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The Returns to an MBA Degree: The Impact of Programme Attributes

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ABSTRACT

This paper explores the impact of various MBA programme attributes on the average post-MBA salary of graduates, contributing to the literature on the returns to an MBA degree, which to date, has focused predominantly on the impact of individual student traits. The analysis uses a new panel dataset, comprising MBA programmes from across the world. Results indicate that pre-MBA salary and quality rank of programme are key determinants of post-MBA salary.

KEYWORDS

MBA; Returns to education; programme characteristics

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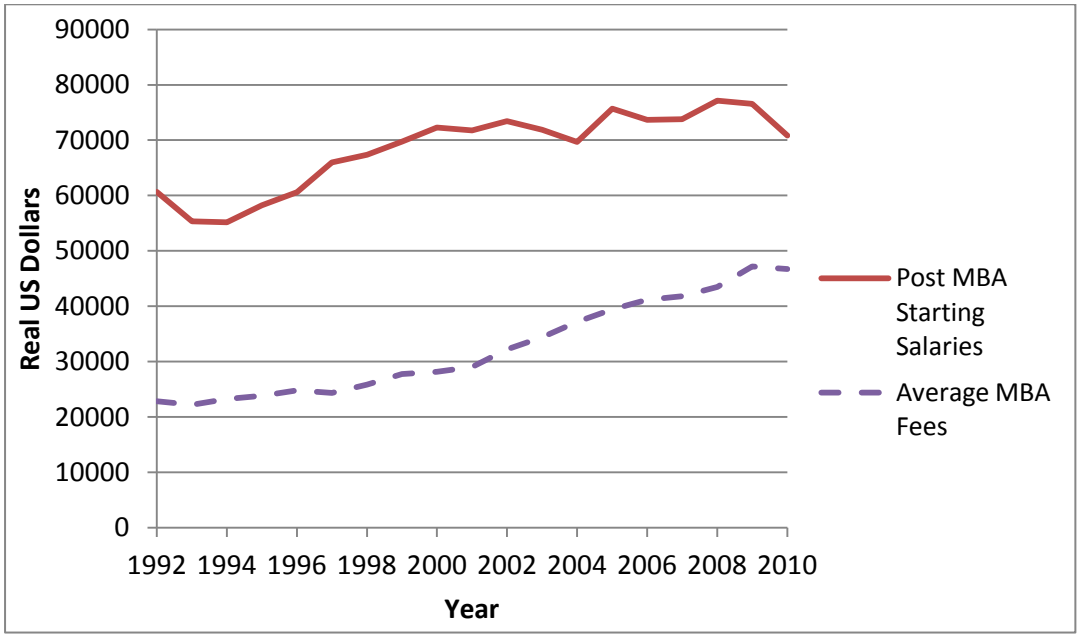
I. INTRODUCTION AND LITERATURE REVIEW

This paper explores the impact of various MBA programme attributes on the average post-MBA salary of graduates. Studies of the salary returns to a full-time MBA qualification are particularly valuable, given not only the premium fees typically associated with these programmes, but also the opportunity cost of not working while studying for the degree. However, the business education sector currently faces challenges, at least partly reflecting the difficult international macroeconomic environment of recent years. Hence, as Figure 1 suggests, there has been some decline in real post-MBA starting salaries, despite rising full-time MBA real fees.

FIGURE 1: AVERAGE REAL POST-MBA STARTING SALARIES AND MBA FEES



Source: Which MBA Guides (1992-2010)

An extensive economics literature considers factors determining the returns to various levels of education, including a number of papers focusing on the factors influencing returns to an MBA degree, stretching back to Reder (1978). Tracy and Waldfogel (1997) use regression analysis to determine the impact of student cohort characteristics and the ratio of acceptances

to applications on post-MBA average salaries which they then use to determine the value-added of an MBA at a particular institution. These value-added figures are then used to derive an alternative to published MBA programme rankings. The present paper innovates relative to Tracy and Waldfogel (1997) by employing a wider range of covariates, and by using a panel of both US and non-US universities. This not only enables us to control for unobserved university fixed effects, but also to compare results between US and non-US universities.

