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SIGNALING AND SKILLS: THE VALUE OF AN MBA

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Costs associated with post graduate education include both accounting (tuition and fees), and economic (opportunity cost of lost income) categories. Benefits can include, but are not limited to, higher income, higher income growth, reduced unemployment, and improved skills. One method used to estimate the value of a degree is to calculate the present discounted value of expected future wages less the cost of tuition and foregone wages. Previous literature has modeled increased wages as a result of improved skills and as a result of signaling. Drawing on salary and demographic data for recent MBA graduates from the Graduate Management Admissions Council[1], I estimate the value of an MBA degree that arises from improved skills and the value that accrues from signaling.

JEL classifications: J24, J32, I20
Keywords: education, foregone income, wages, human capital, signaling

[1] The Graduate Management Admissions Council is also referred to as GMAC throughout paper.

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I. Introduction

The purpose of this paper is to estimate how much of the value of an MBA is due to improved skills and how much is due to signaling. Using data from the 2007 GMAC Global MBA Graduate Survey Questionnaire, I measure the difference between wages before and after an individual receives an MBA degree. Skills an individual learns via education can be considered human capital. Studies based on human capital theory, such as Mincer (1958), Becker (1962), Schultz (1967), Pfeffer (1977), find that an additional year of schooling results in increased skill levels and therefore higher wages. Studies based on signaling theory assume that students' skill sets are unaffected by higher education and so the value of a degree lies in the fact that it is a credible signal of the student's abilities.

To obtain separate estimates of the signaling and human capital values of an MBA, I separate GMAC survey respondents into three groups. Group A consists of individuals who do not receive employer tuition contributions and work for a new employer upon graduation. Group B consists of individuals who do not receive employer tuition contributions and continue working for their previous employer upon graduation. Group C consists of individuals who receive employer tuition contributions and continue working for their previous employer upon graduation. Assuming employers are rational profit maximizers, the average increase in compensation for Group B should be larger than the average increase in compensation for Group C by the average employer tuition contribution. Assuming that employees do not need to signal to employers for whom they are already working, the average increase in compensation for Group A should be larger than

the average increase in compensation for Group B by the average signaling value of the MBA. By comparing the changes in wages for the three groups, I am able to verify that I have represented the groups correctly.

Previous research suggests that human capital and signaling theories conflict. I develop a model that allows for the effects of both theories to have simultaneous impacts. I also find the magnitude by which each of these theoretical impacts affect the value of an MBA. Therefore, by attaining an MBA degree, an individual can signal his innate capabilities and also increase his skills and knowledge.

II. Literature Review

Mincer (1958) develops a model to estimate the difference between an individual's lifetime earnings profile based on education and age. He uses 1939-1949 income data provided by the Decennial Censuses of Population. By comparing the age-earnings profile of men with college degrees to those without, he finds that years of schooling has a positive influence on earnings. The age-earnings profile of men with college degrees increases more rapidly and decline more slowly after peak earnings than the lifetime earnings slope of less-educated men. Mincer finds that years of schooling positively influence earnings. Becker (1962) supports this finding by expressing that education imbeds resources, such as skills, into individuals. This is also known as investing in human capital.

However, personal preferences do have an effect on how much education an individual will choose to complete. Schultz (1961) states that there are three different classes of expenditures: expenditures that do satisfy consumer preferences

and in no way enhance capabilities; expenditures that do not satisfy consumer preferences but do enhance capabilities; and expenditures that both satisfy consumer preferences and also enhance capabilities. Individuals whose educational expenditures are of the third classification will have a lower cost and greater benefit to increased schooling.

Filer et al. (1996) further explains this idea using an example of two types of individuals. The two types are those who are naturally less productive, which he considers "dull," and those who are more productive, considered "bright." Dull workers will produce at an amount that would earn them wage W_0. Bright workers have innate characteristics that make them more productive, resulting in earning wage W_1. However, if the costs to schooling were equal for all, everyone would choose a level of schooling which leads to W_1. Instead, "dull" individuals suffer higher monetary and nonmonetary costs of schooling than those who are "bright." Therefore, as Weiss (1995) concludes, individuals choose lengths of schooling that equate their marginal costs of schooling to their marginal return of schooling.

