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Education, Certification, and the Earnings of Industrial Accountants

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Abstract

Utilizing a model of the relationship between skill accumulation and earnings known as human capital theory, we analyzed the incremental earnings associated with various educational and professional credential for a sample of members of the National Association of Accountants (NAA). Data were collected by means of a questionnaire survey of NAA members and were analyzed utilizing a multiple regression technique. Earnings is regressed on various education and certification variables. Employment characteristics and personal characteristics of the respondents are included as control variables.

Our analysis documents positive earnings increments for the bachelors and MBA degrees and the CPA certificate. For the MBA and CPA, these returns are concentrated in the middle and later stages of accountants' careers. Also, we examine the variation in these returns across different subgroups of our sample. Individuals in finance positions have more responsibility and are more upwardly mobile than those in traditional accounting jobs. Prior experience in public accounting is found to be a partial substitute for the above credentials. Finally, the credentials generated more consistent returns in smaller firms.

Observations have been made in the accounting literature about the relative advantages to accountants of acquiring various educational degrees and/or professional certifications. Some of these observations are based on analyses of the

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difference in average earnings between those who have a given level of education or a given certificate versus those who do not. Such analyses involve a simple comparison of mean earnings disaggregated by one or two variables such as age, race, or sex (for example, see Serocke [1985] and Arbital [1986]). These analyzes do not take into account other variables that may explain the earnings differentials. For example, an earnings differential between accountants with a specific educational degree versus those lacking that degree may be due to a difference in the average years of work experience between the two groups rather than the degree itself.

The relationships between educational credentials, professional certifications, and earnings in the accounting profession are of importance to undergraduate accounting students. After earning baccalaureate degrees, students must decide whether to prepare for professional exams and/or to enter graduate school. Examination of the inter-relationships between degree, certifications, and earnings can assist students in making these decisions in an informed and rational manner.

METHODOLOGY

The foundation of the analysis in this article is an economic model referred to as human capital theory. Briefly, the central idea of the model is that the accumulation of skills, as manifest in degrees and certifications, increases productivity. Since productivity is valued by employers, these productivity increments generate increased earnings to holders of job skills.

This theory has been summarized in a single-equation model of earnings [Mincer, 1974]. It is semi-logarithmic in form, with the natural log of hourly earnings as the dependent variable. A complete list of the independent variables specified in our version of Mincer's model is presented in Table 1. This model includes many of the important determinants of earnings. However, it is not possible to specify a model that explains all variation in earnings because certain important determinants are difficult to measure, i.e., initiative and motivation.

The model is estimated using ordinary least squares (OLS) multiple regression. This technique enables us to identify the independent effects of the education and certification variables on earnings. The regression coefficients of our education and certification variables are the partial derivatives of hourly earnings with respect to these variables. Given the semi-logarithmic specification of the model, these coefficients estimate the percentage earnings increment attributable to education and certification. The important point is that these estimates control for the potentially distorting effects of the non-education and non-certification variables in

Table 1
Variable Included in the Earnings Function

DEPENDENT VARIABLE
1. ln W = natural log of 1984 hourly earnings.

HUMAN CAPITAL VARIABLES
2. BA = 1 for accountants with a bachelors degree.
3. MBA = 1 for accountants with an MBA degree.
4. MSACT = 1 for accountants with a masters degree in accounting.
5. CONTED = hours of continuing education in 1984.
6. CPA = 1 for accountants with the CPA credential.
7. CMA = 1 for accountants with the CMA credential.
8. CIA = 1 for accountants with the CIA credential.
9. GEXP = years of full-time work experience in accounting.
10. GEXPSQ = the square of GEXP.
11. FEXP = years of full-time experience with current employer.
12. FEXPSQ = the square of GEXP.
13. PEXP = years of full-time experience in current position.
14. PEXPSQ = the square of PEXP.