More recently, Arcidiacono et al. (2008) and Grove and Hussey (2011a) estimate the financial returns of an MBA, with Grove and Hussey (2011b) considering school and individual factors impacting on returns to an MBA. However, to date the recent literature focuses predominantly on the impact of individual student characteristics. Although Grove and Hussey (2011b) and Hussey (2011) consider some programme factors, their analysis of such factors is limited to the type of MBA undertaken, i.e. full-time; part-time; executive; programme specialisms; and whether a programme is in the top 10 or 25 US News rankings. The present paper examines the impact on post-MBA salaries of a much broader range of programme variables, and also considers full ranking information provided in The Which MBA Guides. To date other literature on the impact of rankings on education markets has instead focused predominantly on the impact of published rankings on application decisions, see Griffith and Rask (2007), Bowman and Bastedo (2009). A separate literature focuses on the differential between male and female post-MBA salaries, for example see Graddy and Pistaferri (2000), Montgomery and Powell (2003). The present paper also speaks towards these literatures, albeit not in as great a detail as in previous work.

The lack of attention to the impact of programme characteristics may partly reflect a paucity of data; the only recent data used to date being individual alumnus survey data collated by the Graduate Management Admissions Council (GMAC). Results below use data from a newly constructed dataset, using institution level data from the Which MBA Guide. Whilst the use of institution level data means that we lose some of the richness of the individual level data from GMAC, our dataset provides information on variables such as university and programme accreditations, as well as published programme rankings. Our results are likely to be of value not only to prospective students when considering an MBA programme, but also to university policy makers. Results shed light on the determinants of post-MBA starting salaries, but also the programme attributes that maybe do not have the impact expected.

The next section describes the dataset collated and econometric methodology employed. Section III describes the results, with conclusions offered in Section IV.

II. DATA AND METHODOLOGY

Data are from successive editions of the Which MBA Guide, published by The Economist. This annual publication contains information on MBA programmes, increasingly from countries across the world, although earlier editions focused on US and European programmes. The Appendix lists the number of observations in each country in our sample. Some data in the Guide are collected directly from each institution, for example data on fees, staff and student numbers, and accreditations. Accreditations from each of the three main business school accreditation bodies are included: AACSB (Association to Advance Collegiate Schools of Business), EQUIS (European Quality Improvement System), and AMBA (Association of MBAs). Although EQUIS is a European body, EQUIS accreditation is not restricted to European schools. Since 1993, alumni have also been surveyed for The Which MBA Guide, scoring their programme, faculty, facilities, careers services and peers, each out of a maximum of five. Aggregated responses are reported, allowing us to use variables that reflect alumni views of the programmes undertaken.

The Which MBA Guide has also produced an overall ranking of the top MBA programmes since the 2002 edition of the Guide. The ranking is constructed from a weighted average of the current and previous two years' data (the weights are 50 percent for the current year, 30 percent for the year before, and 20 percent for two years before) to reduce the volatility in the rankings. It consists of 21 components; Ridgers (2009) has details of the construction of the overall ranking. Other high profile MBA programme rankings exist, for example The Financial Times, US News and World Report and Business Week rankings. Using the 2010 rankings of each of the four publications, the correlation between each pair of rankings was never lower than 0.73, suggesting confidence in the Which MBA Guide rankings used. Further, it can be argued that even if a particular publication is not read, students and potential employers are likely to have some awareness of a university's approximate position in the rankings as programme publicity often draws attention to rankings obtained, and newly published rankings are widely reported in the news media.

All monetary values are converted into US dollars in real terms using the year-average exchange rates obtained from the International Financial Statistics of the International

Monetary Fund (IMF) and the Consumer Price Index of each country obtained from the World Economic Outlook database of the IMF.

TABLE 1: DESCRIPTIVE STATISTICS

Variable	US Sample N = 311		Non-US Sample N = 295		p-value equal means
	Mean	Std. Dev.	Mean	Std. Dev.	
Post-MBA salary	71329	8834	80281	24898	0.000
Average age	27.76	0.948	29.67	1.712	0.000
Work experience	4.610	0.766	6.325	1.711	0.000
Average GMAT score	668	3.27	635	3.70	0.000
Which MBA rank	45.5	27.3	53.8	29.2	0.000
Pre-MBA salary	44499	9524	49100	17664	0.000
% Women students	0.303	0.053	0.315	0.090	0.058
% Foreign students	0.374	0.140	0.682	0.208	0.000
AACSB	0.971	0.168	0.559	0.497	0.000
AMBA	0.019	0.138	0.742	0.438	0.000
EQUIS	0.051	0.221	0.756	0.430	0.000
% faculty with PhD	0.937	0.084	0.883	0.126	0.000
Faculty per student	0.593	0.417	0.899	0.676	0.000
Alumni faculty evaluation	4.443	0.196	4.163	0.247	0.000
Alumni facilities evaluation	4.343	0.260	4.173	0.348	0.000
Alumni careers service evaluation	3.748	0.418	3.451	0.449	0.000
Alumni programme evaluation	4.292	0.218	4.156	0.249	0.000
Alumni peers evaluation	4.298	0.307	4.121	0.321	0.000