In order to capture this relationship between schooling and wages, studies including human capital theory employ the Mincerian earnings equations. This model often includes demographic variables such as age, race, and gender, as well as variables to capture ability, such as test scores (Weiss 1995). Other studies include the evaluation of twins, similar to the one conducted by Ashenfelter and Kruger (1994). They hold ability constant by using a sample of 3000 sets of twins to determine the relationship between wages and education level. They follow the assumption that because the twins are from the same genetic build and family

background, they exhibit similar characteristics and abilities. Most other studies following the Mincerian earnings equation generate a proxy measurement of ability. Pfeffer (1977) uses GPA as a proxy for ability. He also includes socioeconomic background, self-employment, grades and test scores, and whether the individual occupies a line or staff position as variables in his study. He uses data from a state university from 1960 to 1974. Pfeffer finds that GPA has no effect on starting or current salaries.

Other studies, such as the one conducted by Norwood and Henneberry (2006) calculates employers' willingness to pay for certain student attributes, such as experience or extracurricular activities. They survey 339 employers and find that employers believe relevant internship experience is very important, while GPA and awards received are the least important attributes. Employers indicated that they will pay at least $6,000 for experience. Tsia (2010) uses the Mincerian earnings equation, and includes age, race, gender, marital status, and number of years worked. Using the Panel Study of Income Dynamics for the period 1979-2005, he finds that an individual who attends graduate school but has little to no work experience will make the same amount as an individual who maintains only a bachelor's degree. His finding further emphasizes the importance of work experience on an individual's wages.

Although most studies use wages to evaluate the value of an MBA, Baruch et al. (2001) evaluate the added value obtained from completion of an MBA program using a range of skills and individual attributes. The study uses a list of necessary skills based on qualities that former graduates and current colleagues with relevant

industry experience believe are needed for success in the workplace. Baruch et al. employ data from City University Business School in the United Kingdom. The survey respondents evaluate their need for certain skills in their current job and the extent to which the MBA program aided in the development of those skills. Twenty-five percent of respondents experienced rapid career development, as measure by promotion rate, upon their completion of the MBA program, which they attributed to the knowledge and skills gained. However, as stated by Schultz (1961), educational increases can also be reflected in the market place via increased wages and salaries. Schoenfeld (2008), using the 2007 Alumni Perspective data from the Global MBA Graduate Survey, found that 78% of MBA alumni believed that their MBA degrees were essential to obtaining their first jobs following graduation. This could be due to not only to the skills and knowledge they gained from the program, but also to the signal of the degree. Also, Schoenfeld finds that 68% of alumni believe that the financial reward from their MBA best represents the overall value of the degree.

Although years of schooling can enhance earnings by increasing marketable skills, Wolpin (1977) argues that a private monetary return may be "informationally based." Filer et al. (1999) states that more able workers use education as a signal in order to distinguish themselves from less productive workers. Spence (1973) furthers this idea by developing a theoretical model focused on signals and indices found in the job market. He describes signals as qualities an employee can alter, such as education, that relay information to employers. He describes indices as unchangeable characteristics, such as race, age, and gender. He states that an

employer uses a mixture of a potential employee's signals and indices to determine his wage. He finds that an individual will invest in more education if the cost of the signal is less than the corresponding increase in wages. This finding relies on the assumption that costs of a signal are negatively correlated with innate productive capability. Thus, signals indicate innate productive capability. Due to the presence of imperfect information, Stiglitz (1975) finds that employers must use a type of screen, such as signals, to determine employee wages. He also uses a theoretic model to show that individuals with higher levels of ability, such as intelligence or productivity, will have an incentive to identify themselves in order to receive higher wages. Based on signaling theory, Stiglitz finds that more productive workers will have higher wages.

Spence (1973) discovers that a feedback cycle may exist in the job market. For example, an employer hires individuals in year one. If those individuals meet the employer's expectations, wages will not decrease for individuals hired in year two with similar signals and indices, a phenomenon he labels "self-confirming". If individuals hired in year two do not meet expectations, individuals hired in year three with similar indices will experience lower wages. The feedback cycle indicates that an employer can determine employees' on-the-job productivity. Streb (2007) confirms this finding, stating that on-the-job interaction reveals workers' productivity to the employer.

