full range of disciplines (science, humanities and social sciences) and because, as shown in Table 1, a relatively large number of universities made an RAE submission in these subjects (76+), allowing us to obtain reasonable sample sizes across the four university types. If we had chosen economics, for example, the relevant population would have consisted of only 35 departments concentrated among Russell Group and other old universities. Business and management gives us a larger and more diverse population of 90 departments.[8] In

[7] Compulsory schooling ends at age 16 in the UK. Secondary school ends at 18 and students wishing to go to University have to achieve (high) standards in the examinations taken at the end of secondary school (known as 'A' levels).

[8] There are 60 universities which have a business and management department and no economics department submitted to the RAE. For these, it is likely that the business and management department includes some economists who would have been assessed by the economics and econometrics RAE sub-panel. Their outputs and scores will have been taken into account in the overall departmental business and management RAE score.

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Table 1

Population and Sample Statistics

	Number of universities		Number of departments	
	Relevant population	Our sample	Relevant population	Our sample
University type				
Russell Group	24	23	111	62
Other old universities	35	34	139	76
Former polytechnics	35	33	131	79
New universities	26	22	58	31
	120	112	439	248
Departments				
Business			90	55
Computer science			81	45
English			87	44
Psychology			76	47
Human resources			105	57
			439	248

Notes. Relevant population comprises academic departments (business, computer science, English and psychology) that made a submission to the 2008 Research Assessment Exercise, together with the human resources department from universities that had at least one department submitting. Russell Group refers to the 24 most research-intensive universities in the UK; other old universities refers to institutions that were universities prior to 1992; former polytechnics refers to institutions that were polytechnics offering more technical/vocational courses prior to 1992; new universities refers to other institutions that achieved university status post-1992, often former higher education colleges.

fact, we show in our analysis that there are no significant differences in the management scores across academic departments (university type is more important in explaining variation across our sample). We, therefore, think it is likely that surveying a different set of academic departments would yield similar results.

As shown in Table 1, a total of 120 universities had at least one of these four academic departments submitting to the RAE 2008. We also surveyed human resource (HR) departments in all the submitting universities to look at the relative importance of management practices at the department and university level. For each university, this gives a potential maximum of five observations, although it is clear from Table 1 that older universities typically have a higher number of RAE-submitting departments than newer universities. Our final sample contains information on management practices in 248 departments (including the HR department) within 112 UK universities. Our sample includes 34 universities for which we observe only one department, 38 for which we observe two, 25 for which we observe three, 12 for which we observe four and three for which we observe all five.

1.3. *The Management Practices Survey*

To measure the quality of management practices we use an existing methodology that has been used in manufacturing (Bloom and Van Reenen, 2007), health (Bloom *et al.*, 2010) and the social care sector (Delfgaauw *et al.*, 2011). Using an existing methodology has a number of advantages. First, the survey has been extensively tried and tested, successfully being used to survey several thousands of organisations in more

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than 20 different countries. Second, following the same methodology and using a common set of indicators allows us to set our results in a wider context.

The focus of the management survey is a set of operations-focused management practices. The survey does not cover leadership or values, although these are likely to also be important in explaining performance variation (Goodall, 2006, 2009*a*,*b*; Stephan *et al.*, 2011). At the core of our survey is a set of 17 indicators of management practices, grouped into four subcategories as follows:

Operations

1 *Standardised process*: presence of clear processes for research development and mentoring of junior staff.
2 *Continuous improvement*: processes (research/teaching) are reviewed and opportunities for improvement are actively sought.

Monitoring

3 *Performance tracking*: the overall performance of the organisation (department/university) is tracked using meaningful metrics and with appropriate regularity.
4 *Performance review*: performance of individual members of staff is reviewed in a comprehensive and systematic way.
5 *Performance dialogue*: individual performance review is well structured.
6 *Consequence management*: differing levels of personal performance lead to different consequences.
7 *Clarity/comparability*: performance measures are easily understood and openly communicated.

Targets

8 *Target balance*: there are meaningful targets for the organisation – in particular beyond external processes such as the regular research assessment process.
9 *Target interconnection*: targets cascade well through the organisation and are responsive to individual department needs.
10 *Target horizon*: the organisation is actively engaged in pursuing long-term goals, with appropriate short-term targets.
11 *Target stretch*: targets are appropriately difficult to achieve.

Incentives

12 *Rewarding high performers*: good performance is rewarded proportionately.
13 *Removing poor performers*: organisation is able to deal with underperformers.
14 *Promoting*: promotion is performance based.
15 *Managing talent*: emphasis is put on talent management.
16 *Retaining talent*: organisation will go out of its way to keep its top talent.
17 *Attracting talent*: the organisation has a clear employee value proposition.

The set of indicators and related questions are provided in the online Appendix, together with information on the scoring methodology. From this, it should be clear that the survey is not designed as a simple question–answer survey. Instead, each

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indicator has a set of related questions designed to allow the interviewer to make a reasonable assessment of the quality of management practices in the organisation. This is based on open questions (i.e. 'Can you tell me how you promote your employees'), together with examples rather than closed questions (i.e. 'Do you promote your employees on tenure (yes/no)?'). The prompting questions (and examples) are designed to allow the interviewer to understand the actual management practices in the organisation. For each indicator, the interviewer reports a score between 1 and 5, a higher score indicating a better performance.

The interviews were carried out during the Summer of 2012 by six students (five from the University of Bristol and a recent graduate from Boston University), including one first-year undergraduate, three third-year undergraduates, one student with a Masters and one doing a PhD, spread across a number of departments (law, classics, management, administration and biology). They undertook a two-day training programme which had been designed by the original management interview team at the London School of Economics. This training programme, together with paired practice interviews, helped to ensure a consistent approach. The interview process was project managed on a day-to-day basis by McCormack.

The interviews were independently double-scored by two interviewers, one conducting the interview, the other listening in.[9] Any differences in scores were discussed and reconciled at the end of the interview. If the difference in scores was two or more (which was the case for 17 of a total of 3,757 indicator scores), there was a discussion with the project manager. In 974 cases, the scores differed by one point with no obvious patterns across interviewers or indicators. These smaller differences were discussed and resolved by the two scorers. The double-scoring was to ensure that the interviews and scoring are comparable across interviewers, although our regression analysis additionally controls for interviewer fixed effects. Each interview took between 45–60 min.

To ensure unbiased responses, interviews were conducted by telephone without the respondents being aware in advance that they were being scored, making it more likely that the interviews genuinely captured actual management practices. In addition, the interviewers were not given any metrics on the universities' performance in advance of the interview and nor were survey respondents asked for this information. These were matched in from independent sources after the interviews were finished.

1.4. *Measures of Performance*

UK universities are monitored by independent public regulators on the basis of their research and teaching performance, with much of this monitoring related to performance at the departmental level. In addition, there are several independent rankings which combine this performance information with other indicators. We use three of these performance metrics in our analysis, focusing on departmental level rankings. This is in contrast to earlier research that used only university level rankings (Goodall, 2006, 2009*a*,*b*; Aghion *et al.*, 2010).

[9] Of the 248 interviews, 221 were double-scored.

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First, the Research Assessment Exercise (now Research Excellence Framework) provides an assessment of the quality of research output of the academic staff members at departmental (discipline) level. These quality profiles were intended to provide objective, comparable measures of the department's research performance as assessed by peer reviewers. In principle, these measures are potentially comparable across academic disciplines but we focus on relative performance within disciplines. RAE results are available from 2008 and from 2001. We use ranking information, reversing the rankings such that a higher number indicates a more highly ranked department.

Second, we use an assessment of student satisfaction. This is measured by the National Student Survey (NSS) satisfaction score, which has been collected annually since 2005. We focus on responses to the question 'Overall, I am satisfied with the course' (scored 1–5 where 1 indicates completely disagree and 5 indicates completely agree). We normalise at the department level to allow for differences across disciplines.

Third, we use the ranking of the department according to independent university guides. There are several of these in the UK: we focus on the Complete University Guide (CUG) where rankings information is available at the department level over the period 2008–13.[10] These rankings are weighted indices covering research outputs, student satisfaction, student outcomes and measures of resources. As this reflects both teaching and research at departmental level, this is our key measure of output. Again, we reverse the rankings such that a higher number reflects a better performance.