Note: p-value equal means is the p-value of a two-tailed t-test for the equality of means between the US and non-US samples. The mean values of AACSB, AMBA and EQUIS refer to the fraction of institutions which have these accreditations. All alumni evaluations are on a 5-point scale.

The sample is an unbalanced panel, covering seven years from 2004 to 2010 and a maximum of 606 observations from 115 universities, with 311 observations from 52 universities in a sample restricted to US universities. Table 1 provides basic descriptive statistics, dividing the sample into US and non-US programmes. As the data are from the Which MBA Guide, observations relate to MBA programmes identified by that publication as the best quality MBA programmes, which since 2002, the guide ranks as amongst the top 100 in the world. Except for the percentage of women students, there are statistically significant differences between US and non-US programmes in all variables at the 5 percent level. Compared to non-US universities, US universities occupy lower ranks in the Which MBA Guide (indicating higher quality), and have younger students with higher average GMAT scores and

fewer years of work experience. Both pre- and post-MBA salaries are lower for students from US programmes than from non-US programmes.

We estimate Mincer (1974) type equations of the natural log of post-MBA salaries as a function of pre-MBA salaries, age, work experience, average GMAT score, the rank of the MBA programme, and other covariates. Pre-MBA salaries, age, work experience, and the average GMAT score capture the human capital of MBA holders; in particular, the inclusion of pre-MBA salaries helps to capture aspects of workplace ability that are not captured by measures such as GMAT scores. Apart from age and work experience, all non-dichotomous explanatory variables are in natural logs. Squared age and work experience variables were initially included in regressions, however the coefficients on these squared variables were never found to be significantly different from zero, and so were dropped from the analysis.

Since the dataset is a panel, we use fixed-effects estimation including a full set of year and programme fixed effects, so the coefficients are estimated based on changes in the variables over time within each programme, and all time-invariant programme-specific effects are swept out by the fixed effects.

III. RESULTS

1. *Main Results*

Table 2 presents the results for all universities in the sample[3]. Column (1) reports the baseline specification; column (2) adds additional student characteristics, column (3) adds professional accreditation, column (4) adds faculty characteristics, column (5) adds alumni evaluations, and column (6) includes all covariates. As expected, higher post-MBA salaries are associated with higher pre-MBA salaries and having attended a lower ranked (higher quality) university, while it may pay to study for an MBA at a younger age[4]. Of particular note are the variables that do not seem to impact significantly on the financial returns to an MBA degree. These include the average GMAT scores of students and the extent of previous work experience, both factors that might have been expected to have a significant impact.

[3] Results are very similar if we estimate the model with a consistent sample across specifications.
[4] Although age and work experience are highly correlated (correlation > 0.8), including both variables separately does not change the results. Including age and work experience in natural logs yields weaker results compared to those reported.