However, human capital and signaling theory are often viewed as conflicting theories. Kroch and Sjoblom (1994) conduct a study to determine if human capital theory or signaling theory better estimates the value of education. Variables used

are earnings, years of schooling, schooling rank (relative to others born in the same year), age, sex, and race. In order to capture a schooling signal, a rank index is used. They argue that an employer uses an individual's education rank to determine his distribution of abilities relative to his peers. The study uses grade level to indicate the role human capital theory has in an individual's earnings. If the coefficient of rank is equal to zero, human capital theory is a better estimate of earnings. If the grade level coefficient is zero, Kroch and Sjoblom would conclude that signaling does occur.

They find that years of schooling consistently influences earnings positively, whereas rank gives mixed results. This indicates that the model supports human capital theory more than signaling theory. However, this study did not have a direct measure of work experience, an important variable in the theoretical earnings equation. Instead, the authors create a synthetic measure by assuming that once an individual leaves school, they gain experience during each consecutive year in the work force. Consequently, the coefficient on years of schooling is inflated and begins to favor the human capital theory outcome.

Arkes (1999) also uses the signaling model which assumes that employers cannot measure the ability and productivity of a candidate during the interview process and must use signals to judge the abilities of a candidate. He finds that an individual with a bachelor's degree will earn 21.1% higher earnings than an individual with the same amount of schooling and no degree. Signaling theory suggests that a bachelor's degree shows employers a candidate has a greater level of self-motivation and a greater academic ability than lower levels of education. Arkes

also states that in developing a signaling model, it is important to omit ability variables that the employer would not be able to observe during the interviewing process.

III. Methodology

A. Theoretical Model

I contribute to previous research by using a model that captures both the increased skills and signaling value of an MBA. Studies focused on human capital theory find that lifetime earnings increase as years of schooling increase. Signaling theory relies on an employer's detection of signals to develop an estimate of an individual's productivity and his appropriate wage. I assume that, based on human capital theory, skills increase via an MBA program. In addition, I hypothesize that the signal for all MBA students should be approximately equal.

My model will include variables such as age, gender, education level (MBA degree), work experience, MBA program type, and extracurricular activities. These variables allow me to accurately determine the net change in salary of MBA alumni that result from the signaling value and the learned skilled value of their degree.

Based on the findings from Pfeffer (1977) and Norwood and Henneberry (2006), as well as the lack of access to GPA data, it will not be included in my model. However, I will include work experience. In order to calculate value added I focus on monetary gains from completion of an MBA degree. I use the change in salary as the dependent variable in my study. I assume that, because signaling is used to indicate

an individual's productivity, once an individual is hired, the signaling value of their education, at any level, is not relevant to that employer.

I develop one model and test three groups of people in order to capture the signaling value and skills value of an MBA. Previous research mainly focuses on evaluating the relationship between salary and years of schooling. I focus on the change in salary individuals experience after completing their MBA degree. By using the change in salary, I am able to evaluate only the value added from their MBA. Following Arkes' (1999) methodology, I omit any ability measures in my model, aside from experience. I use the constant term to evaluate the change in salary for different groups of individuals. The change in salary includes different values for each different group. Group A will have a constant that represents the signaling and learned skills value of their MBA degree. Group B will have a constant that represents only the signal value of their degree. Group C will have a constant that represents signal value less the employer's cost of tuition. I use to constant because it captures this change in salary for each group after accounting for age, gender, experience, extracurricular activities, and program type.

Both Spence (1973) and Streb (1994), find that on-the-job interaction reveals an employee's productivity to their employers. According to signaling theory, education can be used as a signal of innate productivity or ability. This signal is used to help an employer combat imperfect information regarding potential employees' abilities and productivity. In order to capture this, I split the survey respondents into three main groups: A, B, and C. Group A consists of individuals who do not receive employer tuition contribution and work for a new employer upon

completion of the MBA program. Group B consists of individuals who do not receive employer tuition contribution and will continue to work for their previous employer. Group C consists of individuals who do receive tuition reimbursement and will continue to work for their previous employer. It is important to separate individuals based on tuition contribution because I assume that employers who contribute to an employee's tuition will recoup their investment costs, resulting in a smaller change in wage for the employee. I also assume that individuals who seek new employment will have wages that represent the skills and signaling value of an MBA whereas wages of those who remain with their previous employer represent only the skills value of an MBA.

