Original Article

Cracking the rankings Part (i): Understanding the Financial Times MBA rankings

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Abstract League tables are of great interest to universities. This is particularly true for business schools, for which the *Financial Times* (FT) produces a suite of rankings of programme areas on a rolling annual cycle. Despite publication by the FT of most of the inputs and outlines of the methodologies, these are often little used by business school managers or researchers. This is the first of a pair of papers that show how the FT's data and methodology can be used to reconstruct the underlying calculations to a very high degree of fit. This can help business school managers understand strengths and weaknesses and thus inform strategic decisions. Researchers can also test hypotheses they advance or search for patterns more robustly. This article concentrates on the FT's programme area rankings, using the MBA rankings as the main example; the second paper turns to their more complex aggregate European Business Schools ranking.
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Introduction

Status indicators are of perennial interest to universities for reputation, marketing and attracting funding. There is now a huge variety of such

'league tables', with more under development including an effort by the EU (U-Multirank, 2011). The performance of business schools is particularly closely scrutinised in the business media, and of particular importance to schools' marketing of postgraduate and executive education arms. Some of the most prominent rankings schemes are *The Financial Times* (FT), *The Economist*, *The Wall Street Journal*, *Bloomberg Business Week* and *Forbes*.

For UK business schools, the most prominent is the suite of rankings published by the FT. Over the course of each year, the FT publishes rankings of the 'quality' of a range of postgraduate and post-experience programme areas run by business schools, plus an aggregate ranking of European business schools.

There have been many critiques in the academic literature of the ranking approach to assessment of quality, including the FT's methods. The FT's basic method is to apply a set of weights of their own devising (so somewhat arbitrary) to all schools. There are therefore issues of its technical characteristics and fairness, for example large differences in rankings can arise from small differences in the weighted total scores. High weights given to a few variables, in particular (adjusted) salaries, mean that fluctuations arising from issues such as particular cohorts of students and survey (non-)response can have large impacts, and appearance or absence of a school in a table could potentially result in rank reversal. Thus, the rankings tables disguise substantial imprecision (Köksalan *et al*, 2010) and are vulnerable to volatility including randomness (Devinney *et al*, 2008; Dichev, 2008). It has also been suggested that the weighting structure introduces structural biases (Antunes and Thomas, 2007; Devinney *et al*, 2008). Attempts at 'fairer', and more robust, reappraisals include using Data Envelopment Analysis (Ray and Jeon, 2008) (though *efficiency* is likely to be of lesser concern to students) and allowing the FT's weights to be varied somewhat in each school's favour to construct 'divisions' rather than ranks (Köksalan *et al*, 2010) (though the extent of the variation permitted is also arbitrary and producing a small number of divisions rather than a ranking does not provide much discrimination). Further criticisms include the encouragement of normative (Wedlin, 2006) or dysfunctional (Hopwood, 2008) behaviours by schools in response to this imposed concept of 'quality'.

Despite this, the rankings are prominent, popular and perceived by the target audience (in particular business school applicants, alumni and deans) to have *de facto* legitimacy (Devinney *et al*, 2008). It is therefore useful for schools to understand how rankings systems work, and thus the potential effects of their decisions.

The FT publishes most of the top-level input data used and some information on their methodology, which is similar and fairly straightforward for the programme areas but more complex and less revealed for the combined

European Business Schools ranking. The numerical nature of the methodology and the availability of much of the input data make it possible and potentially interesting to analyse a school's relative performance and look for patterns within the data sets as a whole.

Occasionally, analyses have been published using the FT's MBA data, including a special issue of the *European Management Review* (Kogut, 2008). However, these papers often have shortcomings. Analyses either say little about the methodology or ignore or fail to take advantage of it. The focus in the literature, as far as consideration of the FT's rankings are concerned, has been the MBA: the FT's other rankings have not been considered.

In particular, a recent paper in the *Journal of the Operational Research Society* (JORS) (Naudé *et al*, 2010) applied a series of statistical analyses to 1 year's FT ranking of MBA programmes. Curiously, this study ignored the underlying methodology used by the FT, instead converting all the input data to ranks, thus working with entirely ordinal data and consequently violating a basic assumption of the parametric statistical techniques used. Processing the data according to the FT's methodology would have both maintained the structure of the data and not compounded these violations. Although a couple of papers (Devinney *et al*, 2008, Köksalan *et al*, 2010) have made use of the FT's methodology, these do not reveal much of the detail and also only considered the MBA rankings. The JORS paper, together with the author's work in deconstructing rankings for the management team at a very large business school, suggests that the workings of the FT rankings are not widely understood.

The purpose of this article (Part (i)) is therefore to:

- demonstrate clearly how the FT's programme-area ranking systems work, with the MBA ranking as an example;
- examine how closely the rankings can be reconstructed using the (partial) input data sets published by the FT;
- demonstrate how the reconstructed underlying calculations can be useful to:
    - business school managers in understanding the performance of their school in the ranking 'league tables' and thus investigate strategies to improve their school's position – comparisons between Manchester Business School (MBS) and several other leading UK business schools are used to illustrate this; and
    - researchers in testing hypotheses about business schools' performance and characteristics – examination of one hypothesis advanced but untested in the literature is undertaken to illustrate this.