TABLE 2: REGRESSION RESULTS

Dependent Variable	Ln(Post-MBA salary)					
	(1)	(2)	(3)	(4)	(5)	(6)
Average age	-0.012	-0.012	-0.012	-0.012	-0.013	-0.014
	(0.006)*	(0.007)*	(0.006)*	(0.006)**	(0.006)**	(0.005)**
Work experience	0.004	0.004	0.004	0.007	0.007	0.008
	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)
Ln(average GMAT score)	0.260	0.261	0.265	0.254	0.261	0.258
	(0.316)	(0.321)	(0.319)	(0.307)	(0.263)	(0.266)
Ln(Which MBA rank)	-0.082	-0.082	-0.083	-0.092	-0.103	-0.104
	(0.017)***	(0.017)***	(0.017)***	(0.019)***	(0.019)***	(0.021)***
Ln(pre-MBA salary)	0.347	0.349	0.344	0.350	0.351	0.349
	(0.056)***	(0.056)***	(0.056)***	(0.053)***	(0.052)***	(0.050)***
Ln(% female students)		0.002				0.013
		(0.025)				(0.022)
Ln(% foreign students)		0.016				0.010
		(0.016)				(0.015)
AACSB			0.002			0.002
			(0.039)			(0.041)
AMBA			-0.066			-0.089
			(0.093)			(0.080)
EQUIS			0.003			0.011
			(0.029)			(0.026)
Ln(% faculty with PhD)				0.022		0.032
				(0.042)		(0.044)
Ln(Alumni faculty evaluation)				-0.590		-0.424
				(0.178)***		(0.248)*
Ln(faculty per student)				-0.003		-0.005
				(0.015)		(0.015)
Ln(Alumni facilities evaluation)					-0.266	-0.205
					(0.149)*	(0.151)
Ln(Alumni careers service evaluation)					-0.215	-0.222
					(0.082)**	(0.083)***
Ln(Alumni programme evaluation)					-0.092	0.163
					(0.220)	(0.275)
Ln(Alumni peers evaluation)					0.048	0.079
					(0.209)	(0.202)
R^2	0.41	0.41	0.41	0.43	0.45	0.46
N	606	601	606	603	606	598

Notes:* significant at 10%; ** significant at 5%; *** significant at 1%. Heteroskedastic-robust standard errors reported in parentheses. All regressions include university and year fixed effects.

The accreditations of a university (AACSB and EQUIS) and an MBA programme (AMBA) are also not found to have a significant impact on post-MBA salaries, despite being considered signals of quality. We offer two, related, possible explanations for the non-significance of professional accreditation. First, universities only rarely change accreditation status (this occurs for less than 4 percent of the sample), so the fixed effects estimates may be unable to recover the coefficients associated with these variables. This is partly because the professional bodies accredit a university or MBA programme for periods of over a year: five years in the case of AACSB, three or five years in the case of EQUIS, and one, three or five years in the case of AMBA. Second, we speculate that these potential quality signals may be more important to applicants, students and academics than potential employers. By focusing on top ranking MBA programmes across the world, many of the universities in the dataset have the accreditations and so little impact of the accreditations can be detected. The value of university careers services is also questioned as there may be a significant, negative relationship between alumni evaluations of careers services and post-MBA salaries.

Table 3 shows that dividing the sample to US and non-US universities yields additional results. Most significantly, the negative relationship between alumni perceptions of careers services and post-MBA salaries holds only for the non-US sample. It may be that the older students in this sample may already have wider business networks and so have less need for careers services. University ranks and pre-MBA salaries continue to be highly significant predictors of post-MBA salaries in both US and non-US samples, although both variables have larger effects for non-US universities than for US universities.

TABLE 3: US AND NON-US UNIVERSITIES

	(1) US sample	(2) Non-US sample
Dependent Variable	Ln(post-MBA salary)	
Average age	-0.001	-0.015
	(0.005)	(0.009)*
Work experience	0.012	0.011
	(0.007)	(0.011)
Ln(average GMAT score)	0.138	0.295
	(0.210)	(0.261)
Ln(Which MBA rank)	-0.022	-0.164
	(0.010)**	(0.032)***
Ln(pre-MBA salary)	0.068	0.455
	(0.031)**	(0.046)***
Ln(% female students)	0.036	0.003
	(0.020)*	(0.026)
Ln(% foreign students)	0.005	-0.026
	(0.009)	(0.029)
AACSB	-0.201	0.041
	(0.021)***	(0.034)
AMBA	0.048	-0.080
	(0.019)**	(0.073)
EQUIS	0.002	-0.006
	(0.016)	(0.037)
Ln(% faculty with PhD)	0.000	0.063
	(0.017)	(0.093)
Ln(Alumni faculty evaluation)	-0.204	-0.137
	(0.253)	(0.348)
Ln(faculty per student)	0.003	-0.008
	(0.011)	(0.021)
Ln(Alumni facilities evaluation)	0.053	-0.319
	(0.090)	(0.189)*
Ln(Alumni careers service evaluation)	-0.045	-0.306
	(0.054)	(0.104)***
Ln(Alumni programme evaluation)	-0.020	-0.023
	(0.232)	(0.352)
Ln(Alumni peers evaluation)	0.173	0.070
	(0.123)	(0.231)
R^2	0.35	0.63
N	308	290

Notes:* significant at 10%; ** significant at 5%; *** significant at 1%. Heteroskedastic-robust standard errors reported in parentheses. All regressions include university and year fixed effects.