B. Econometric Model

I estimate the following model:

$$\Delta Y_i = \alpha_i + \beta_1 g_i + \beta_2 a_i + \beta_3 n_i + \beta_4 l_i + \beta_5 p_i + \beta_6 s_i + \varepsilon_i \quad (1)$$

Table 1. Variable Definitions

ΔY_i	Change in salary for individual i
g_i	Gender of individual i, 1 if male, 0 female
a_i	Age^2 of individual i in t=2007
n_i	Years of experience of individual i in t=2007
l_i	Natural Log Experience of individual i in t=2007
p_i	MBA Program Type of individual i, 1 if traditional, 0 otherwise
s_i	Extracurricular Activities of individual i

C. Data

I use the Global MBA Graduate Survey Questionnaire data from 2007. I include the change in salary, gender, age^2, experience, the natural log of experience, program type, and a count of extracurricular activities. The survey consists of responses from 150 Universities with MBA programs. The total number of survey respondents in 2007 was 5,642. Students with job offers indicated the dollar value of their salary, both prior and post to MBA completion.

I test the model for multicollinearity and heteroskedasticity. There is evidence of multicollinearity between age, age^2, experience, and the natural log of experience. In order to correct for this, I drop age from the model. The mean variance inflation factor for the model that includes age is 22.83, whereas, it is only 3.15 after age is dropped. The model is also corrected for heteroskedasticity.

IV. Results and Analysis

The results of the ordinary least-squares regression model estimated using equation (1) appear in table 2.

Table 2. OLS Regression Results for three groups of individuals

$\Delta Y_i = \alpha_i + \beta_1 g_i + \beta_2 a_i + \beta_3 n_i + \beta_4 l_i + \beta_5 p_i + \beta_6 s_i + \varepsilon_i$			
Regressor	Group A	Group B	Group C
Constant	37641*** (4444)	22235*** (3822)	19905*** (2466)
g_i	1809* (1046)	2539 (2742)	4908*** (1490)
a_i	-12.02* (6.75)	-0.62 (4.00)	-2.18 (1.68)
n_i	-1166 (792)	-964 (1212)	-653 (639)
l_i	3989* (2056)	4988 (3793)	4383 (3036)
p_i	2912** (1220)	296 (3725)	-4556** (1596)
s_i	834*** (236)	1685** (693)	517 (415)
R^2	0.058	0.032	0.035
Observations	2168	279	622
* p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01			

OLS with Robust Heteroskedasticity-Corrected Standard Errors

Group A consists of individuals who do not receive employer tuition contribution and work for a new employer upon completion of the MBA program. Group B consists of individuals who do not receive employer tuition contribution

and will continue to work for their previous employer. Group C consists of individuals who do receive tuition reimbursement and will continue to work for their previous employer. As the results indicate, being a male positively influences wages by $1,800 when seeking a new employer. Being male also positively influences wages for those who maintain working for their current employer and also received tuition reimbursement. This indicates that out of all the men and women who complete their MBA, men tend to experience an initially higher change in salary.

Age negatively influences wages when seeking a new employer. This indicates that employers are willing to pay more for younger individuals when seeking new employees. This aligns with my expectations because younger people tend to require lower wages and have higher potential to develop into valuable employees. This may also indicate that older employees demand higher wages initially, therefore their earnings differential may be less than younger individuals who may be receiving a promotion.

The natural log of experience positively influences wages when seeking a new employer. This suggests that experience is important to employers; therefore, they are willing to pay more for those with higher levels. However, experience does not influence the change in wages for individuals who do not leave their previous employer. This may support the idea that employers take experience into account when first hired, but after doing so, it is no longer relevant.

Program Type is captured using a dummy variable. One represents individuals who completed a full time traditional MBA program; zero represents

individuals who participated in an executive, full time accelerated, part time program MBA program, or other. Program type is a significant indicator of the change in salary for individuals who are seeking new employment. Completion of a traditional two-year program positively influences the change in salary by almost $3,000. However, for individuals in group C, completing a traditional two-year MBA program negatively affects their change in salary by roughly $4,500.