The accompanying paper (Part (ii)) considers the more complex (and more opaque) aggregate overall *European Business Schools* ranking.

The FT Rankings

Over the course of the year, the FT publishes the following sets of programme area rankings:

- *Global* (*Full-Time*) MBA, January
- *Executive Education*, May, two rankings:
  - Open Programmes
  - Customised Programmes
- *Masters in Finance*, June, two rankings:
  - Pre experience
  - Post experience
- *Masters in Management*, September
- *Executive MBA*, October

The aggregate ranking (using all but the new *Masters in Finance* rankings) is:

- *European Business Schools*, December

Some other types of programmes are regularly tabulated, but not ranked.

The Programme Area Rankings

For each of the programme areas, the FT uses a set of input variables (grouped into attributes) weighted in a linear model to assess programme 'quality'. Some variables are the result of combining or ranking of unrevealed data. Some are collected from an alumni questionnaire 3 years after graduation, with the numbers presented incorporating weighted values from up to 2 years' previous responses. In the case of the (*Customised*) *Executive Education* rankings, data are collected from programme commissioners. Financial figures are pre-processed: the salary data are trimmed and, for larger cohorts of respondents, adjusted for employment sector average salaries and then converted to purchasing power parity (PPP) US dollars. These steps reduce the volatility and exposure to financial exchange rate fluctuations somewhat, although issues about relative salary differentials within different cultures are likely to remain. Qualification for consideration for the ranking includes the receipt of responses from a minimum number and percentage of the class.

The other variables are populated with data provided by the schools themselves (which are subject to periodic audit).

Reconstruction

We will use the *Global MBA* ranking (these are full-time MBA programmes) as the example here. This is the most long-standing of the FT's rankings, first published in 1999 when a ranking of 50 schools using 17 variables (Bradshaw, 2007) was released. The latest ranking (January 2011) considered 158 schools, of which there were sufficient data to rank 108 (Clarke, 2011), based on the 20 variables listed in Table 1 (for definitions, see *Financial Times*, 2011).

Table 2 shows an extract (a horizontal slice) of the table of the top 100 of the 108 schools published in January 2011. The mean and standard deviation of each variable have been added (in italics) for later calculations. Although most of the details of the methodology are published (Clarke, 2011) along with most of the input data (as shown in Table 2), there are some unknowns:

- Only data for the top 100 schools are published, although in 2011 108 schools had sufficient alumni and school information to be ranked. These bottom-end data are unavailable, though snippets appear via other FT rankings.
- Many schools have 'n/a' in the FT doctoral rank column (21 in 2011).

Table 1: FT MBA ranking top-level input variables, weights and groupings

Variable	*Weight (%)*	*FT attribute group*
Weighted salary (US$)	20	Academic Career Progression
Salary percentage increase	20	Academic Career Progression
Value for money rank	3	Academic Career Progression
Career progress rank	3	Academic Career Progression
Aims achieved rank	3	Academic Career Progression
Placement success rank	2	Academic Career Progression
Employed at 3 months (%)	2	Academic Career Progression
Alumni recommend rank	2	Academic Career Progression
Women faculty (%)	2	Diversity
Women students (%)	2	Diversity
Women board (%)	1	Diversity
International faculty (%)	4	Diversity
International students (%)	4	Diversity
International board (%)	2	Diversity
International mobility rank	6	Diversity
International experience rank	2	Diversity
Languages	2	Diversity
Faculty with doctorates (%)	5	Idea Generation
FT doctoral rank	5	Idea Generation
FT research rank	10	Idea Generation

Table 2: MBA rank results and input data published by the FT plus means and standard deviations (based on an extract from *Financial Times* (2011, pp. 36–39))

Financial Times MBA 2011 *The top full-time global MBA programmes*								*Alumni career progress*							*Diversity*	
Rank in 2011	*Rank in* 2010	*Rank in* 2009	*3-year average rank*	*School name*	*Country*	*Audit year*	*Salary today (US$)*	*Weighted salary (US$)*	*Salary percentage increase*	*Value for money rank*	*Career progress rank*	*Aims achieved rank*	*Placement success rank*	*Employed at 3 months(%)*	*Alumnirecommend rank*	*Women faculty (%)*
24	28	23	25	University of Michigan: Ross	USA	2008	134,208	137,189	104	78	37	39	4	78(95)	14	23
25	28	31	28	University of California at Berkeley: Haas	USA	2007	143,538	144,790	87	85	47	23	6	87(100)	12	30
26	21	17	21	University of Cambridge: Judge	UK	2007	135,475	137,199	101	18	20	18	55	74(89)	43	10
27	16	20	21	University of Oxford: Saïd	UK	2008	134,667	132,905	102	19	30	42	73	71(92)	30	15
28	38	38	35	SDA Bocconi	Italy	2008	110,829	110,186	123	12	32	71	59	88(90)	51	40
29	40	32	34	Manchester Business School	UK	2010	115,544	116,100	111	48	13	27	70	80(84)	39	33
30	36	34	33	Cornell University: Johnson	USA	2008	140,454	140,273	107	92	46	16	13	81(98)	25	25
31	33	29	31	UCLA: Anderson	USA	2008	136,906	137,726	106	77	45	53	34	81(90)	19	17
32	41	41	38	City University: Cass	UK	2007	124,006	124,006	90	15	15	67	56	97(99)	61	27
							μ	*116,569.41*	*101.25*	*50.50*	*50.50*	*50.50*	*50.50*	*84.30*	*50.45*	*23.80*
							σ	*22,681.59*	*21.20*	*28.87*	*28.87*	*28.87*	*28.87*	*10.32*	*28.80*	*7.44*

The mean and standard deviation of each variable have been added (in italics) for later calculations.