2. *Robustness Checks*

It was hypothesised that employers may offer higher salaries to graduates from high ranking programmes, paying less attention to the particular rank of a programme. Hence in line with the approach used by Grove and Hussey (2011a), the regressions were rerun instead using dummy variables to indicate whether an institution was ranked 1-10, or 11-25 in the Which MBA guide. We found results that were similar to those reported in Tables 2 and 3. We were also concerned about possible effects of the international economic downturn on the analysis. As such, the analysis above was repeated, comparing results for the full sample, US and non-US subsamples, when the data are divided into 2004-2007 and 2008-2010 periods. Again, results remained comparable to those reported in Tables 2 and 3.[5]

A possible explanation for the lack of significant coefficient estimates in Tables 2 and 3 above is that some of the variables are collinear. This is a particular concern as the overall ranking of a programme reflects to differing extents many of the programme characteristics that we include as explanatory variables, while accreditations as well as rankings are signals of quality. Correlations are especially high among the alumni evaluations of various programme characteristics, exceeding 0.6 in many cases. Including only one alumni evaluation in the regression shows that the included alumni evaluation is always significantly negative (results suppressed for brevity). That is, regardless of which alumni evaluation is considered, better alumni evaluation is always associated with lower post-MBA salaries. This perhaps suggests that students trade off a good experience whilst on an MBA programme with lower post-MBA salaries. What the results in Tables 2 and 3 also show is that, despite the high correlation across alumni evaluations, it is the negative evaluation of careers services that has the largest independent effect on post-MBA salaries.

[5] Results withheld for the sake of brevity but of course available on request.

TABLE 4: ROBUSTNESS CHECKS

Dependent Variable	Ln(post-MBA salary)			
	(1)	(2)	(3)	(4)
Average age	-0.013	-0.013	-0.011	-0.058
	(0.006)**	(0.006)**	(0.006)*	(0.052)
Work experience	0.008	0.004	0.011	0.074
	(0.007)	(0.010)	(0.008)	(0.051)
Ln(average GMAT score)	0.253	0.464	0.279	-2.639
	(0.264)	(0.356)	(0.333)	(1.273)**
Ln(Which MBA rank)	-0.102	-0.100		-0.467
	(0.020)***	(0.022)***		(0.090)***
Ln(pre-MBA salary)	0.352		0.350	0.379
	(0.051)***		(0.057)***	(0.287)
Ln(% female students)	0.007	-0.010	0.011	-0.002
	(0.024)	(0.032)	(0.029)	(0.023)
Ln(% foreign students)	0.010	-0.002	0.011	0.012
	(0.015)	(0.022)	(0.016)	(0.014)
Ln(% faculty with PhD)	0.028	0.002	0.067	0.031
	(0.041)	(0.054)	(0.045)	(0.037)
Ln(Alumni faculty evaluation)	-0.403	-0.569	-0.398	-0.345
	(0.246)	(0.261)**	(0.290)	(0.227)
Ln(faculty per student)	-0.005	-0.010	-0.002	-0.008
	(0.015)	(0.020)	(0.017)	(0.014)
Ln(Alumni facilities evaluation)	-0.192	-0.201	-0.113	-0.185
	(0.148)	(0.162)	(0.174)	(0.129)
Ln(Alumni careers service evaluation)	-0.222	-0.223	-0.144	-17.057
	(0.083)***	(0.117)*	(0.089)	(8.149)**
Ln(Alumni programme evaluation)	0.147	0.340	0.173	0.161
	(0.270)	(0.358)	(0.325)	(0.196)
Ln(Alumni peers evaluation)	0.073	0.142	0.140	0.044
	(0.209)	(0.277)	(0.231)	(0.192)
Rank*careers				0.272
				(0.065)***
Pre-MBA salary * careers				-0.029
				(0.243)
Age * careers				0.036
				(0.042)
Work experience * careers				-0.055
				(0.040)
GMAT * careers				2.386
				(1.053)**
US dummy * careers				-0.014
				(0.151)
R^2	0.46	0.23	0.37	0.50
N	598	598	598	598

Notes:* significant at 10%; ** significant at 5%; *** significant at 1%. Heteroskedastic-robust standard errors reported in parentheses. All regressions include university and year fixed effects.