Extracurricular activities positively influence wages for group A and C. However, extracurricular activities have a smaller impact on wages when an individual's seeks new employment. This may be due to the greater importance of other variables, such as experience, age, program type, skills, and signaling.

Overall, the model for group A has six significant variables, whereas group B only has two. I believe this accurately represents characteristics an employer takes into account when first hiring an individual. In the second model, the employee is continuing their employment contract; therefore, their initial wage offering would capture the importance of age, experience, and gender. Also, the employee program type should represent the current position they hold within the company. It may also represent a future change in position. This also supports the idea that employers initial wage offering will capture these variables, as well as the signaling value of a degree. It is important to recall that signaling value merely represents individual's innate characteristics, such as intelligence or motivation. Once working for an employer, these innate abilities will become apparent to the employer.

Therefore, individuals who maintain their employment contract after completing their degree will experience no signaling value of the MBA.[2]

To further illustrate this, refer to the table 3 below:

Table 3.

	Group A (No Support & New Employer)	Group B (No Support & Staying with Employer)	Group C (Support & Staying with employer)
Constant	37641 (4444)	22235 (3822)	19905 (2466)
Observations	2168	279	630

OLS with Robust Heteroskedasticity-Corrected Standard Errors

Group C includes individuals who receive employer contributions and are staying with their employer. Their change in salary represents the value of skills less the amount of employer contribution. The difference between the constant of group B and that of group C represents the amount of employer contribution for one year. In this case, it is 2330. This suggests the employer's cost of tuition is $2,330 a year. If an employee continues to work for an employer for eight years after completion of the program, the present value is roughly $17,113. The average employer tuition contribution is roughly $19,000.[3]

To find the value of the MBA to the employee we examine group A and B. Group A has a constant of $37,641. This value represents both the learned skills and signaling value of an MBA. Group B has a constant of $22,235. This value represents

[2] The adjusted in this model are not surprising. Previous studies use wages as the dependent variable, whereas I use the change in wages. I also conducted the same models as listed in table 2 using wages as the dependent variable. The adjusted for each model is consistent with studies conducted by Pfeffer (.16) and Tsai (.34). These results are displayed in appendix 1.

[3] The average national tenure in 2008 for individuals between 25-65+ years old is 8 years. The present value of the tuition investment uses a real WACC value of 8.45%. Average contribution is calculated using the mean contribution amount after accounting for the 2007 corporate income tax rate of 35%. This is used because it represents the amount the company could have spent the money on other investments. Refer to appendix 4 for references.

only the learned skills value of an MBA. The difference between the constant values of Group A and Group B is $15,405. This represents the signaling value of an MBA degree. I use the constant to capture this relationship because it represents the change in salary after filtering for effects of age, gender, experience, MBA program type, and extracurricular activities.

In order to determine the present value of an MBA, I assume that an individual will continue to work for their employer for 37 years. I assume this length of time based on the average age in the survey (30) and the retirement age (67). I also assume these individuals will not receive any promotions in the 37 year span. The market rate used is 2.69%. This is based on corporate AAA bond valuations in 2007 less the inflation rate. (Calculated using the change in CPI from 2006-2007). I find that present discounted value of an MBA is $875,251. Furthermore, the value of skills is $517,026 while the value of the signal is $358,225.53. Therefore, increased skills represent 60% of the value of an MBA while signaling represents 40%.

V. Conclusion

The purpose of this analysis was to develop a model to find the skills and signaling value of an MBA degree. In doing so, I examine three groups of people. Group A consists of individuals who do not receive employer tuition contributions and will be working for a new employer upon graduation. The results indicate that gender, age, experience, program type, and extracurricular activities all play a role in the amount of wages he will be offered. Group B consists of individuals receiving no employer tuition contributions and are staying with their previous employer

upon completion of their MBA. Only extracurricular activities have a significant impact on this group's wages. This may indicate that, once working for an employer, gender, age, experience, and program type will not affect future wages with that company. Group C, who consists of individuals who received employer tuition contributions and are staying with their employer upon graduation, experience higher wages if male. This may simply indicate that more men are seeking higher profile jobs, which pay higher wages. Also, program type seems to influence wages for this group, which may indicate that depending on the MBA program type, they may be receiving a promotion.