Financial Times MBA 2011 *The top full-time global MBA programmes*						*Alumni career progress*	*Diversity*								*Idea generation*		
Rank in 2011	*Rank in 2010*	*Rank in 2009*	*3-year average rank*	*School name*	*Country*	*Audit year*	*Women students (%)*	*Women board (%)*	*International faculty (%)*	*International students (%)*	*International board (%)*	*International mobility rank*	*International experience rank*	*Languages*	*Faculty with doctorates (%)*	*FT doctoral rank*	*FT research rank*
24	28	23	25	University of Michigan: Ross	USA	2008	30	20	31	29	17	58	44	0	94	3	6
25	28	31	28	University of California at Berkeley: Haas	USA	2007	30	9	44	42	9	61	30	0	100	9	5
26	21	17	21	University of Cambridge: Judge	UK	2007	26	19	52	94	55	11	70	0	96	52	51
27	16	20	21	University of Oxford: Saïd	UK	2008	24	30	56	95	32	4	56	0	97	32	51
28	38	38	35	SDA Bocconi	Italy	2008	33	21	29	67	64	22	43	0	88	12	62
29	40	32	34	Manchester Business School	UK	2010	23	23	35	93	23	14	19	0	89	1	70
30	36	34	33	Cornell University: Johnson	USA	2008	29	16	33	31	27	64	42	0	89	65	33
31	33	29	31	UCLA: Anderson	USA	2008	31	20	32	37	12	88	45	0	92	24	16
32	41	41	38	City University: Cass	UK	2007	39	43	58	77	57	33	29	0	96	42	62
							29.69	*19.18*	*37.79*	*51.32*	*30.40*	*50.50*	*50.50*	*0.21*	*89.37*	*40.00*	*48.95*
							6.28	*9.93*	*21.65*	*28.46*	*27.73*	*28.87*	*28.87*	*0.43*	*12.76*	*22.80*	*28.35*

The mean and standard deviation of each variable have been added (in italics) for later calculations.

- Some schools have some proportion of their students studying additional languages, details of which are used in the FT's calculations but not included in the published input data.
- Nine of the input variables are given in the form of ranks rather than raw interval data.

For the doctoral programme data, only one of the schools with missing data advertises a doctoral programme on its website and this is a relatively new programme; thus, it seems most reasonable not to penalise these schools for what appears to be lack of (rather than hidden) activity in this area. The other data have to be taken as presented.

Starting with the published data, the first step in the reconstruction is to standardise all the variables so they have a mean of 0 and standard deviation of 1. This is the standard Z-score transformation.

If the raw input data value for school j on variable i is X_{ij}, then the corresponding Z-score is:

$$Z_{ij} = \frac{X_{ij} - \mu_i}{\sigma_i}$$

where μ_i and σ_i are, respectively, the mean and standard deviation of input variable i, as shown in Table 2.

(N.b. the distributions are not 'normalised': the distributions are not fitted to a normal distribution.) For the input variables that are ranks, as small numbers are 'good', these have to be reverse scored, that is,

$$Z_{ij} = \frac{\mu_i - X_{ij}}{\sigma_i}$$

Each input 'X' value (extract in Table 2) is thus converted to the corresponding Z-score (extract in Table 3). The missing doctoral data feed through to a value of 0 (the mean across all schools) on this variable, and thus a neutral contribution to a school.

The Z-scores are then weighted (according to Table 1) and summed to produce an overall reconstructed total score for each school, that is,

$$\textit{Reconstructed Total Score}_j = \sum_{i=1}^{20} w_i Z_{ij}$$

These total scores are then ranked to position each school in the 'league table'. Table 4 shows a reconstruction for the section of the table corresponding to Tables 2 and 3. The results are shown graphically in Figures 1 and 2. Table 4