1.5. *Other Controls*

We include in our analyses, controls for resources at departmental and University level, including the number of staff, students and expenditure. This includes both academic spending per staff member that is a reasonable measure of (average) salary within a department and other spending, which we normalise by number of students. These measures of resources are derived from sources external to our respondents to the management survey (mainly from the government regulators). Details are provided in Table A2 in the Appendix. It is important to be able to control for resources in exploring the link between management and performance. It means, for example that better management in a department is not simply picking up a higher level of resources. When it comes to the incentives scores, we can also rule out that better hiring and promotion practices are simply allowing heads of departments to compete more aggressively in terms of the academic salaries they can offer.

1.6. *Differences Across Types of University*

In Table 2 we show that the groupings of universities that we identify above (Russell Group, other old, former polytechnics and other new) are meaningful, in terms of there being significant differences in the performance of the departments, the resources available, the markets they operate within and the management structures.

[10] Our results are not guide specific: using the *Guardian* Guide rankings (available from 2011–3) yielded similar results.

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Table 2

Sample Characteristics by University Type

	Russell Group	Other old	Former polytechnics	Other new	p-value	*N*
Department characteristics						
CUG 2013 ranking	16.5	33.4	67.1	85.5	0.000	169
RAE 2008 ranking	14.6	34.6	60.1	74.4	0.000	187
Student satisfaction score 2012	4.21	4.21	4.07	4.11	0.052	146
Number of staff	157.0	92.3	108.6	44.2	0.000	187
Number of students	1,158.8	1,483.4	2,318.0	970.0	0.000	191
Staff–student ratio	9.20	14.50	18.94	19.15	0.000	187
Academic spending per staff (z_score)	0.314	0.248	−0.284	−0.525	0.000	186
Professorial salaries (z_score)	0.606	−0.216	−1.157	−0.291	0.000	87
Other spending per student (z_score)	0.720	0.067	−0.355	−0.713	0.000	191
Perception of UK competition	5.09	5.29	7.46	7.71	0.536	169
Perception of global competition	7.82	6.85	6.79	4.40	0.008	100
Main competition – international	0.111	0.000	0.000	0.000	0.232	175
Main competition – national	0.757	0.360	0.100	0.050	0.000	175
Main competition – local	0.133	0.640	0.900	0.950	0.000	175
Management characteristics						
Female	0.291	0.206	0.371	0.391	0.096	191
Full time	0.187	0.196	0.262	0.304	0.630	188
From outside university	0.225	0.288	0.236	0.190	0.835	161
From academia	0.434	0.618	0.383	0.421	0.109	180
Tenure at university (years)	12.97	14.37	14.39	14.15	0.852	179
Tenure as head (years)	2.68	2.84	4.40	4.36	0.015	188
Whether fixed-term	0.913	0.796	0.241	0.238	0.000	179
Likely next job is academic	0.444	0.359	0.181	0.222	0.066	137
Likely next jobs is management	0.250	0.327	0.290	0.217	0.600	191
Likely next job is retirement	0.277	0.153	0.159	0.055	0.235	137
Centralised processes_operations	0.282	0.237	0.136	0.389	0.208	139
Centralised processes_monitoring	0.632	0.842	0.875	0.571	0.031	130
Centralised processes_incentives	0.333	0.455	0.786	0.667	0.002	46

Notes. For variable definitions see Table A2 in the Appendix. p-value refers to equality of means across university types, controlling for department and clustering standard errors at the university level. Russell Group refers to the 24 most research-intensive universities in the UK; other old university refers to institutions that were universities prior to 1992; former polytechnic refers to institutions that were polytechnics offering more technical/vocational courses prior to 1992; new university refers to other institutions that achieved university status post-1992, often former higher education colleges.

First, there are significant differences in measures of research performance and student satisfaction. The research-intensive (Russell Group) universities typically score highest on measures of performance, followed by the other old universities, the former polytechnics and the other new universities.

Second, there are clear differences in the level of resources across the university types.[11] As expected, the research-intensive universities have a higher level of resources as measured by academic spending per staff member and other spending per student. Staff–student ratios are also lower in these elite universities.

Third, there are differences in the markets in which the universities operate. The older universities see themselves as competing internationally and nationally, while

[11] This information is only available at the level of the cost centre, which is determined by the statistics collection body (the Higher Education Statistics Authority) and typically aggregates across departments, though the aggregation is below faculty level.

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the newer ones primarily see themselves as competing with other institutions locally.[12]

Fourth, the summary statistics in Table 2 (collected as part of the survey) give some indication of differences in management structures across the types of institutions. In both groups of older universities, management is more typically a part-time role (where the rest of the time is for academic activities) and fixed-term. While managers (heads of department) at these universities are only slightly more likely to come directly from an academic position than those at the new universities, they are much more likely to return to being an academic (rather than a management role). This highlights alternative routes to becoming head of department in the UK. In the first route (more common in older universities) being head is a temporary administrative responsibility that rotates among senior academic members of the department. In the other route (more common in newer universities) being head of department is the first step of a management career, on the way to a more senior faculty or university-level position. These two types of managers may have very different objectives. In the first case, the managers may try not only to minimise the cost of being head but also focus more on what they think will enhance the academic environment of the department. In the second case, the manager may pay closer attention to university-level management policies. In the next Section, we look at whether manager characteristics are reflected in different scores.

Finally, there are differences in the extent to which aspects of management are centralised within universities. Across all types of university, operations (the organisation of research and teaching) are largely left to departments. However, there are clear differences with respect to 'incentives', where the old universities have more decentralised processes than the new. In our analysis, we find there is a strong link between decentralisation of incentives and the quality of this dimension management practices. As we cannot differentiate between decentralisation and quality, our interpretation is that good management practices in relation to incentives involve decentralisation to the department level.

2. Variation in the Management Scores

We begin our analysis by describing the variation in the management scores.

2.1. *Comparison with Other Sectors*

By applying essentially the same survey to universities as was used to measure management practices in manufacturing firms and hospitals, we can make some high-level comparisons across these industries. Focusing on 15 of the 17 individual indicators that are the most directly comparable,[13] we find universities score relatively highly (mean score = 3.24, SD = 0.476) compared to both manufacturing firms (mean

[12] The question asked about competition without specifying whether this was competition for students or in research performance.

[13] The two operations indicators (and related questions) are fairly specific to each industry and are excluded.

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score = 3.03, SD = 0.642) and hospitals (mean score = 2.45, SD = 0.612). We find the greatest differences with manufacturing in relation to targets, possibly related to the high level of benchmarking information in the UK higher education sector, and incentives, which may reflect the importance of individual talent in research. However, we do not put too much weight on this cross-sectoral comparison. Although we have gone to some length to attempt comparability in scores across studies, we cannot completely rule out some differences in scoring.

One difference that is more meaningful is the high degree of heterogeneity in scores within universities compared to manufacturing firms and hospitals. In previous studies, when several 'plants' were sampled from the same organisation, subsequent analysis showed a high level of correlation between management scores within the same organisation (0.530 for hospitals and 0.734 for manufacturing firms). Thus, multi-plant sampling acted as a check on scoring of management quality but the analysis focused on the organisation-level average. In the case of universities, however, the degree of correlation in scores across departments within the same institution is very low (0.086). This is the case even when we look at departments within institution interviewed by the same interviewer (0.036). The high degree of heterogeneity may well arise because departments within institutions essentially operate in separate labour markets, some being national and others international, depending on the academic standing of the department. Compared to manufacturing firms or hospitals, many staff within a university department do not have skills that are transferrable to other departments within the same institution (as distinct from moving to the same department in another institution). Furthermore, in some universities, departments also operate in different markets for students. Thus, we focus our analysis on departments.[14]

2.2. *Variation by Department and University Type*

Across departments (Table 3, panel (*a*)), HR departments score more highly overall than the academic departments. However, this higher overall score masks differences across the sub-components of the management scores. The biggest positive gap in favour of the HR departments is in 'targets'; in 'operations' (processes for research and teaching) the academic departments score higher. This ties in with the fact that universities appear to decentralise these operations processes to the departments (as shown in Table 2). Within academic departments, Business departments typically score highest and English departments lowest but these inter-departmental differences are not significant within universities (i.e. controlling for university fixed effects).