PROFESSIONAL ATTRIBUTE VARIABLES
15. FIN = 1 for those working in finance and related fields.
16. JOBSA = for those in senior accountant positions.
17. JOBEXU = 1 for those in executive positions.
18. ASPEXU = 1 for those who aspire to an executive position.
19. EVERPA = 1 for accountants who have ever been employed by a public accounting firm.
20. SECJOB = average hours per week employed at a second job.
21. EMPLOYRS = number of employers over entire accounting career.
22. UNEMPL = weeks of work missed due to unemployment in 1984.
23. FIRMSIZE = total number of accountants employed by the firm.

PERSONAL ATTRIBUTE VARIABLES
24. SEX = 1 for female accountants.
25. SINGLE = 1 for accountants whose marital status is single.
26. DIVORCE = 1 for accountants who are divorced.
27. DEPEND = number of dependents in the family unit.
28. SICK = weeks of work missed due to illness in 1984.
29. BLACK = 1 for accountants whose race is black.
30. HISPANIC = 1 for accountants who are Hispanic.

OTHER CONTROL VARIABLES
31. SMSA2 = 1 for accountants employed in metropolitan areas with population of 100,000 to 500,000.
32. SMSA3 = 1 for accountants employed in metropolitan areas with population of 500,000 to 1,000,000.
33. SMSA4 = 1 for accountants employed in metropolitan areas with population of 1,000,000 to 2,000,000.
34. SMSA5 = 1 for accountants employed in metropolitan areas with population greater than 2,000,000.

our model. We have also examined the correlations among our independent variables for the presence of multicollinearity and have found no large correlation coefficients. However, the possibility of correlation between linear combinations of independent variables must be kept in mind.

The data used to estimate the model were generated by a questionnaire survey of 9,520 randomly selected members of the National Association of Accountants (NAA) to which 3,202 responded. From these, we have deleted 520 because of incomplete responses, 707 because they were not employed in private industrial firms, and 201 because they were not employed in traditional accounting and finance related occupations. The remaining 1,774 are a homogeneous group of industrial accountants employed in traditional accounting and finance-related occupations. Comparisons of variable means from our sample of industrial accountants with data from the Bureau of Labor Statistics, the National Association of Accountants, The Institute of Certified Management Accountants, and Lander [1983] indicate that our data are representative of the general population of industrial accountants.

OVERALL EMPIRICAL RESULTS

The discussion in this article is limited to the regression coefficients of the education and certification variables in our model. (Discussion of the empirical results for the other variables in our model can be found in Rosenzweig and Hadley [1987a] and [1987b].) The estimated regression equation for our entire sample of 1774 accountants is presented in Table 2. Regression results for various sub-groups of our sample are presented in Table 3. In this Table, the reported coefficients are limited to the main education/certification variables (BA, MBA, and CPA). The sub-groups are disaggregated by type of job (finance versus traditional accounting), years of experience (less than ten years versus ten or more years), prior work experience in public accounting or not, and size of firm.

Table 2 indicates a statistically significant (.01 level) regression coefficient of .152 for the bachelor's degree (BA) variable. (The BA variable is a binary variable equal to one for accountants holding a BA degree and zero for all others.) This regression result shows that accountants in our sample who hold a BA degree had 15.2 percent higher annual earnings than the accountants without a BA degree. Assuming that the other independent variables in our mode (see Table 1) provide adequate controls, this result indicates that the BA degree contributes a 15.2 percent annual increment to the average industrial accountant's earnings.

Economists have typically estimated the return to college education in general to be in the 9-12 percent range (see Hansen [1963] and Hanoch [1967]).