Table 3: Reconstructed Z-scores, MBA 2011

	Weighted salary (US$)	*Salary percentage increase*	*Value for money rank*	*Career progress rank*	*Aims achieved rank*	*Placement success rank*	*Employed at three months (%)*	*Alumni recommend rank*	*Women faculty (%)*	*Women students (%)*
University of Michigan: Ross	0.91	0.11	−0.95	0.47	0.40	1.61	−0.61	1.27	−0.11	0.05
University of California at Berkeley: Haas	1.24	−0.68	−1.20	0.12	0.95	1.54	0.26	1.33	0.83	0.05
University of Cambridge: Judge	0.91	−0.03	1.13	1.06	1.13	−0.16	−1.00	0.26	−1.85	−0.59
University of Oxford: Saïd	0.72	0.02	1.09	0.71	0.29	−0.78	−1.29	0.71	−1.18	−0.91
SDA Bocconi	−0.28	1.01	1.33	0.64	−0.71	−0.29	0.36	−0.02	2.18	0.53
Manchester Business School	−0.02	0.46	0.09	1.30	0.81	−0.68	−0.42	0.40	1.24	−1.07
Cornell University: Johnson	1.05	0.27	−1.44	0.16	1.20	1.30	−0.32	0.88	0.16	−0.11
UCLA: Anderson	0.93	0.22	−0.92	0.19	−0.09	0.57	−0.32	1.09	−0.91	0.21
City University: Cass	0.33	−0.54	1.23	1.23	−0.57	−0.19	1.23	−0.37	0.43	1.48

Table 3: *continued*

	Women board (%)	*International faculty (%)*	*International students (%)*	*International board (%)*	*International mobility rank*	*International experience rank*	*Languages*	*Faculty with doctorates (%)*	*FT doctoral rank*	*FT research rank*
University of Michigan: Ross	0.08	−0.31	−0.78	−0.48	−0.26	0.23	−0.49	0.36	1.62	1.52
University of California at Berkeley: Haas	−1.03	0.29	−0.33	−0.77	−0.36	0.71	−0.49	0.83	1.36	1.55
University of Cambridge: Judge	−0.02	0.66	1.50	0.89	1.37	−0.68	−0.49	0.52	−0.53	−0.07
University of Oxford: Saïd	1.09	0.84	1.53	0.06	1.61	−0.19	−0.49	0.60	0.35	−0.07
SDA Bocconi	0.18	−0.41	0.55	1.21	0.99	0.26	−0.49	−0.11	1.23	−0.46
Manchester Business School	0.38	−0.13	1.46	−0.27	1.26	1.09	−0.49	−0.03	1.71	−0.74
Cornell University: Johnson	−0.32	−0.22	−0.71	−0.12	−0.47	0.29	−0.49	−0.03	−1.10	0.56
UCLA: Anderson	0.08	−0.27	−0.50	−0.66	−1.30	0.19	−0.49	0.21	0.70	1.16
City University: Cass	2.40	0.93	0.90	0.96	0.61	0.74	−0.49	0.52	−0.09	−0.46

Table 4: Reconstructed ranks, total points score and points contribution showing aggregation, MBA 2011

	FT rank	*Reconstructed rank*	*Reconstructed total score*	*Weighted salary (US$)*	*Salary percentage increase*	*Value for money rank*	*Career progress rank*	*Aims achieved rank*	*Placement success rank*	*Employed at three months (%)*	*Alumni recommend rank*	*Women faculty (%)*	*Women students (%)*
				20%	*20%*	*3%*	*3%*	*3%*	*2%*	*2%*	*2%*	*2%*	*2%*
University of Michigan: Ross	24	22	**42.23**	18.18	2.17	−2.86	1.40	1.20	3.22	−1.22	2.53	−0.22	0.10
University of California at Berkeley: Haas	25	23	**41.05**	24.88	−13.52	−3.59	0.36	2.86	3.08	0.52	2.67	1.67	0.10
University of Cambridge: Judge	26	27	**36.44**	18.19	−0.51	3.38	3.17	3.38	−0.31	−2.00	0.52	−3.71	−1.18
University of Oxford: Saïd	27	26	**37.31**	14.40	0.47	3.27	2.13	0.88	−1.56	−2.58	1.42	−2.37	−1.81
SDA Bocconi	28	28	**33.57**	−5.63	20.25	4.00	1.92	−2.13	−0.59	0.72	−0.04	4.35	1.05
Manchester Business School	29	29	**29.26**	−0.41	9.15	0.26	3.90	2.44	−1.35	−0.83	0.80	2.47	−2.13
Cornell University: Johnson	30	31	**22.36**	20.90	5.39	−4.31	0.47	3.59	2.60	−0.64	1.77	0.32	−0.22
UCLA: Anderson	31	30	**25.41**	18.66	4.47	−2.75	0.57	−0.26	1.14	−0.64	2.18	−1.83	0.42
City University: Cass	32	32	**19.92**	6.56	−10.84	3.69	3.69	−1.71	−0.38	2.46	−0.73	0.86	2.97