Our inclusion of pre-MBA salaries as an explanatory variable is an important innovation, as it controls for other unobserved characteristics of students in MBA programmes, which may be correlated with workplace performance and hence salaries. Pre-MBA salaries and the Which MBA rank always have highly positive and significant effects on post-MBA salaries. Therefore, one additional sensitivity check we perform is to estimate the model sequentially omitting each of these variables, to check if the omission leads to omitted variable bias in the results. Table 4 reports regression results for the full sample, dropping the accreditation variables. Column (1) reports the analogue to column (6) of Table 2; dropping the accreditation variables has no appreciable impact on the results. Columns (2) and (3) drop pre-MBA salaries and the Which MBA rank, respectively. Once again this does not change the results, suggesting that, whilst these variables are important determinants of post-MBA salaries, they are not highly correlated with other explanatory variables in the model.

The result that for non-US programmes at least, careers services, as evaluated by alumni have a negative, significant impact on post-MBA salaries remains curious[6]. Consequently, the final column of Table 4 replicates the model in column (1), including a set of interaction terms of the alumni careers score with the Which MBA rank, pre-MBA salary, average student age, work experience, GMAT score, and a dummy variable for whether the university is in the US or not. Some interesting results emerge. While institutions with lower alumni evaluations of careers services are still associated with higher post-MBA salaries, the positive, significant coefficient on the rank and careers interaction variable suggests that at higher ranked (lower quality) institutions, better careers services have a less-negative effect on post-MBA salaries (the sum of the coefficients on careers services and on the interaction term is still negative). Further, GMAT scores and careers services can be considered complementary goods. The interaction between the US dummy and careers services is not significant, suggesting that the difference between US and non-US institutions in the effect of careers services is a result of differences in their Which MBA ranks and their students' GMAT scores.

A final concern was possible measurement error in the pre-MBA salaries, which may result in attenuation bias in the corresponding coefficient[7]. Experimenting with reverse regressions and comparing first-differences with fixed effects estimates (Hausman (2001), Grilliches and

[6] Alumni evaluations of career services may be endogenous to post-MBA wages, since graduates who get high-paying jobs may then view the careers services favourably. However, this potential endogeneity should bias the results against obtaining a negative coefficient on the alumni evaluations of careers services, so if anything the results are a lower bound on the negative effect of alumni evaluations of careers services on post-MBA salaries.
[7] Measurement error in post-MBA salaries would inflate the standard error of the estimates but will not bias the coefficients.

Hausman (1986)) suggested that measurement error may indeed be present in the data. In light of this (and without any good instruments in our data) our results may be viewed as a lower bound on the effect of pre-MBA salaries on post-MBA ones.

IV. CONCLUSIONS

The MBA degree is unusual, not only because it is primarily aimed at post-experience students, but also because of its explicit focus on the business world. Because of this business orientation, the MBA is perhaps the university degree for which the question of economic returns is the most appropriate. Whilst the economic returns to other degrees can be calculated, it may be more difficult to calculate the other, intangible returns to other types of degrees, whereas such concerns are much less important in the context of MBAs.

This paper explores the programme attributes impacting on the financial returns to an MBA, using a unique and much more extensive panel dataset than has previously been used of programme characteristics from an international sample of universities. Results indicate that pre-MBA salary and quality of programme as measured by Which MBA Guide rankings are key determinants of post-MBA salary. There is also some evidence that it pays to undertake a full-time MBA at a younger age, and in line with this result, the length of previous work experience of students, as well as better GMAT scores, have no bearing on post-MBA salaries. These results highlight which human capital variables impact on post-MBA salaries. Interestingly, professional accreditations and alumni evaluations of faculty, facilities and programme undertaken are found to have no significant impact on post-MBA salaries, and careers services, as evaluated by alumni, may have a negative impact on post-MBA salaries. Hence, not all potential signals of MBA programme quality affect post-MBA salaries.

APPENDIX: LIST OF UNIVERSITIES BY COUNTRY

Country	Observations	Universities
Australia	11	5
Belgium	9	2
Canada	22	8
China	4	1
Denmark	1	1
France	32	8
Germany	3	1
Hong Kong	16	3
Ireland	6	1
Italy	7	1
Japan	7	1
Mexico	3	1
Monaco	7	1
Netherlands	19	3
New Zealand	2	1
Singapore	12	2
Spain	25	4
Switzerland	7	1
UK	102	18
US	311	52
Total	606	115

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