Table 2
Regression Results for Industrial Accountants

VARIABLE	MEANS	REGRESS. COEFFS. (STANDARD ERRORS)	VARIABLE	MEANS	REGRESS. COEFFS. (STANDARD ERRORS)
HUMAN CAP					
BA	0.866	0.15 (.044) ***	EVERPA	0.298	0.114 (.036) ***
MBA	0.205	0.090 (.033) ***	SECJOB	1.141	-0.003 (.004)
MSACT	0.015	0.116 (.108)	EMPLOY	3.060	-0.042 (.009) ***
CONTED	15.380	0.000824 (.001)	UNEMPL	0.285	0.013 (.006) **
CPA	0.256	0.087 (.037) **	FIRMSI	290.597	0.000010 (.000)
CMA	0.055	0.040 (.058)	PERS ATTRIB SEX	0.160	-0.036 (.040) ***
CIA	0.007	0.009 (.157)	SINGLE	0.112	-0.106 (.048) **
GEXP	16.482	0.046 (.006) ***	DIVORCE	0.064	0.094 (.055) *
GEXPSQ	370.755	-0.000570 (.000) ***	DEPEND	2.167	0.038 (.011) ***
FEXP	9.381	0.016 (.006) **	SICK	0.274	0.012 (.017)
FEXPSQ	155.344	-0.000371 (.000) **	BLACK	0.011	0.171 (.123)
PEXP	4.325	0.009 (.009)	HISPAN	0.011	0.015 (.123)
PEXPSQ	36.915	-.000 (.000)	OTH CON VAR		
PROF ATTRIB			SMSA2	0.272	0.038 (.034)
FIN	0.234	0.148 (.031) ***	SMSA3	0.141	0.014 (.042)
JOBSA	0.162	-0.064 (.074)	SMSA4	0.115	0.099 (.045) **
JOBEXU	0.795	0.030 (.075)	SMSA5	0.170	0.243 (.040) ***
ASPEXU	0.632	0.109 (.030) ***	CONSTANT		1.866 (.087) ***

* indicates statistical significance at the 90 percent level
** indicates statistical significance at the 95 percent level
*** indicates statistical significance at the 99 percent level

ln W	2.901	
GEO Mean	$18.19	
N	1774	1774
R Squared		0.33

Our result for accountants is beyond the high side of this range. Since economists consistently agree that a college degree is a worthwhile investment, it is reasonable to infer from our result that an accounting BA is especially worthwhile in terms of pecuniary rewards.

One possible reason for the high return to the accounting BA is the specialized and technical nature of the typical accounting curriculum. It is commonly perceived to be more difficult than the average college curriculum. Therefore, accounting may attract students with above-average innate ability and/or motivation, which may partially explain the superior earnings increment to the BA in the accounting profession. Also, the rigor of the accounting curriculum may generate learned abilities and motivation which subsequently result in superior earnings.

An alternative (but not mutually exclusive) explanation for the superior return to a BA accounting degree may be disequilibrium in the labor market for entry-level accountants. This market has been characterized by excess demand during the past decade. Excess demand in a skilled occupation caused hourly earnings to rise in the short run because of inelastic supply. If present in the entry-level accounting market, this effect would be expected to increase the earnings increment to accountants with BA degrees in the short run. In the long run, normal market adjustments should correct the disequilibrium as more students are attracted to the study of accounting by the occupation's superior entry-level earnings. Eventually, the increased supply of accountants will bring earnings increments into line with alternative occupations, but this process may take many years.

While there are other possible explanations for the superior earnings increment for the BA in accounting, these two are the most plausible. It is interesting to note that although they are not mutually exclusive explanations, they do have opposite implications for the increment's continuity. If the first is the dominant explanation, accountants would be expected to continually earn a premium from their education, while the second explanation suggests that the premium is only temporary.

Our overall earnings equation included two other educational binary variables: a masters degree in accounting (MSACT) and a masters degree in business administration (MBA). The coefficient of the MBA variable is .09 (9.0 percent) and is highly significant (.01 level). The coefficient of the MSACT variable is .116 (11.6 percent) but is insignificant at all conventional levels of statistical significance. These results indicate that the broadening experience of a general MBA degree has more consistent and demonstrable effect on earnings than the specialized experience of graduate studies in accounting.

Two recent articles in the *Wall Street Journal* have suggested that the MBA may not be a good investment given current job-market conditions (see Mitchell [1988] and Bennett [1988]). The Bennett article discusses pecuniary returns for those who "switch careers" by earning an MBA degree in their mid-thirties. The analysis is

based upon a study by Lawrence Lucy and Carol Caruthers of Price Waterhouse, and the conclusion is that such a career switch is highly unlikely to generate a satisfactory return.

Two factors must be kept in mind when comparing the conclusions of the Bennett article with our regression results concerning the MBA. First Bennett's conclusions were for MBA candidates from all disciplines including those who switched into business from other professions. Our results are for accountants who are attempting to enhance their professional status with an MBA degree that broadens their business skills and thereby prepares them for higher level managerial responsibilities. This distinction in the function of the degree for the two groups may help explain differences in the financial return to the degree.