Table 4: *continued*

	Women board (%)	*International faculty (%)*	*International students (%)*	*International board (%)*	*International mobility rank*	*International experience rank*	*Languages*	*Faculty with doctorates (%)*	*FT doctoral rank*	*FT research rank*	*Alumni career progress*	*Diversity*	*Idea Generation*
	1%	*4%*	*4%*	*2%*	*6%*	*2%*	*2%*	*5%*	*5%*	*10%*	*55%*	*25%*	*20%*
University of Michigan: Ross	0.08	−1.25	−3.14	−0.97	−1.56	0.45	−0.97	1.81	8.11	15.15	**24.62**	**−7.47**	**25.08**
University of California at Berkeley: Haas	−1.03	1.15	−1.31	−1.54	−2.18	1.42	−0.97	4.17	6.80	15.51	**17.28**	**−2.70**	**26.47**
University of Cambridge: Judge	−0.02	2.62	6.00	1.77	8.21	−1.35	−0.97	2.60	−2.63	−0.72	**25.82**	**11.38**	**−0.76**
University of Oxford: Saïd	1.09	3.36	6.14	0.12	9.67	−0.38	−0.97	2.99	1.75	−0.72	**18.45**	**14.84**	**4.02**
SDA Bocconi	0.18	−1.62	2.20	2.42	5.92	0.52	−0.97	−0.54	6.14	−4.60	**18.51**	**14.06**	**1.00**
Manchester Business School	0.38	−0.52	5.86	−0.53	7.59	2.18	−0.97	−0.15	8.55	−7.43	**13.95**	**14.33**	**0.98**
Cornell University: Johnson	−0.32	−0.88	−2.86	−0.25	−2.81	0.59	−0.97	−0.15	−5.48	5.63	**29.76**	**−7.39**	**0.00**
UCLA: Anderson	0.08	−1.07	−2.01	−1.33	−7.79	0.38	−0.97	1.03	3.51	11.62	**23.37**	**−14.12**	**16.16**
City University: Cass	2.40	3.73	3.61	1.92	3.64	1.49	−0.97	2.60	−0.44	−4.60	**2.73**	**19.64**	**−2.44**

Note: The figures in bold are the total (left) and Attribute Group sub-total scores (right) of the variable scores.

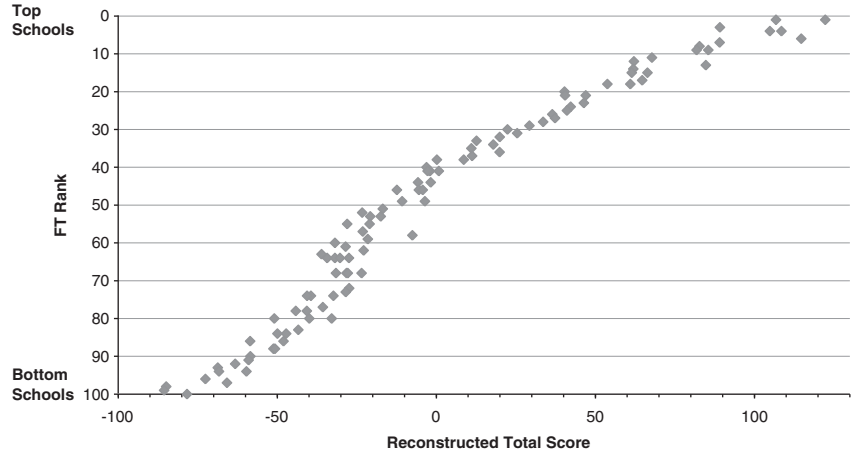

Figure 1: Fit of Reconstructed Scores with FT Ranking showing a reasonable and curvilinear fit, MBA 2011.

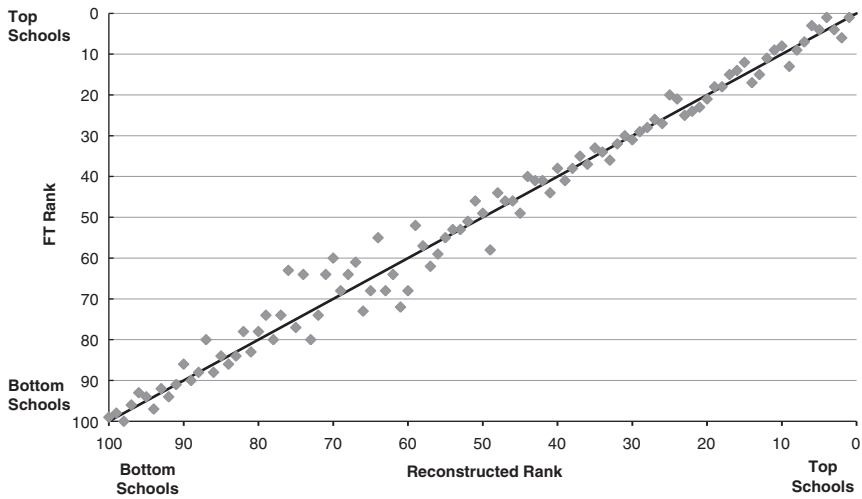

Figure 2: Fit of Reconstructed Rankings with FT Rankings, MBA 2011, showing increased 'noise' in the fourth quintile (ranks 60–80).
Note: The solid line indicates the line of perfect fit.

also contains sub-totals of the variables in each of the three FT attribute groups shown in Table 1.

The (Spearman) correlation is 0.991. Further assessment of the accuracy of the reconstruction can be derived from comparisons of particular score

Table 5: Reported versus reconstructed score intervals showing high correspondence, MBA 2011

	FT	*Reconstruction*
Range: Top (LBS) – Bottom (EM Lyon)	210	207.8
Top of leading group (LBS) – Top of second group (IESE)	41	40.5
Top of second group (IESE) – Top of third group (LUMS)	69	70.5

Table 6: Comparative performance of programme area rank reconstructions

Programme Area	*Top X published*	*Correlation*
MBA (2011)	100	**0.991**
EMBA (2010)	100	**0.988**
Masters in Management (2010)	65	**0.990**
Exec Ed – Open (2010)	60	**0.997**
Exec Ed – Customised (2010)	65	**0.988**

Note: Values assessed by correlation value are shown in bold.

intervals mentioned by the FT (*Financial Times*, 2011) against the reconstruction (Table 5).