By contrast, there are sizeable differences in scores across university types which are statistically significant, controlling for department type (Table 3, panel (*b*)). In terms of the overall score, departments in research-intensive universities (the Russell Group) score significantly higher than the rest, with an average score of 3.48. This is followed by other old, then former polytechnics and finally the other new, where the average

[14] In our analyses, we cluster standard errors by university.

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Table 3

Management Practice Scores by Department and University Type

	Overall	Operations	Monitoring	Targets	Incentives
(a) By department					
Business	3.34	3.90	3.38	3.36	3.11
	(0.447)	(0.531)	(0.502)	(0.641)	(0.630)
Computer science	3.26	3.81	3.26	3.11	3.18
	(0.374)	(0.514)	(0.470)	(0.662)	(0.529)
English	3.14	3.77	3.18	3.09	2.93
	(0.429)	(0.522)	(0.448)	(0.684)	(0.558)
Psychology	3.24	3.78	3.25	3.26	3.03
	(0.558)	(0.690)	(0.522)	(0.801)	(0.616)
University HR	3.45	3.55	3.36	3.68	3.35
	(0.457)	(0.801)	(0.546)	(0.563)	(0.559)
p-value	0.063	0.088	0.429	0.002	0.105
p-value, academic departments only	0.278	0.723	0.414	0.179	0.602
(b) By university type					
Russell Group	3.48	3.90	3.39	3.31	3.51
	(0.432)	(0.647)	(0.448)	(0.852)	(0.464)
Other old university	3.29	3.72	3.21	3.25	3.22
	(0.425)	(0.579)	(0.476)	(0.623)	(0.497)
Former polytechnic	3.21	3.77	3.24	3.38	2.89
	(0.466)	(0.619)	(0.516)	(0.626)	(0.600)
New university	3.19	3.53	3.43	3.37	2.74
	(0.496)	(0.752)	(0.594)	(0.741)	(0.537)
p-value	0.002	0.182	0.025	0.377	0.000

Notes. The p-value refers to test of equality of means, controlling for university and department fixed effects as appropriate and clustering standard errors at the university level. Russell Group refers to the 24 most research-intensive universities in the UK; other old university refers to institutions that were universities prior to 1992; former polytechnic refers to institutions that were polytechnics offering more technical/vocational courses prior to 1992; new university refers to other institutions that achieved university status post-1992, often former higher education colleges.

score is 3.19. Figure 2 shows that the management scores between the two types of new universities are more dispersed with several departments performing quite poorly in terms of their overall management score.

The higher overall management score among the research-intensive group universities is not driven by consistently better performance across all subgroups of scores. There is no significant difference by university type in 'targets' and 'operations' and while there are significant differences in 'monitoring', it is the other new universities that score highest with a score of 3.43. The higher score in the research-intensive universities is driven by ratings on the 'incentives' component of the management practices scores. The incentives scores are the most dispersed across the university types and there is a more than 1 SD difference in mean incentive scores between Russell Group and other new universities. Table 4 presents the scores for the individual indicators by university type. The Table shows there is only one incentives indicator where there is no difference between the research-intensive university departments and the rest and that is 'removal of poor performers'. For this score, Russell Group departments underperform relative to their scores on other incentive indicators, suggesting this is an outlier to otherwise higher scores in this group of management practices.

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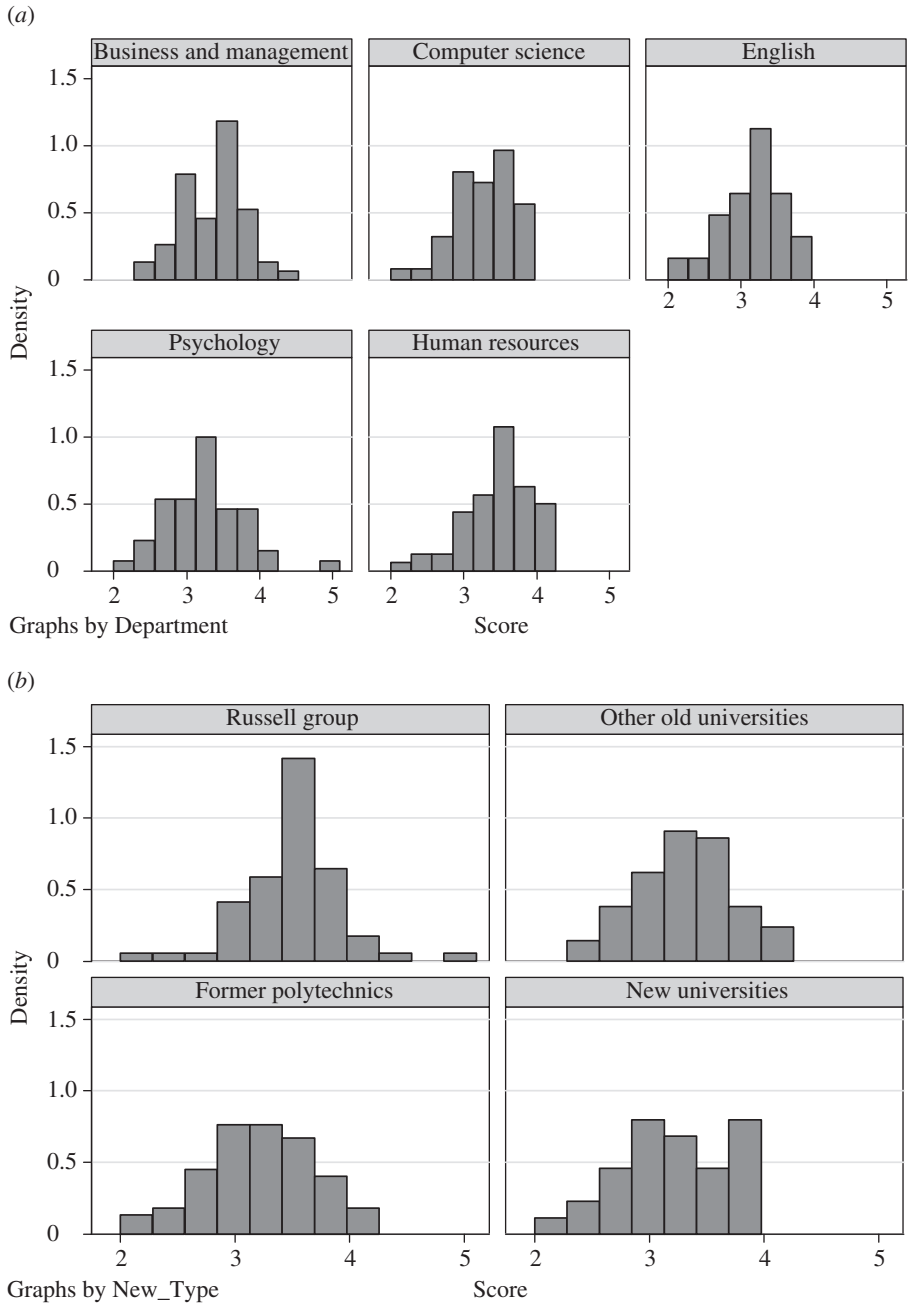


Fig. 2. *Distribution of Overall Management Scores. (a) By Department and (b) By University Type*
Notes. The *x*-axis measures the department's overall management score (aggregating 17 individual indicators). The management score is from 1–5. Russell Group refers to the 24 most research intensive universities in the UK; other old universities refer to institutions that were universities prior to 1992; former polytechnics refers to institutions that were polytechnics offering more technical/vocational courses prior to 1992; new universities refers to other institutions that achieved university status post-1992, often former higher education colleges.