The second factor is the career timing of the acquisition of the degree. The Lucy and Caruthers analysis is based on a typical 35 year old with ten years of experience who leaves the labor force to pursue an MBA degree. Our sample includes those who received their MBA degrees at various stages in their careers.

To investigate the issue of mid-career MBA degrees, we reestimated our earnings equation including only those from our MBA population who earned their degree at age 35 or later. There are 364 accountants in our sample with an MBA, but only 84 earned their degree after age 34. The reestimated equation (including all non-MBAs and these 84 "older MBAs") indicated no significant return for the MBA degree which is consistent with the Lucy and Caruthers' analysis. The regression coefficient of the MBA variable equals -.007 and is statistically insignificant. The implication is clear. The MBA must be earned early in ones career to generate satisfactory returns. Those who miss the opportunity find that the opportunity has vanished by mid-career.

One possible reason for this is that education impacts a workers' achievements in the labor market only at the entry level. By mid-career, it may be too late to successfully use the MBA degree to get on the "fast track" to the top. This interpretation builds upon Spence's [1973] idea that education is primarily a screen or a signal to prospective employers that is used to assign employees to alternative career tracks at the time they enter a particular career.

Of the three credentials variables entered in our overall equation, only the Certified Public Accountant (CPA) impacts significantly upon earnings. The results for our entire sample indicate that a CPA adds an 8.7 percent increment to the earnings of industrial accountants (significant at the .05 level). The coefficient for the Certified Management Accountant (CMA) is only 4.0 percent and is completely insignificant in statistical terms. The coefficient for the Certified Internal Auditor (CIA) is completely trivial and insignificant at 0.8 percent. It should be noted, however, that there are only twelve CIAs in our sample.

These results document the dominance of the CPA credential in the accounting profession. This dominance might be expected for accountants employed in public accounting since the CPA is traditionally perceived to be the appropriate credential for that area. However, it is somewhat surprising for our sample of industrial accountants since the CMA is specifically tailored for a career in industrial accounting. The absence of a significant earnings increment for the CMA is perhaps due to its lack of widespread recognition, a consequence of the relative newness of the credential. Employers are unlikely to pay a premium for a credential until they establish some familiarity with the special capabilities that can be expected from a CMA.

We have also investigated the timing of the CPA credential during the worklife cycle. There are 455 CPAs in our sample, but only 55 earned their credential at age 35 or later. The reestimated regression equation which includes only CPAs who earned their credential at age 35 or older shows a coefficient of -.043 (statistically insignificant) for the CPA variable. Therefore, our analysis reveals the same patterns for the CPA with respect to returns over the worklife cycle as is the case of the MBA. It pays to earn a CPA early in ones worklife, but those who pass the opportunity by do not appear to get a second chance.

Reflection upon the above results generates a few strategic observations relevant to students who have recently completed or are nearing the completion of a BA degree in accounting. The most profitable career-enhancing degrees/credentials are clearly the MBA and the CPA. However, the pursuit of either of these is worthwhile in pecuniary terms only if they are obtained early in the career, allowing sufficient post degree or certification career years to generate the long-run payoffs that are characteristic of those credentials.

RETURNS TO CREDENTIALS FOR SUBGROUPS

Although Table 2 demonstrates strong returns to the BA, the MBA, and the CPA credentials for the entire sample, these returns are not uniform across all segments of our sample. To demonstrate how the returns vary, regression equations were estimated for the following subgroups: those in finance jobs vs. those in traditional accounting fields; those with less than ten years of experience as accountants vs. those with more than ten years; those with prior work experience in public accounting vs. those without such experience; and those who are employed in small firms (defined as ones who employ less than fifty accountants) vs. those who are employed in large firms. Table 3 summarizes the regression coefficients for the BA, MBA, and CPA credentials for these subgroups.