There are, however, some discrepancies: the mean absolute error is 2.77 rank places. The maximum error in ranking is 13 places. This is presumably due to the unrevealed data (see above). Another unexplained feature is the large number of ties in the FT's published ranking, which is unexpected from a numerical system such as this. Alternative assumptions about the treatment of the missing doctoral data (for example, setting them to the bottom rank $+1$), or about rounding (for example, of the weighted Z-scores) do not significantly improve the set of fit measures.

The FT's ranking publications for other programme areas follow the same methodology with similar sets of variables. Table 6 shows that reconstructions can be performed to similar levels of accuracy, and thus similar useful investigations into areas of strength and weakness and 'what-if?' analyses can be performed.

Value for business schools

As a high level of reconstruction is possible, the intermediate steps can yield information about where schools score well or poorly relative to each other, and about changes from year to year. Figure 3 shows the FT's MBA ranks for the top eight UK business schools (excluding LBS). Cambridge and Oxford

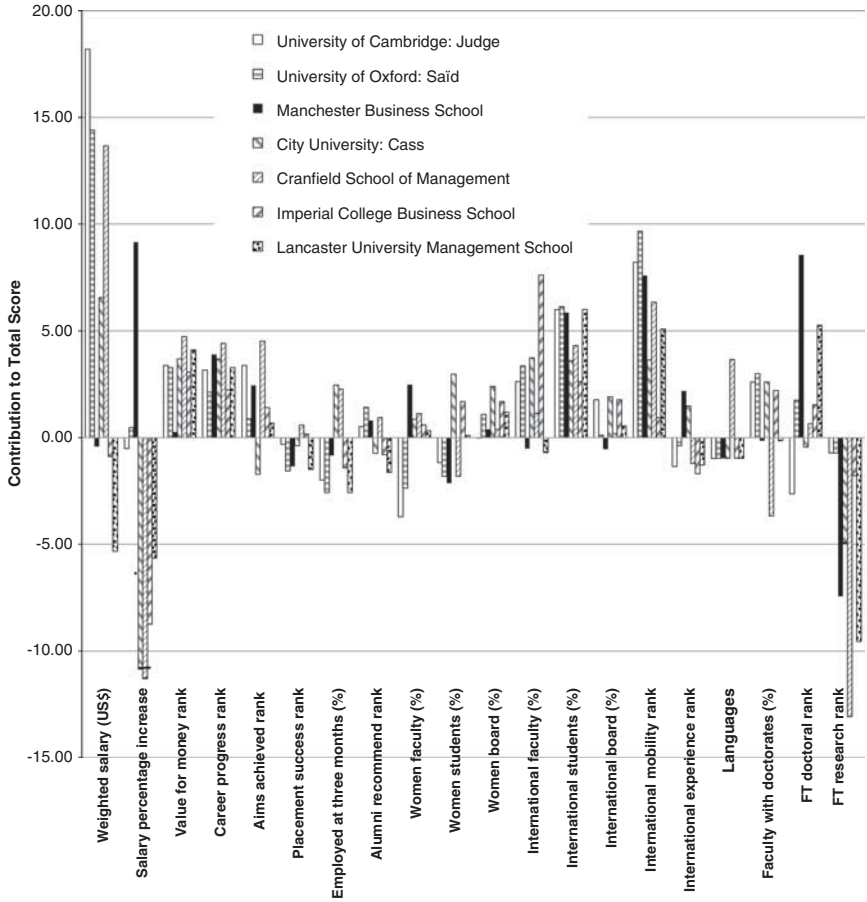

Figure 3: Comparative reconstructed contributions to Total Scores, MBA 2011 (the average score on each variable across all 100 schools is 0).

get a big boost from *weighted salary*. MBS does particularly well on *salary percentage increase* and *FT doctoral rank*. Cranfield is pulled down greatly by *salary percentage increase.* All do poorly on *FT research rank* (the FT uses a very limited list of journals to assess this).

As shown in Figure 4, for a selected set of top UK schools, the rankings can be very volatile from year to year (even though the variables and weights have not changed over the period shown). It is therefore useful to also examine changes in contributions over time.