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Table 4

Scores for Individual Indicators by University Type

	Russell Group	Other old	Former polytechnics	New universities	p-value
Operations					
1. Standardised process	3.97	3.82	3.90	3.58	0.112
	(0.724)	(0.706)	(0.691)	(0.672)	
2. Continuous improvement	3.82	3.63	3.65	3.48	0.309
	(0.758)	(0.670)	(0.752)	(0.927)	
Monitoring					
3. Performance tracking	3.79	3.62	3.58	3.90	0.087
	(0.681)	(0.565)	(0.744)	(0.789)	
4. Performance review	3.64	3.43	3.48	3.84	0.012
	(0.603)	(0.736)	(0.677)	(0.687)	
5. Performance dialogue	3.71	3.51	3.58	3.71	0.275
	(0.584)	(0.825)	(0.761)	(0.782)	
6. Consequence management	3.05	2.85	2.97	3.23	0.137
	(0.762)	(0.766)	(0.784)	(0.762)	
7. Clarity/comparability	2.77	2.62	2.58	2.48	0.375
	(0.818)	(0.783)	(0.727)	(0.996)	
Targets					
8. Target breadth	3.19	3.16	3.19	3.32	0.737
	(0.938)	(0.694)	(0.735)	(0.748)	
9. Target interconnection	3.56	3.48	3.59	3.55	0.660
	(0.975)	(0.985)	(0.870)	(1.090)	
10. Target horizon	3.36	3.37	3.56	3.52	0.413
	(1.017)	(0.814)	(1.009)	(1.028)	
11. Target stretch	3.15	3.04	3.19	3.10	0.608
	(1.069)	(0.876)	(0.769)	(1.044)	
Incentives					
12. Rewarding high performers	3.52	3.01	2.54	2.26	0.000
	(0.882)	(0.973)	(1.047)	(0.998)	
13. Removing poor performers	2.84	2.73	2.72	2.81	0.683
	(0.682)	(0.782)	(0.783)	(0.654)	
14. Promoting	3.60	3.62	3.30	3.29	0.015
	(0.557)	(0.652)	(0.822)	(0.782)	
15. Managing talent	3.87	3.58	3.16	3.23	0.000
	(0.639)	(0.837)	(0.823)	(1.044)	
16. Retaining talent	3.45	3.04	2.52	2.19	0.000
	(0.969)	(0.791)	(0.904)	(0.873)	
17. Attracting talent	3.79	3.38	3.09	2.71	0.000
	(0.749)	(0.765)	(0.804)	(0.824)	

Notes. The p-value refers to test of equality of means, controlling for department and clustering standard errors at the university level. Russell Group refers to the 24 most research-intensive universities in the UK; other old refers to institutions that were universities prior to 1992; former polytechnics, refers to institutions that were polytechnics offering more technical/vocational courses prior to 1992; new universities refers to other institutions that achieved university status post-1992, often former higher education colleges.

2.3. *Accounting for Variation in Management Scores*

What explains variation in management scores across universities? To what extent do different scores across university types simply reflect differences in their other characteristics, for example resources or the pressure felt by departments with respect to volume of students?

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To explore this, we estimate the following linear regression:

$$M_{ij} = \alpha + \boldsymbol{\gamma}'\mathbf{Z}_{1ij} + \boldsymbol{\delta}\mathbf{Z}_{2j} + \text{Uni_type}_j + \text{dept}_i + u_{ij}, \quad (1)$$

where M_{ij} is the management z-score for department i in university j. We focus only on academic (i.e. we exclude the HR) departments. We run separate regressions for the overall score and for each of the main components (operations, monitoring, targets and incentives). $\mathbf{Z}_1$ is a vector of controls at the department level including characteristics of the manager (female, whether full-time manager, years' tenure and likely next role) and measures of departmental level resources (the number of staff, the number of students, spending on academic staff and other spending). Previous studies (Bloom *et al.*, 2010) have shown competition to be an important determinant of management practices, so we explore this by including measures of competition (these are self-reported and were collected as part of the survey). $\mathbf{Z}_2$ is a vector of controls at the university level, including the number of cost centres as defined by the university regulator (to allow for the spread of the university across academic disciplines) and an indicator for London, as several of the London universities share central administration for degree awarding functions. We also include departmental and interviewer fixed effects and cluster standard errors at the university level.

The results are reported in Table 5. Column (I) has no controls other than university type, departmental and interviewer fixed effects. For university type, the reference group is the research-intensive group of universities (Russell Group). This column shows this group scores around 0.5 SD higher than all the other three types on overall management score.

Moving from column (I) to (II) shows the effect of adding controls for manager characteristics, resources, competition and London location. A number of the manager characteristics variables enter significantly. Female heads of departments score lower overall and, specifically, lower in relation to incentives. This is an interesting finding, although we do not know for sure whether this reflects a genuine difference or a gender difference in reporting. Full-time managers score lower, particularly in relation to operations and incentives. Because this is a self-reported measure referring to the time spent doing the job, one possibility is that worse managers spend longer on management tasks. The manager's next role also affects how they perform. Managers who are likely to return to academia (the default category) score lower in terms of their overall management score. The difference is most pronounced in relation to operations and targets. The latter, in particular, are likely to reflect university management policies and our findings are thus consistent with managers anticipating a return to academia having fewer upward-looking career concerns. The number of years as head of department is not significantly correlated with any of the management scores.

Looking at the other controls, we find some significant variation in management scores with our measures of resources, although this is not systematically the case for all of the dimensions of management. London-based institutions score lower on average.

Including these controls, we find no significant differences across types of universities in the quality of management with respect to 'operations' (second set of columns), 'monitoring' (third set of columns) or 'targets' (fourth set of columns).

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Table 5

Variation in Management Scores

	Overall score			Operations			Monitoring		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Other old	−0.529**	−0.550**	0.497	−0.395*	−0.301	0.589	−0.360**	−0.286	0.265
	(0.180)	(0.235)	(0.424)	(0.201)	(0.217)	(0.507)	(0.168)	(0.279)	(0.415)
Former polytechnics	−0.575**	−0.839**	0.876*	−0.273	−0.237	0.589	−0.190	−0.251	1.227**
	(0.204)	(0.252)	(0.502)	(0.210)	(0.286)	(0.534)	(0.173)	(0.294)	(0.340)
New universities	−0.565**	−0.350	0.235	−0.530*	0.021	0.112	0.181	0.644	0.123
	(0.237)	(0.377)	(0.344)	(0.273)	(0.427)	(0.575)	(0.250)	(0.458)	(0.409)
Female manager		−0.327*			−0.098			−0.162	
		(0.174)			(0.188)			(0.165)	
Full-time manager		−0.413**			−0.403*			−0.163	
		(0.195)			(0.209)			(0.214)	
Tenure_head (years)		0.019			−0.016			0.021	
		(0.030)			(0.036)			(0.021)	
Next_management		0.414**			0.420*			0.283	
		(0.188)			(0.228)			(0.188)	
Next_retire		0.361			0.425			0.194	
		(0.294)			(0.320)			(0.309)	
Next_dk		0.346			0.291			0.148	
		(0.220)			(0.302)			(0.202)	
z_staff		−0.109			−0.025			−0.066	
		(0.200)			(0.149)			(0.169)	
z_students		0.153			−0.113			0.028	
		(0.201)			(0.219)			(0.175)	
z_academicspend		0.015			0.235**			0.122	
		(0.091)			(0.101)			(0.103)	
z_otherspend		0.177			0.139			0.075	
		(0.139)			(0.152)			(0.124)	
Competition in UK		0.003			0.023			0.021	
		(0.017)			(0.021)			(0.018)	
Competition globally		−0.497**			0.262			−0.396*	
		(0.197)			(0.205)			(0.223)	
# costcentres (university)		0.242			0.723**			−0.019	
		(0.260)			(0.284)			(0.269)	
London		0.135			−0.246			0.266	
		(0.218)			(0.231)			(0.233)	
central_ops (0/1)			1.518**			0.774			1.151**
			(0.511)			(0.632)			(0.442)
central_monitoring			−1.104**			−0.088			−1.107**
			(0.392)			(0.536)			(0.521)
central_incentives			−0.731**			−0.691**			−0.411
			(0.348)			(0.303)			(0.348)
N	187	158	36	187	158	36	187	158	36
R^2	0.080	0.143	0.517	0.040	0.143	0.341	0.060	0.153	0.448