RETURNS TO CREDENTIALS FOR VARIOUS GROUPS

	OVERALL			FINANCE			ACCOUNT.			GEXP<10			GEXP>=10			EVERPA			NEVERPA		
	BA	MBA	CPA	BA	MBA	CPA	BA	MBA	CPA	BA	MBA	CPA	BA	MBA	CPA	BA	MBA	CPA	BA	MBA	CPA
OVERALL	0.152[a]	0.090	0.087																		
	(.044)	(.033)	(.037)																		
	***	***	**																		
	0.886	0.205	0.256																		
	1774	1774	1774																		
FINANCE	0.082	0.096	0.128																		
	(.077)	(.049)	(.061)																		
		*	**																		
	0.904	0.264	0.313																		
	416	416	416																		
ACCOUNT.	0.161	0.086	0.072																		
	(.053)	(.042)	(.046)																		
	***	**																			
	0.881	0.187	0.239																		
	1358	1358	1358																		
GEXP<10	0.222	0.103	0.069	0.289	0.259	0.254	0.226	0.053	0.022												
	(.157)	(.104)	(.098)	(.299)	(.107)	(.129)	(.181)	(.140)	(.120)												
	0.938	0.156	0.326	0.97	0.28	0.42	0.93	0.125	0.303												
	500	500	500	100	100	100	400	400	400												

	***	***	***				***	**	**													
	0.866	0.224	0.229	0.883	0.259	0.278	0.86	0.213	0.213													
	1274	1274	1274	316	316	316	958	958	958													
EVERPA	-0.038	0.146	0.104	-0.223	0.102	0.120	0.009	0.164	0.097	-0.245	0.264	-0.011	-0.118	0.122	0.144							
	(.160)	(.096)	(.084)	(.231)	(.097)	(.092)	(.201)	(.134)	(.113)	(.728)	(.422)	(.346)	(.097)	(.057)	(.051)							
														**	***							
	0.932	0.189	0.631	0.966	0.223	0.682	0.919	0.176	0.612	0.956	0.14	0.75	0.924	0.206	0.59							
	529	529	529	148	148	148	381	381	381	136	136	136	393	393	393							
NEVERPA	0.178	0.072	0.037	0.162	0.092	0.072	0.183	0.066	0.035	0.242	0.082	0.074	0.165	0.062	-0.009							
	(.032)	(.025)	(.035)	(.0893)	(.060)	(.091)	(.034)	(.028)	(.038)	(.059)	(.041)	(.041)	(.038)	(.032)	(.052)							
	***	***		*			**	**		***	**	*	***	*								
	0.867	0.212	0.097	0.869	0.287	0.108	0.866	0.191	0.094	0.931	0.162	0.168	0.84	0.233	0.068							
	1245	1245	1245	268	268	268	977	977	977	364	364	364	881	881	881							
FMSIZ<50	0.145	0.084	0.100	0.120	0.093	0.103	0.138	0.082	0.094	0.154	0.060	0.137	0.131	0.091	0.078	0.024	0.170	0.89	0.168	0.052	0.055	
	(.035)	(.029)	(.032)	(.097)	(.068)	(.082)	(.037)	(.032)	(.034)	(.068)	(.052)	(.046)	(.042)	(.036)	(.042)	(.090)	(.061)	(.050)	(.037)	(.033)	(.046)		
	***	***	***				***	**	***	**		***	***	**	*		***	*	***				
	0.862	0.179	0.252	0.88	0.233	0.349	0.857	0.164	0.224	0.925	0.122	0.32	0.839	0.201	0.226	0.917	0.164	0.611	0.838	0.186	0.089	
	1156	1156	1156	258	258	258	898	898	898	319	319	319	837	837	837	360	360	360	796	796	796	
FMSZ>=50	0.051	0.103	0.081	-0.114	0.091	0.189	0.103	0.115	0.067	0.291	0.226	0.151	0.012	0.039	0.142	-0.509	0.075	0.135	0.145	0.094	-0.002	
	(.128)	(.076)	(.090)	(.143)	(.072)	(.096)	(.164)	(.102)	(.119)	(.544)	(.272)	(.298)	(.075)	(.046)	(.057)	(.673)	(.272)	(.262)	(.063)	(.040)	(.055)	
						*									**				**	**		
	0.93	0.254	0.265	0.943	0.316	0.253	0.926	0.233	0.27	0.961	0.215	0.337	0.918	0.27	0.236	0.964	0.243	0.675	0.918	0.258	0.111	
	618	618	618	158	158	158	460	460	460	181	181	181	437	437	437	169	169	169	449	449	449	