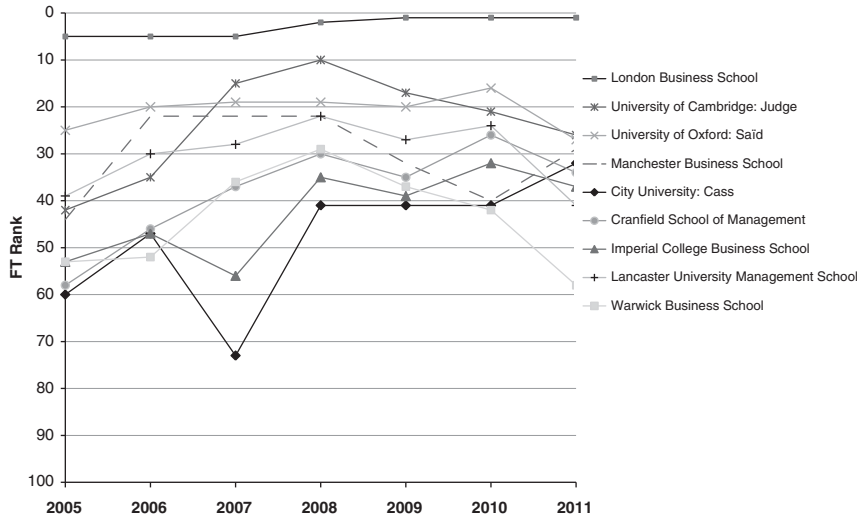

Figure 4: Selected MBA programme FT rankings, 2005–2011, showing volatility.

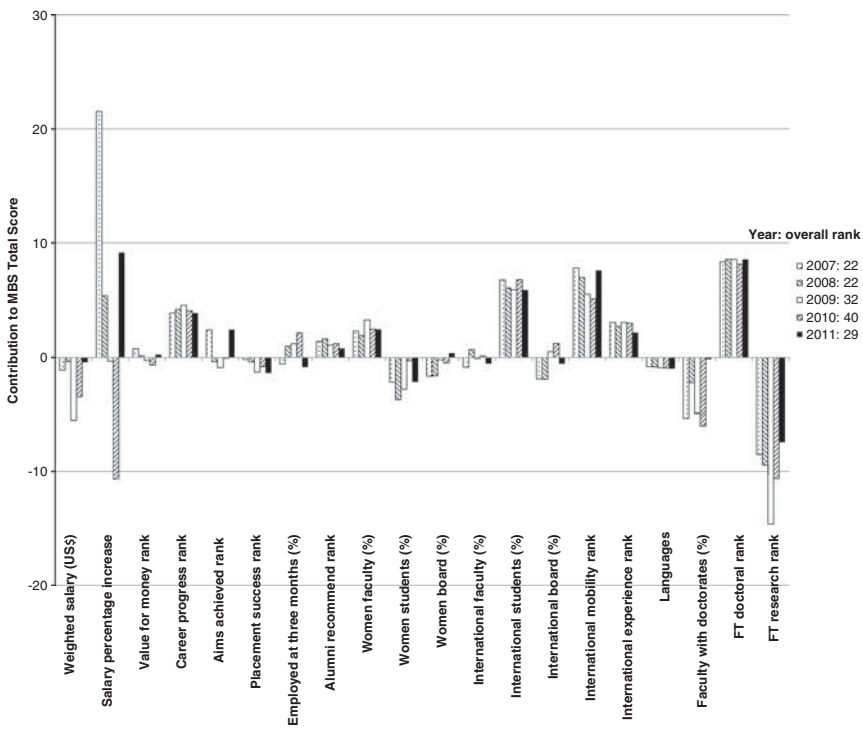

Figure 5: Reconstructed MBS Contributions, MBA 2007–2011.

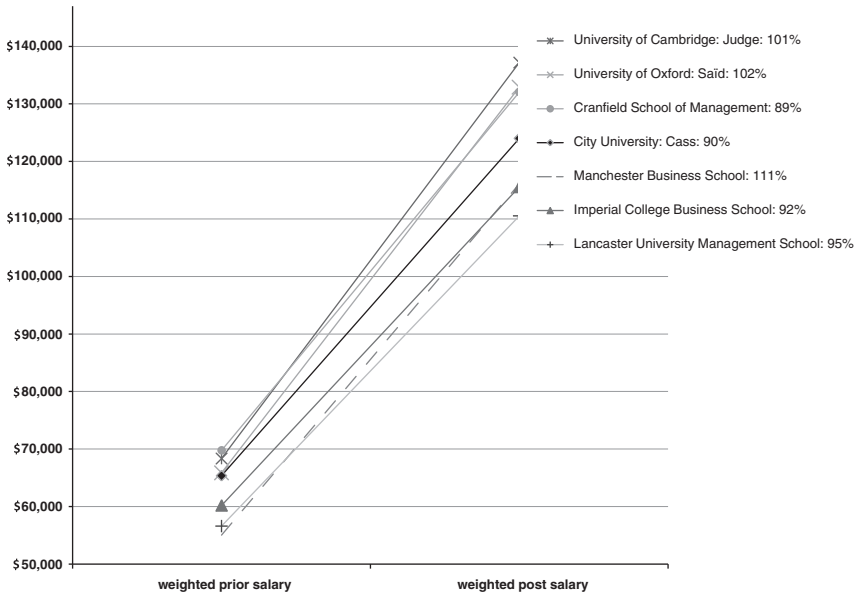

Figure 6: Comparison between schools on weighted post salary and salary per cent increase (the gradient of the line), MBA 2011.