But on 'incentives', the research-intensive Russell Group score significantly better than the other university types even with controls for resources. The new universities each score over 1.3 SD below the research–intensive ones, with the other old group of universities having a score between the most research-intensive and the new universities (0.74 SD lower than the most research-intensive one). The difference in management quality on 'incentives' drives significant differences in overall scores between the research-intensive and the other old and former polytechnics. In summary, the results in column (II) of Table 5 confirm that Russell Group

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Table 5
(*Continued*)

	Targets			Incentives		
	(I)	(II)	(III)	(I)	(II)	(III)
Other old	−0.212	−0.230	0.431	−0.624**	−0.739**	0.330
	(0.209)	(0.198)	(0.489)	(0.163)	(0.247)	(0.322)
Former polytechnics	0.005	−0.143	0.725	−1.018**	−1.417**	0.332
	(0.216)	(0.222)	(0.596)	(0.196)	(0.268)	(0.406)
New universities	0.013	0.140	0.686	−1.217**	−1.329**	−0.261
	(0.252)	(0.396)	(0.472)	(0.200)	(0.324)	(0.296)
Female manager		−0.187			−0.413**	
		(0.179)			(0.172)	
Full-time manager		−0.300			−0.342*	
		(0.211)			(0.184)	
Tenure_head (years)		0.013			0.017	
		(0.024)			(0.029)	
Next_management		0.476**			0.195	
		(0.205)			(0.168)	
Next_retire		0.498			0.125	
		(0.315)			(0.252)	
Next_dk		0.518**			0.119	
		(0.249)			(0.203)	
z_staff		−0.144			−0.063	
		(0.178)			(0.173)	
z_students		0.122			0.251	
		(0.195)			(0.167)	
z_academicspend		−0.078			−0.055	
		(0.086)			(0.094)	
z_otherspend		0.244*			0.088	
		(0.130)			(0.123)	
Competition in UK		0.011			−0.021	
		(0.018)			(0.020)	
Competition globally		−0.412**			−0.470**	
		(0.161)			(0.206)	
# costcentres (university)		0.162			0.191	
		(0.256)			(0.265)	
London		0.013			0.154	
		(0.237)			(0.220)	
central_ops (0/1)			1.628**			0.980**
			(0.627)			(0.405)
central_monitoring			−0.960*			−0.844**
			(0.474)			(0.383)
central_incentives			−0.433			−0.686**
			(0.387)			(0.301)
N	187	158	36	187	158	36
R^2	0.028	0.098	0.479	0.268	0.315	0.546

Notes. ***p < 0.01, **p < 0.05, *p < 0.10. Standard errors are clustered at the university level. For variable definitions see Table A2 in the Appendix. Regressions additionally include department and interviewer fixed effects.

universities score better on incentives and that this does not simply reflect their higher level of resources.

Column (III) of Table 5 reports an additional specification in which we explore the link between management practices and the extent to which management processes are centralised within the university (this information was collected as part of our

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survey in addition to the management practices questions). We focus on centralisation of three aspects of management: monitoring, operations and targets. The questions were not asked in all cases and so the sample sizes are therefore, considerably smaller. We, therefore, run a simpler specification excluding the controls for manager characteristics, resources, competition and London location. The results in column (III) suggest that centralisation – and what is centralised – is important. Centralisation of 'operations' has an overall positive effect on the overall scores, raising them by just over 1.5 of a SD. However, centralisation of 'incentives' has the opposite effect – it reduces the departmental scores – and this reduction is significant for the incentives scores (where it lowers them by nearly three quarters of a SD), the operations scores (a reduction of 0.36 of a SD) and the overall management practices score (a reduction of 0.731). Universities that decentralise incentives to the department level score more highly and this decentralisation is more common in the elite universities than other types of universities. Our interpretation of these findings is that the quality of incentives management within universities is inherently linked to decentralised incentives processes.[15] This finding echoes the earlier findings from Aghion *et al.* (2010), which looked across, rather than within, country.

3. Does Management Matter?

We have shown that there are significant differences in management scores across universities. We now turn to address the key question of whether this matters for performance. While we cannot establish causality in a single cross section, we control for observable differences in resources and condition on past performance, allowing us to control for university and departmental-level factors, which have a time-invariant effect on output.

3.1. *The Raw Association with Performance*

More detailed than Figure 1, Figure 3 provides visual evidence of the raw correlations between management scores and the measures of performance within the sample as a whole. The top left panel presents the association at departmental level between the overall management score and the CUG ranking (which incorporates both teaching and research assessments). While there is dispersion, the Figure shows the relationship at the mean is positive. The top right panel focuses on research output, while the bottom panel focuses on student satisfaction. Higher management practices scores are associated with better performance for both research and teaching assessments.

[15] Our centralised management score is from the survey. Given this, an alternative explanation is that university managers who are poor managers blame this on centralised management. But this interpretation is not supported by the difference in the association of different aspects of management with the centralisation measures.

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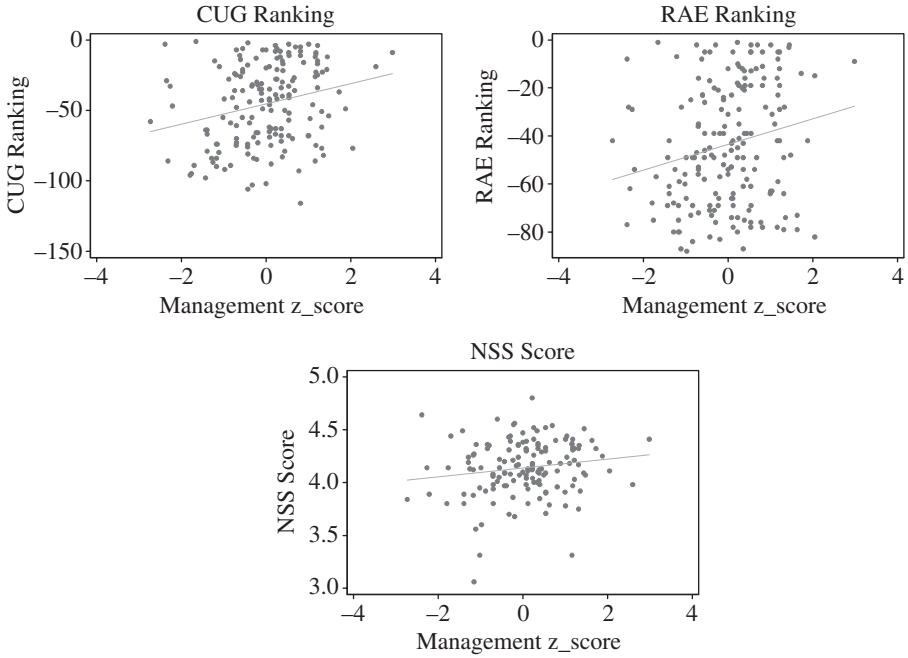


Fig. 3. *Overall Management Score and Performance*

Notes. Management score refers to the department's overall management score (aggregating 17 individual indicators). CUG ranking refers to the department's Combined University Guide ranking (reversed such that a higher number indicates a better ranking). RAE ranking refers to the department's ranking in the Research Assessment Exercise (reversed such that a higher number indicates a better ranking). NSS score refers to the department's student satisfaction score in the National Student Survey.

3.2. *Allowing for Differences in Resources and Controlling for Past Performance*

To explore the relationship between management and performance further, we control for differences in resources and attempt to mop up unobserved heterogeneity by additionally controlling for past performance.

We estimate the following regressions:

$$Y_{ij} = \alpha + \varphi M_{ij} + \boldsymbol{\gamma}'\mathbf{Z}_{1ij} + \boldsymbol{\delta}\mathbf{Z}_{2j} + \boldsymbol{\gamma}\mathbf{Z}_{ij,t-5} + \text{Uni_type}_j + \text{dept}_i + u_{ij}, \tag{2}$$

where Y_{ijt} refers to a performance measure. We run separate regressions for the CUG ranking, the RAE ranking and the NSS score. In each case, we use the most recent measure, although in the case of the RAE ranking, this is last available for 2008. We include the same controls as before ($\mathbf{Z}_1$ and $\mathbf{Z}_2$). We estimate (2) without and with lagged performance, the latter specification allowing us to control for unobservable department- and university-level factors, which have a time-invariant effect on performance. We choose the five-year lag to allow management to be correlated with changes in performance over a reasonable period. Choosing other lags yields similar results.