Furthermore, Group A's change in wages, after filter for the effects of the other variables in the model, represents both the skills and signal value of an MBA. This value is approximately $37,641. Group B's change in wages, after filtering for the effects of the other variables in the model, represents only the skills value of an MBA. This value is approximately $22,235. Based off of these findings, the signaling value of an MBA is approximately $15,405. This means that the signaling value of an MBA is 40% of its overall value, whereas the skills value is worth 60%.

VI. Future Research

Future research can focus on determining the rate of promotion for individuals with an MBA degree, as well as the extent of levels of advancement in their careers. Also, future studies may include a wider array of variables and larger sample sizes. My model lacks race, which theoretically is an important variable. Often, human resource departments actively seek employees that will help support diversity within a company. By including race, we may be able determine if certain

ethnicities experience higher wage changes. Also, some studies previously used the number of dependent children. This may cause increases in wages. For example, if an individual is supporting 2 children, they may have a greater incentive to request a higher salary than if they were merely supporting themselves.

Future research can able extend this study to other degree types. Currently, there is much publicity surrounding the value of a law degree. In other situations, the value of a doctorate degree can be examined. Because there are many different types of doctorate degrees, including medical and non medical, that are needed for different areas of work. I expect the signal value of differ among these separate industries.

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APPENDICES

Appendix 1: Comparison of Dependent Variables and *R*

Table 1. Regression results using WAGES as dependent variable.

$Y_i=\alpha_i+\beta_i g_i+\beta_i a_i+\beta_i n_i+\beta_i l_i+\beta_i p_i+\beta_i s_i+\varepsilon_i$				
Regressors	Group A	Group B	Group C	All
Constant	47609***	43583***	42544***	44333***
g_i	8249***	7737	12693***	10308***
a_i	6.729*	5.235	11.559***	11.528***
n_i	1931***	5255***	3048***	2445***
l_i	4182***	-2213	2279	3033**
p_i	3735***	--3253	-13264***	188
s_i	1331***	3043***	1220*	1292***
R^2	0.145	0.205	0.255	0.189
Observations	2608	312	657	4143
* p-value < 0.10, ** p-value < 0.05, *** p-value < 0.01				

OLS with Robust Heteroskedasticity-Corrected Standard Errors

Table 2. Comparison between results with different dependent variables.

Regressors	All (wages)	All (change in wages)
Constant	44333***	28628***
g_i	10308***	2941***
a_i	11.528***	-4.204
n_i	2445***	-876**
l_i	3033**	2857*
p_i	188	2403**
s_i	1292***	1053***
R^2	0.189	0.046
Observations	4143	3594
* p-value < 0.10 ** p-value < 0.05 *** p-value < 0.01		

OLS with Robust Heteroskedasticity-Corrected Standard Errors

Table 3. Comparison of studies using Wages as dependent variable.

Tsia	**Pfeffer**	**Peck**
Experience	Experience	Experience
Age	Age, Race, Gender	Age
Social Class	Married, Number of Children under 18	Gender
Degree Earned	Tenure	MBA Program Type
High School(public or private)	Years of Schooling	Extracurricular Activities
Adjusted R^2: .16	.34	.19

Appendix 2: Multicollinearity Correlations Tables

Before Correction:

Group A:

Variable	**VIF**	**1/VIF**
Age	76.41	0.013
Age^2	66.01	0.152
Experience	8.00	0.125
Lnexperience	5.79	0.173
Extracurricular	1.28	0.778
Program type	1.27	0.788
Gender	1.02	0.984
Mean VIF	22.83	

Group B:

Variable	**VIF**	**1/VIF**
Age	65.85	0.015
Age^2	56.81	0.018
Experience	8.87	0.118
Lnexperience	6.19	0.161
Program type	1.34	0.744
Extracurricular	1.32	0.757
Gender	1.04	0.962
Mean VIF	20.20	

Group C:

Variable	VIF	1/VIF
Age	109.29	0.009
Age^2	96.57	0.010
Experience	10.07	0.099
Lnexperience	8.34	0.199
Gender	1.09	0.915
Extracurricular	1.07	0.931
Program type	1.06	0.939
Mean VIF	32.50	

After Correction:

Group A:

Variable	VIF	1/VIF
Experience	7.58	0.132
Lnexperience	5.65	0.177
Age^2	2.10	0.477
Extracurricular	1.27	0.787
Program type	1.27	0.788
Gender	1.01	0.991
Mean VIF	3.15	

Group B:

Variable	VIF	1/VIF
Experience	7.57	0.132
Lnexperience	6.17	0.162
Age^2	1.60	0.623
Extracurricular	1.33	0.752
Program type	1.31	0.761
Gender	1.04	0.963
Mean VIF	3.17	

Group C:

Variable	VIF	1/VIF
Experience	9.17	0.103
Lnexperience	8.20	0.122
Age^2	1.80	0.556
Extracurricular	1.07	0.931
Program type	1.06	0.943
Gender	1.05	0.955
Mean VIF	3.82	

Appendix 3. Present Discounted Value Calculations

For Employees/students:

$$PDV_i = C\left[\frac{1}{r} - \frac{1}{r(1-r)^t}\right]$$

$$PDV_A = 37641.05\left[\frac{1}{.0269} - \frac{1}{.0269(1+.0269)^{37}}\right] = \$\,875{,}251$$

$$PDV_B = 22235.21\left[\frac{1}{.0269} - \frac{1}{.0269(1+.0269)^{37}}\right] = \$\,517{,}026$$

Skills Value: $ 517,026

$\frac{22235}{37641} = 60\%$

Signal value: 358,225

$\frac{37641-22235}{37641} = 40\%$

For Employers:

$$PDV_A = 2330\left[\frac{1}{.085} - \frac{1}{.085(1+.085)^8}\right] = \$\,17{,}113$$

Appendix 4. List of rates used in calculating PDV equations

Table 4. List of rates used in calculating PDV equations.

Inflation; 2007	0.0277	BLS
Corporate AAA bond valuation; 2007	0.0549	Bloomberg, L.P.
Market rate	0.0272	Calculated
Corporate tax rate; 2007	0.35	Deloitte
Tenure, ages 25-65+; 2008	7.06	Census
Weighted Average Cost of Capital (WACC), economy wide; 2008	0.1122	Bloomberg, L.P.
Real WACC	0.0845	Calculated
Social Security cost to employer	.0620	Social Security Online
Medicare cost to employer	.0145	Social Security Online

Appendix 5. Survey Questions

1. In what type of MBA program are you enrolled?
    a. Full time traditional/two year
    b. Full time accelerated/one year
    c. Part time/professional
    d. Executive (EMBA)
    e. Other

2. Please estimate the total amount, in U.S. dollars, that you received in employer reimbursement/sponsorship during your entire graduate business degree. (black space to fill in)

3. Did you participate in any of the following while you were a student in your graduate business program?

a. Internship
b. Work Projects
c. Student career/professional clubs
d. Student government
e. Study abroad programs
f. Community service organizations
g. Mentor programs
h. Leadership programs
i. Academic competitions
j. Diversity/multicultural events
k. Volunteer activities

4. How many years have you worked full time since completing your undergraduate or first university degree?
    a. None
    b. Less than 6 months
    c. 6 months, but less than year
    d. 1 year, but less than 2 years
    e. 2 years, but less than 3 years
    f. 3 years, but less than 4 years
    g. 4 years, but less than 6 years
    h. 6 years, but less than 8 years
    i. 8 years, but less than 10 years
    j. 10 years of more

5. What annual base salary, in U.S. dollars, did you earn on your last full-time job before starting your graduate business program? (base salary does not include signing bonuses, moving allowances, stock options, benefits packages, or other one-time compensation)? (blank space to fill in or check box "prefer not to say").

6. What annual base salary, in U.S. dollars, do you expect after graduation? (base salary does not include signing bonuses, moving allowances, stock options, benefits packages, or other one-time compensation)? (blank space to fill in or check box "prefer not to say").

7. Currently, in which phase of the job search process are you? Please check only one response.
    a. Searching (interviewing or receiving offers)
    b. Not searching(Accepted offer from current/previous employer)
    c. Not searching(Staying with current/previous employer)
    d. Not searching(Accepted offer from new employing organization)
    e. Not searching(Postponing job search until later)
    f. Not searching(Planning to start or manage my own business)

8. What is your gender?
    a. Male
    b. Female

9. When were you born? (month and year dropdown boxes)