Example: Manchester Business School

Figure 5 explores the contributions to MBS's Total Score over 5 years. The most volatile element is *salary percentage increase*: the ratio of the salary 3 years after graduation to the salary before MBA. The movement of around 35 points from 2008 to 2010 translates to about 22 places in the ranking (see Figure 1) from this variable alone.

Figure 6 shows a comparison between leading UK business schools (excluding LBS) on the two main variables (20 per cent of the weight each): average 3-year post-MBA *weighted salary* and *salary per cent increase*. These are, of course, related to each other. For the 2011 ranking, MBS's very high *salary per cent increase* arises from a relatively low average prior salary to a greater extent than to high post-MBA salary.

The Z-scores of *salary percentage increase* reveal that every extra percentage point adds roughly one point to the Total Score, which, as shown on Figure 1, is worth about 1/2 a place in the rankings. The large change in *salary percentage increase* from 2010 (91 per cent) to 2011 (111 per cent) thus equates closely to the ranking change (11 places).

The reconstruction can be used for 'what-if?' investigations. For example, forthcoming changes in the data submitted by a school about its own

characteristics (as opposed to that from alumni). The magnitude of changes in these data are generally very marginal, equating to only one or two rank places at most, although we have found that the data return for *faculty with doctorates* can have a bigger impact (see Figure 5).

What more major strategic or tactical responses *might* there be to information such as this? Figures 5 and 6 show the potential to benefit from enrolling students earning a little less relative to other schools, but who have the potential to benefit from the programme to catch up with or overtake (in salary terms) students at other schools. Thus, a response could be attempting to spot and attract such 'high-potential-but-underpaid' candidates.

Another could be geographical targeting. The FT (*Financial Times*, 2011) notes substantially higher PPP earnings among MBA alumni working in Latin America and the Far East than in Europe or North America. (One possible contributory factor might be salary structures and differentials in these regions.) Whatever the cause, recruiting students who will work in these relatively high-reward regions would appear to be of benefit.

Of course there could be dangers. Dysfunctional responses to rankings were noted in the Introduction. For example, the impact of the prior experience that students bring and the make-up and balance of the class on the programme must be considered.

Value for researchers

Several authors have noted indications of higher volatility (year-to-year rank changes) away from the top and bottom of the rankings table. Dichev (2008) hypothesised that the presentation of ranks (so ordinal data) in league tables disguises an underlying 'bell-shaped curve' of quality, with one consequence being that as scores are more spread out towards the top end it would be progressively more difficult for a school to move higher up the rankings. The 'S' shape in Figure 1 suggests this, and it is shown clearly in the histogram in Figure 7, with the reconstructed total scores clustering towards the centre of the range. Although the distribution is skewed to the right, it was noted earlier that there are eight schools 'censored' from the extreme bottom (left) end of the distribution, having total scores below the lowest of the top 100 schools (that is, lower than about -91). The very large number of schools in the range 0 to -50 points (approximately ranks 45–85) means that here small changes in total score correspond to large changes in rank. Therefore, in this range it is easier to rise (or fall) and also schools are subject to higher volatility. There is also a lower certainty in reconstruction, as also shown in Figures 1 and 2.

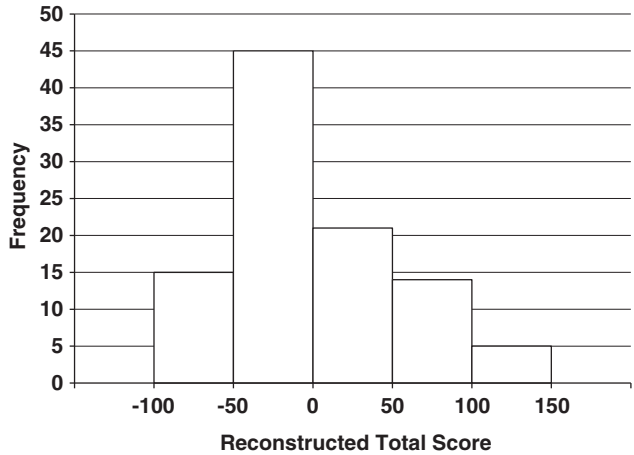

Figure 7: Distribution of reconstructed MBA total scores, 2011: a (skewed) bell-shaped curve of quality.

Discussion

Although it must be remembered that the main goal of a commercial media organisation is to generate readership (and thus lead to higher revenues), several of the league tables they publish are perceived by business schools to be very influential on their own direct and indirect sources of revenue: prospective students, recruiters and clients. In particular, the FT's suite of rankings is both prominent and fairly comprehensive.

This article has demonstrated that the FT provides sufficient data and information about their methodology to make it possible to reconstruct the rankings of programme areas to a high degree of accuracy. (N.b. as before publication a school only has access to the data it provides about itself, less than half the total weight for only 1 of the 100+ schools, *forecasting* is not a possibility.)

The process of reconstruction enables the contributions to the results to be investigated. Areas of (perceived) strength and weakness relative to other schools become clear, as do changes from year to year. This information can facilitate discussions between school managers about tactical development and marketing of programmes. The underlying quantitative data are also of potential use to researchers looking for patterns or to test hypotheses with as powerful (but robust) statistical tools as possible.

For further discussion see Part (ii).

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