The main results are summarised in Table 6. Column (I) shows the correlations including only interviewer fixed effects. Column (II) adds controls for manager,

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Table 6

Relationship Between Overall Management Score and Performance

	CUG ranking (reversed)				RAE ranking (reversed)			
	(I)	(II)	(III)	(IV)	(I)	(II)	(III)	(IV)
z_managscore	6.783**	3.809**	2.740**		5.157**	2.658**	2.489**	
	(2.534)	(1.623)	(1.333)		(2.156)	(1.240)	(1.138)	
z_managscore_ HR				−2.345				−1.208
				(1.658)				(2.172)
Female manager		2.066	1.050	2.088		−0.436	−1.409	1.414
		(2.801)	(2.364)	(3.148)		(2.174)	(2.315)	(3.955)
Full-time manager		1.644	2.375	−7.736**		−0.054	2.623	4.357
		(3.471)	(2.692)	(3.378)		(2.325)	(2.402)	(3.385)
Tenure_head (years)		−0.354	0.362	0.846**		−0.204	−0.121	−0.289
		(0.446)	(0.359)	(0.404)		(0.428)	(0.384)	(0.503)
Next_ management		−6.011*	−2.486	−5.488		−4.049	−4.338*	−3.290
		(3.080)	(2.433)	(4.019)		(2.794)	(2.441)	(3.971)
Next_retire		−10.169**	−10.026**	−6.574		−3.276	−2.448	−1.861
		(4.646)	(3.641)	(4.713)		(3.850)	(4.310)	(6.311)
Next_dk		−2.746	−3.254	1.517		4.243	3.086	1.764
		(3.394)	(2.906)	(4.478)		(3.813)	(3.380)	(4.206)
z_staff		6.364**	2.751	3.994		8.245**	4.669**	1.922
		(2.607)	(2.039)	(3.601)		(2.092)	(1.968)	(3.672)
z_students		−8.071**	−4.377*	−6.241**		−2.780	−0.950	−1.834
		(2.706)	(2.358)	(3.031)		(1.745)	(1.742)	(3.281)
z_acspend		1.074	0.809	1.661		0.328	0.298	2.306
		(1.740)	(1.348)	(1.718)		(1.292)	(1.176)	(1.581)
z_oth_spend		1.954	1.342	−0.995		1.467	1.130	3.170
		(2.683)	(1.707)	(2.352)		(1.500)	(1.162)	(2.445)
Competition in UK		−1.090**	−0.438	0.048		−0.481	−0.367	0.540
		(0.461)	(0.345)	(0.268)		(0.342)	(0.349)	(0.426)
Competition globally		−6.133	−0.725	0.482		4.320	3.754	11.479
		(4.595)	(3.713)	(4.994)		(4.504)	(4.878)	(6.813)
Other old		−15.451**	−8.106**	−6.645**		−11.554**	−8.124**	−1.305
		(4.645)	(3.458)	(2.961)		(3.795)	(3.425)	(4.313)
Former polytechnics		−39.832**	−16.147**	−11.017*		−34.858**	−25.872**	−10.817*
		(4.759)	(4.785)	(6.037)		(4.603)	(4.895)	(6.306)
New universities		−69.177**	−38.160**	−36.495**		−45.961**	−36.811**	−26.273**
		(7.454)	(8.964)	(7.223)		(5.506)	(5.766)	(9.044)
Past performance			0.587**	0.756**			0.325**	0.519**
			(0.090)	(0.092)			(0.080)	(0.110)
N	165	141	141	73	183	154	136	72
R^2	0.072	0.764	0.845	0.914	0.064	0.770	0.821	0.866

department and university characteristics, as well as indicators for university type. The results confirm that, even within university type and conditional on resources, the management score has a significant and positive effect for CUG and RAE rankings. For NSS scores, the coefficient is positive but not significant. Column III adds a further control for lagged performance. In this specification, the overall management z_score is now positive and significant in regressions for all three performance measures. Controlling for both university type and past performance, a 1 SD improvement in management score is correlated with a 2.74 improvement in the CUG ranking, a 2.49 improvement in the RAE ranking and a 0.14 SD improvement in the NSS score. While we cannot give this a strict causal interpretation, these results clearly signal that management is at least part of the story for why departments perform well.

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Table 6
(*Continued*)

	NSS score (z_score)			
	(I)	(II)	(III)	(IV)
z_managscore	0.134	0.111	0.141*	
	(0.083)	(0.097)	(0.084)	
z_managscore_HR				−0.091
				(0.231)
Female manager		0.150	0.026	−0.060
		(0.174)	(0.201)	(0.405)
Full-time manager		0.322*	0.171	−0.272
		(0.193)	(0.187)	(0.382)
Tenure_head (years)		0.004	−0.008	0.012
		(0.033)	(0.026)	(0.053)
Next_management		0.004	0.012	−0.356
		(0.246)	(0.233)	(0.346)
Next_retire		−0.246	−0.184	−0.366
		(0.326)	(0.328)	(0.548)
Next_dk		0.058	0.184	−0.000
		(0.258)	(0.218)	(0.267)
z_staff		0.146	0.080	−0.041
		(0.133)	(0.125)	(0.324)
z_students		−0.388**	−0.215	−0.077
		(0.184)	(0.189)	(0.332)
z_acspend		0.006	0.053	−0.308*
		(0.091)	(0.102)	(0.154)
z_oth_spend		0.225*	0.098	0.309
		(0.127)	(0.158)	(0.311)
Competition in UK		−0.025	−0.021	−0.076
		(0.035)	(0.026)	(0.057)
Competition globally		0.183	0.114	−0.416
		(0.325)	(0.292)	(0.648)
Other old		0.563	0.514*	−0.255
		(0.358)	(0.305)	(0.510)
Former polytechnics		0.142	0.184	−0.610
		(0.311)	(0.302)	(0.532)
New universities		−0.464	−0.154	−1.501
		(0.571)	(0.493)	(0.942)
Past performance			0.257**	0.209
			(0.087)	(0.197)
N	143	121	110	55
R^2	0.038	0.259	0.293	0.436

Notes. ***p < 0.01, **p < 0.05, *p < 0.10. Standard errors are clustered at the university level. For variable definitions see Table A2 in the Appendix. Regressions also include department type and interviewer fixed effects. CUG, Complete University Guide; RAE, Research Assessment Exercise; NSS, National Student Survey.

3.3. *What Level and Aspects of Management Seem to Matter for Performance?*

Column (IV) of Table 6 replaces the departmental level management score with the management score for the HR department in the university. The idea is to see whether it is management at the department level that matters and/or management at the university-level. Our sample is smaller as not all the HR departments were sampled. The results clearly show that management practices in the HR department

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(which we take to be a measure of the quality of central university management) are not important in determining departmental performance. The coefficients on the management practices of the HR department are all negative, *albeit* not statistically significant. The quality of management practices at the centre does not matter for departmental-level measures of performance in research or teaching.

These results strongly indicate that it is management at the department level that matters for measures of department performance. We explore this further looking at whether there is an association between central management practices and university-level performance measures. We use the ARWU ranking of world universities and the CUG ranking of universities in the UK. We regress these performance measures on two alternative university-level management scores. The first reflects the departmental scores and is the average of the management scores among the academic departments. The second is a university level measure and is the HR department management score. Table 7 contains the results. The columns labelled (I) present the former, the columns labelled (II) the latter. The results for the ARWU ranking show that management at the academic department level is relatively more important than university-level management in explaining (positive) performance. The former is associated with a 27.4 point increase in the world ranking, while the latter is associated with a 43.4 point fall. For the CUG ranking, the university level score is associated with a 4.3 point fall in the position in the rankings. These findings suggest that what the HR department does is not associated with increases in performance.