[a]0.152 = Regression Coefficient

(.044) = Standard error of regression coefficient

*** = Indicates statistical significance at the 99 percent level (** = 95 percent; * = 90 perent)

0.886 = Mean

1774 = Number of observations

The respondents were classified as working in finance or accounting jobs based on their answer to a questionnaire item. They were asked which description most closely approximates their job specialty: accounting fields such as cost accounting and financial reporting or finance and other fields which use accounting information but are not producers of it. Table 3 suggests that finance jobs are more challenging and responsible positions for industrial accountants than traditional accounting jobs. Not only do those in finance positions have a higher proportion of post-baccalaureate credentials (MBA and CPA) than those in accounting jobs, but they also obtain a higher earnings increment from them. This is especially true for the CPA. It generates a statistically significant 12.8% earnings increment for those in finance positions while the increment for those in accounting jobs is smaller and statistically insignificant. In contrast, the chief credential for accounting jobs is the bachelors degree which generates a significant 16.1 percent earnings increment.

In addition to the above, finance is apparently a field for those on the "fast track." Significant returns to credentials seem to come in the early years of ones career. Note the returns to ally three credentials are in the 20 to 30 percent range for those in finance jobs with less than 10 years of professional experience, and the increments for the post-baccalaureate credentials are significant. In contrast, accountants in finance positions with more than ten years of experience have much smaller coefficients for the three credentials and all are insignificant.

On the other hand, in accounting jobs, significant returns to credentials can only be demonstrated in the latter parts of the career. For those in accounting jobs with more than ten years of experience, all three credentials have significant coefficients. Holders of accounting jobs with less than ten years of experience have a large coefficient only for the bachelors degree (22.6 percent) and this is not significant because of the large error term. Coefficients for the post-baccalaureate credentials are small and entirely insignificant.

Table 3 suggests that, for an industrial accountant, experience in public accounting is, in part, a substitute for credentials. Overall, significant returns to these credentials cannot be demonstrated by our data for industrial accountants who have public accounting experience. There is a 14.6 percent return to the MBA degree for this group, but it is not significant because of the large error term. Returns to the post-baccalaureate credentials, MBA and CPA, are significant only for selected groups of accountants with more than ten years of experience and who work in small companies.

In contrast, for industrial accountants without public accounting experience, there are significant returns to both the bachelors and MBA degrees. The return to the bachelors degree is especially strong (17.8 percent). As expected, the return to the CPA credential for this group is small and insignificant since relativ 'y few accountants without public accounting experience can qualify to obtain the CPA

certificate. The pattern of strong returns to the BA and MBA is fairly consistent across subgroups.

Significant returns to all three credentials can only be demonstrated for those industrial accountants who are employed in small firms (less than 50 accountants). All three coefficients are significantly positive. A larger proportion of accountants who work in larger firms have BAs, MBAs, and CPAs, but all of the coefficients are insignificant. The magnitudes of the coefficients for the MBA and CPA are roughly the same as those for smaller firms but the large error terms result in the coefficient being insignificant.

This pattern of returns to the credentials in smaller firms is most notable for accountant in traditional accounting jobs. All three coefficients for small firm accountants in accounting jobs are significantly positive. For small firm accountants in finance jobs, the coefficients are roughly the same in magnitude but they are all insignificant because of the larger error terms.

One possible explanation for the fact that there are significantly greater returns to these credentials in smaller firms is that such firms may have less ability to generate qualified accounting personnel internally due to lack of adequate training programs and less diversity of on the job experience. Small firms may have to obtain qualified personnel externally by bidding for them in the accounting labor market based on credentials and other factors. Larger firms may be able to develop more of their accounting personnel internally by means of training and job experience, and therefore may have less need to rely on externally generated credentials.