We now turn to the association between the measures of department-level performance and individual subgroups of management practice scores. Figure 4 shows that the overall university ranking (our preferred measure since it combines both research and teaching) is most strongly associated with the use of incentives. Table 8 confirms and examines this in a regression framework. We run the same specification as stated earlier (2) to look at the relationship between performance and

Table 7

Relationship Between Overall Management Score and University-level Performance

	ARWU ranking (reversed)		CUG ranking (reversed)	
	(I)	(II)	(I)	(II)
Mean z-score academic depts	27.440* 16.271		−1.095 1.644	
z_HRmanagscore		−42.374** 9.260		−4.286** 1.546
Lagged performance	−1.392** 0.127	−1.268** 0.096	0.789** 0.098	0.905** 0.100
N	104	56	86	43
R^2	0.52	0.55	0.84	0.92

Notes. ***p < 0.01, **p < 0.05, *p < 0.10. Analyses at university level. Regressions additionally include indicators for university type. For Academic Ranking of World Universities we run Tobit regressions because many universities are left censored at −800. ARWU, Academic Ranking of World Universities; CUG, Complete University Guide.

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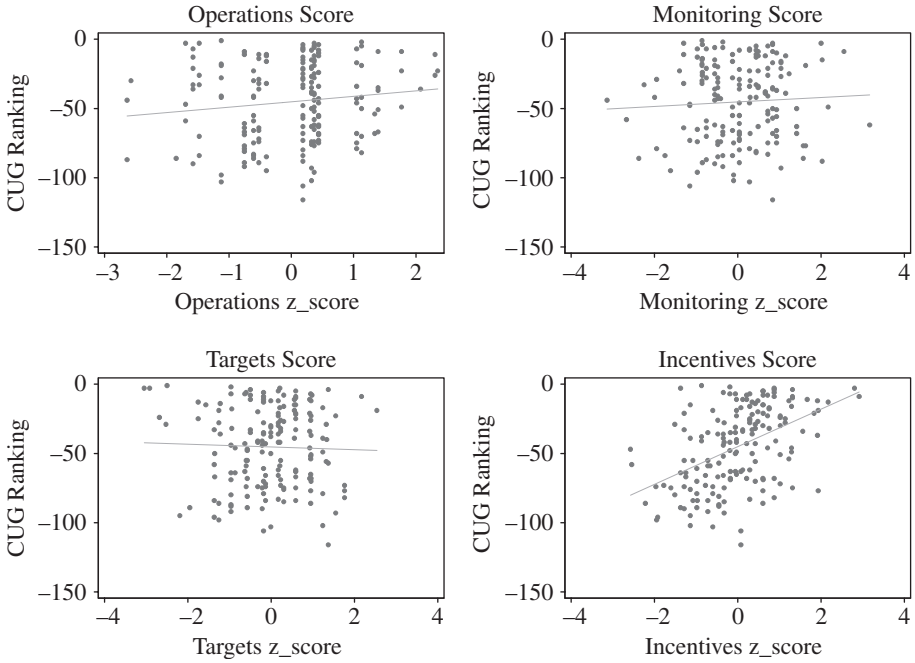


Fig. 4. *Management Score – Sub-components and Performance*
Note. CUG ranking refers to the department's Combined University Guide ranking (reversed such that a higher number indicates a better ranking).

Table 8

Relationship Between Subgroups of Management Scores and Performance

	CUG ranking (reversed)	RAE ranking (reversed)	NSS score (z_score)
z_manag_operations	2.201	2.203*	0.146
	(1.551)	(1.286)	(0.100)
z_manag_monitoring	−0.045	−2.305	−0.025
	(2.195)	(1.390)	(0.120)
z_manag_targets	−1.818	−0.600	−0.006
	(1.711)	(1.517)	(0.141)
z_manag_incentives	3.802*	3.455*	0.100
	(2.219)	(1.845)	(0.109)
N	165	183	143
R^2	0.712	0.699	0.114

Notes. ***p < 0.01, **p < 0.05, *p < 0.10. Standard errors are clustered at the university level. Regressions also include full set of controls as Table 6, column (II). CUG, Complete University Guide; RAE, Research Assessment Exercise; NSS, National Student Survey.

management scores but we now include the all four subgroups of the overall management practices score in a 'horse race' to see which has the strongest association with performance. All regressions include the full set of controls as in Table 6 column (II) but we show only the coefficients on the management scores.

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The results confirm that the subgroup of scores for incentives are the most consistently associated with performance. The incentive score enters positively and significantly for both the CUG and RAE rankings, increasing these by 3.8 and 3.5 respectively. There is evidence that operations also matter. The operations score is positive and significant for the RAE ranking (though smaller than for incentives) and it has the highest (though not significant) coefficient for NSS scores. The coefficients on monitoring and targets are negative (albeit insignificant) for all outcomes. These two aspects of management practices do not appear to matter for performance in either research or teaching.

3.4. *Do Different Aspects of Management Matter in Different Types of University?*

The results so far have shown that better management practices at departmental level are associated with better performance and that practices with respect to incentives matter most. However, it is possible that for the newer universities, where international reputation is less important than local reputation and teaching is more important for income than research, freedom to recruit and retain matter less and perhaps other aspects of management matter more. These universities have historically been subject to greater central control and less autonomy at both departmental level and university level, as many of these were previously part of

Table 9

Overall Management Scores and Performance by Type of University

	Overall score			Operations			Monitoring		
	CUG	RAE	NSS	CUG	RAE	NSS	CUG	RAE	NSS
z_score	3.295	2.068	0.148	7.267**	2.608	0.164	3.946*	−0.410	0.017
	(2.646)	(2.173)	(0.155)	(2.366)	(1.689)	(0.147)	(2.072)	(1.798)	(0.153)
z_score_new	0.846	1.031	−0.069	−4.538	−1.303	0.023	−2.701	2.498	−0.058
	(3.374)	(2.571)	(0.181)	(2.792)	(2.144)	(0.165)	(3.152)	(2.644)	(0.190)
N	141	154	121	141	154	121	141	154	121
R^2	0.764	0.770	0.260	0.772	0.767	0.277	0.758	0.765	0.250

	Targets			Incentives		
	CUG	RAE	NSS	CUG	RAE	NSS
z_score	1.325	2.227	0.278*	1.805	2.255	0.045
	(2.745)	(2.052)	(0.160)	(2.627)	(2.471)	(0.127)
z_score_new	1.005	−0.300	−0.315*	5.175	2.136	0.145
	(3.337)	(2.425)	(0.187)	(3.457)	(2.768)	(0.172)
N	141	154	121	141	154	121
R^2	0.755	0.767	0.276	0.771	0.773	0.262

Notes. ***p < 0.01, **p < 0.05, *p < 0.10. Standard errors are clustered at the university level. Performance measures as in previous regressions. All regressions include full set of controls as in Table 6, column (II). CUG, Complete University Guide; RAE, Research Assessment Exercise; NSS, National Student Survey.

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local government and adopted faculty level structures sooner than the older universities. It may be that monitoring and targets have greater returns in these settings.

We explore this in Table 9, which presents the associations between the management scores (both overall and subgroups) and the three sets of outcomes for different types of university. We estimate the same specification as stated earlier (2) but we include an additional interaction term between the management score and an indicator for 'new universities', combining both former polytechnics and other new universities. We include the full set of controls as in column II of Table 6. In this Table, the coefficient on the management score captures the association between management and performance for older (pre-1992) universities. The interaction term captures any difference in the association for newer universities.

None of the results provides any support for the idea that incentives matter less in newer universities. There is little clear difference between old and new universities in the association between overall score and performance. Operations scores matter less and targets matter significantly less for teaching in newer universities. However, incentives appear to matter more in newer universities than in older universities. The coefficient on the interaction term between incentives and being a new university is 5.2 points higher for the CUG ranking and 2.2 points higher for the RAE ranking, though neither are significantly different from zero.

This raises the question of why newer universities do not adopt the same model as the more successful older universities. One plausible explanation is the fact that there is relatively limited competition across university types. The markets that Russell Group universities are competing in (for both staff and students) are national and increasingly international while newer, more teaching intensive universities see their primary competition in local terms. The lack of direct competition would tend to reduce the pressure on newer universities to adopt models of other university types. This explanation would be in line with the findings of previous management studies on the importance of competition in driving management scores (Bloom and Van Reenen, 2007; Bloom *et al.*, 2010). It would also echo Aghion *et al.* (2010), who found (joint) importance of competition and autonomy in driving performance.

4. Discussion and Conclusions

This article has examined whether management differences between universities are associated with differences in their performance. Using the UK as a test bed and a tried and tested measure of management performance, we have shown wide variation in the management quality across universities. In particular, we have shown differences in scores between older, research-intensive universities and newer, more teaching-oriented universities. In addition, we have shown that these differences are associated with differences in performance. Higher management scores are associated with better performance on externally validated measures of both research and teaching (often seen, in this sector, as orthogonal to each other). These results are robust to controls for resources (academic and non-academic spending and staff/student ratios) and to lagged performance.

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We find significant differences in the management practices at the 'plant' level within the firms – one department within a university might be well managed while another is not. And we also find that the management of the central administration – as measured by the human resources department – is very weakly correlated with better output at departmental and university level. Management in universities is also relatively heterogeneous relative to other organisations (e.g. manufacturing firms, hospitals).

We also find significant differences between aspects of good management practices. Good practice with respect to incentives – the freedom to retain, attract and reward good performers – is the most important correlate of good performance. The setting of targets and monitoring has a much weaker association with good performance. Furthermore, the relationships we find hold for both world leading research-intensive universities and those more focused on teaching. We suggest that limited competition between university types may explain why newer universities do not adopt the management model of elite research-oriented universities. Our findings, therefore, build directly on Aghion *et al.* (2010), who found that market incentives, in the shape of competition, and autonomy from central government control, mattered for universities across Europe and the US. Our results suggest that management structures which allow freedom to use incentives and autonomy at the plant (departmental) level matters for output in this sector; competition may be a factor in adoption of this model.

We have only a single cross section so do not claim causality, but we are able to condition on resources and past performance to deal with unobserved heterogeneity that might jointly explain both management score and current performance. In addition, two aspects of our findings suggest that the strongly patterned set of associations we find may be robust to endogeneity bias. First, the fact that the different aspects of management practice correlate differently with performance suggest that shocks to performance do not lead to the adoption of the whole 'new management' set of practices including monitoring, target setting and use of incentives. Second, if better management were put in as a response to negative shocks, this might explain our findings of a positive association between changes in performance and better use of incentives. However, this would mean that departments with negative shocks (poor student performance or poor research performance) were given greater freedom to use/decide how they retained, recruited and dealt with poor performers, while not having any changes to the extent to which performance was monitored or targeted. This seems somewhat unlikely. And thus, in summary, we think our results are not driven by reverse causality but point to the important aspects of good management in the use of incentives at the plant (departmental) level to motivate academics. This contrasts the commonly held view that these individuals are impervious to good (or bad) management.

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Appendix A.

Table A1
Universities by Type

Russell Group	Other old	Former polytechnics	Other new
Cardiff University	Aberystwyth University	Anglia Ruskin University	Bath Spa University
Imperial College London	Aston University	Birmingham City University	Bishop Grosseteste University College, Lincoln
King's College London	Bangor University	Bournemouth University	Buckinghamshire New University
London School of Economics and Political Science	Birkbeck College	Coventry University	Canterbury Christ Church University
Queen Mary, University of London	Brunel University	De Montfort University	Edge Hill University
Queen's University Belfast	City University, London	Glasgow Caledonian University	Glyndŵr University
University College London	Cranfield University	Kingston University	Leeds Trinity & All Saints
University of Birmingham	Goldsmiths College, University of London	Leeds Metropolitan University	Liverpool Hope University
University of Bristol	Heriot-Watt University	London Metropolitan University	Robert Gordon University
University of Cambridge	Keele University	London South Bank University	St Mary's University College
University of Durham	Lancaster University	Manchester Metropolitan University	University College Plymouth St Mark & St John
University of Edinburgh	London Business School	Middlesex University	University of Abertay Dundee
University of Exeter	Loughborough University	Napier University	University of Bedfordshire
University of Glasgow	Open University	Nottingham Trent University	University of Bolton
University of Leeds	Royal Holloway, University of London	Oxford Brookes University	University of Cumbria
University of Liverpool	Swansea University	Sheffield Hallam University	University of Derby
University of Manchester	University of Aberdeen	Staffordshire University	University of Gloucestershire
University of Newcastle upon Tyne	University of Bath	University of Central Lancashire	University of Northampton
University of Nottingham	University of Bradford	University of East London	University of Wales Institute, Cardiff
University of Sheffield	University of Dundee	University of Glamorgan	University of Worcester
University of Southampton	University of East Anglia	University of Greenwich	University of the West of Scotland
University of Warwick	University of Essex	University of Hertfordshire	York St John University
University of York	University of Hull	University of Huddersfield	
	University of Kent	University of Lincoln	
	University of Leicester	University of Northumbria at Newcastle	
	University of Reading	University of Plymouth	
	University of Salford	University of Portsmouth	
	University of St Andrews	University of Sunderland	
	University of Stirling	University of Teesside	
	University of Strathclyde	University of West London	
	University of Surrey	University of Westminster	
	University of Sussex	University of Wolverhampton UWE	
	University of Ulster		
	University of Wales, Lampeter		

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Table A2

Variable Definitions

	Variable definitions	
Complete University Guide (CUG) ranking	1.5 weight for research assessment, student satisfaction. 1.0 weight for academic services expenditure per student, student completion rates, entry standards for undergraduates, facilities expenditure per student, proportion of students graduating with firsts and upper seconds, graduate prospects, student–staff ratio	Available 2008–13
RAE ranking	Ranking in research assessment exercise. This was conducted jointly by the Higher Education Funding Council for England, the Scottish Funding Council, the Higher Education Funding Council for Wales and the Department for Employment and Learning, Northern Ireland. The RAE produced quality profiles of research activity by academic department based on individual academic publications, indicators of esteem and research environment. The profiles were used to allocate research funding.	Available 2001, 2008
NSS scores	'Overall I am satisfied with the quality of my course' (Q22) Scored from 1 (disagree strongly) to 5 (agree strongly)	Available 2008–12
Academic Ranking of World Universities (ARWU)	Alumni winning Nobel Prizes and Fields Medals (10%), staff winning Nobel Prizes and Fields Medals (20%), highly cited researchers in 21 broad subject categories (20%), articles published in the journals Nature and Science (20%), the Science Citation Index and Social Sciences Citation Index (20%) and the *per capita* academic performance (on the indicators above) of an institution (10%)	Available 2003–12
Staff	Total number of FTE staff, cost – centre	HESA
Number of students	Total number of UG + PG students studying the subject	HESA
Staff–student ratio		HESA
Ac_spending per staff (z_score)	Expenditure on academic staff (cost centre) divided by FTE staff; z-score adjusts for department mean and SD	HESA
Professorial salaries (z_score)	Yearly wage of professors (cost centre); z-score adjusts for department mean and SD	HESA
Oth_spending per student (z_score)	Other spending (cost centre) divided by number of students; z-score adjusts for department mean and SD	HESA
Perception of UK competition	Level of competition in the UK (1–10)	Survey
Perception of global competition	Level of competition globally (1–10)	Survey
Main competition – international	Three main competitors includes university outside UK	Survey
Main competition – national	Three main competitors are national	Survey
Main competition – local	Three main competitors are all local	Survey
Central_ops	Whether operations processes are centralised	Survey
Central_monitoring	Whether performance measurement processes are centralised	Survey
Central_incentives	Whether incentives processes are centralised	Survey
Female	Whether manager is female	Survey
Full-time manager	Whether management position is FT	Survey
% time on management	Percentage time spent on management (If FT, then 100%)	Survey
From outside university	Whether previous position outside university	Survey
From academia	Whether previous position academic	Survey
Tenure at university	Number of years at university	Survey
Tenure as head	Number of years as head of department	Survey
Whether fixed-term	Whether management role is fixed-term	Survey
Likely next job is academic	Sees self next – academic role	Survey
Likely next jobs is management	Sees self next – management role	Survey
Likely next job is retirement	Sees self next – retirement	Survey

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Additional Supporting Information may be found in the online version of this article:

Appendix B. Management Practice Interview Guide.
Data S1.

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