FUTURE IMPLICATIONS

The American Institute of Certified Public Accountants (AICPA) recently decided to require (by the year 2000) five years of academic education as a prerequisite for awarding the CPA certificate [AICPA, 1988]. Thus it is likely that there will be a gradual evolution of the length of the standard education program for the professional accountant from four to five years. The analysis reported in this article provides some insights for decisions on curriculum design for the fifth year. The superior returns to the MBA degree (a general program for managers) over the masters degree in accounting demonstrates the value that the accounting labor market currently places on broad postgraduate education. Therefore, it can be concluded that the fifth year program for professional accountants will be more effective in economic terms if it is dedicated to broadening the base of technical knowledge acquired by the accounting student in the first four years. Consistent with this conclusion is the fact that the more upwardly mobile industrial accountants in our sample, branched out from traditional accounting jobs into more general finance jobs.

The AICPA recognized the need for a broadly based five year educational program in its recently published booklet, *Education Requirements for Entry Into the Accounting Profession.* The Illustrative Program described therein includes extensive requirements for General Education and Education in Business Administration, but the Accounting Education requirements are only marginally greater than those for a traditional four year program.

The value of the traditional accounting degree for providing a desirable technical base of knowledge for careers in accounting and business is widely known. However, it appears that more general education in business and non-business areas can round out the education of professional accountants and help prepare them for the broader responsibilities which they often assume.

CONCLUSIONS

This article has elaborated a methodology for assessing the returns in terms of earnings of various educational and professional credentials for industrial accountants. Information about those returns can be used by accounting students and practicing accountants to make decisions regarding the acquisition of further credentials.

Significantly positive returns to the bachelors and MBA degrees, as well as the CPA certification, are documented; and evidence indicating the desirability of obtaining the MBA and CPA early in the career is developed. Furthermore, the variation of these returns across different subgroups of industrial accountants is analyzed. Specifically, a pattern of returns to post-baccalaureate credentials and returns in the early career years suggest that occupants of finance positions tend to have more responsible jobs and are more upwardly mobile than those who hold traditional accounting jobs. Furthermore, for industrial accountants, prior experience working in public accounting seems to be, in part, a substitute for educational and professional credentials. Finally, these credentials generate more consistent and reliable returns in smaller rather than larger firms.

REFERENCES

Arbital, S. "Salary Survey," *New Accountant,* (March, 1986), pp. 14-15.

American Institute of Certified Public Accountants, *Education Requirements for Entry Into the Accounting Profession,* (AICPA, 1988).

Bennett, Amanda, "MBA May Not Be Worth It For Many Career-Switchers," *The Wall Street Journal,* (July 20, 1988), p. 25.

Bureau of Labor Statistics, *National Survey of Professional, Administrative, Technical, and Clerical Pay,* Bulletin #2208, U.S. Department of Labor (March, 1984).

Hanoch, G., "An Economic Analysis of Earnings and Schooling," *Journal of Human Resources,* (Summer, 1967), pp. 310-329.

Hansen, W. L., "Total and Private Rates of Return to Investment in Schooling," *Journal of Political Economy,* (April, 1963), pp. 128-141.

Lander, G., J. Holmes, M. Tipgos, and M. Wallace, *Profile of the Management Accountant,* (New York: National Association of Accountants, 1983).

Mincer, J., *Schooling, Experience, and Earnings,* (New York: National Bureau of Economic Research, 1975).

Mitchell, Cynthia F., "Business School Loses Some of Its Luster, Educators Cite Black Monday, Aid Changes," *The Wall Street Journal,* (July 20, 1988), p. 25.

Rosenzweig, K. and L. Hadley, "Personal Earnings in the Accounting Profession," *The Woman CPA,* (October, 1987), pp. 14-20.

Rosenzweig, K. and L. Hadley, "An Economic Analysis of the Earnings of Accounts," University of Dayton, Center for Business and Economic Research, Working Paper 87-5 (March, 1987).

Serocke, K., "CMAs Earn Superior Salaries," *Management Accounting,* (November, 1985), p. 16.

Spence, Michael, "Job Market Signaling," *Quarterly Journal of Economics,* 87 (August, 1973), pp. 355-374.