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## **DETERMINANTS OF GRADUATING MIS STUDENT STARTING SALARY IN BOOM AND BUST JOB MARKETS**

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### **ABSTRACT**

This study investigates the influence of internship experience, grade-point average (GPA), and job market on the starting salaries of management information systems (MIS) graduates. The seven-year period of the study includes the strong job market of the Internet boom, as well as the weak job market following the Internet bust. The regression results indicate that several factors are significantly related to starting salary including internship experience, GPA, job market, and size of employer. Internship experience was found to play a particularly strong role in predicting MIS starting salaries. A significant interaction effect indicates that the positive effect of internship experience is stronger during a weak job market. Graduates with internship experience also found employment more quickly. The study is based upon academic and placement data collected from 126 graduates from an AACSB accredited MIS program at Western Washington University during the years 1997-2003.

**Keywords:** MIS graduates, starting salary, careers, internships, GPA, job market conditions

### **I. INTRODUCTION**

Management Information Systems (MIS) graduates have faced a volatile job market in the United States over the past decade. During the technology boom of the late 1990s MIS graduates were in high demand and salaries increased steadily. With the burst of the technology bubble in 2000-2001, graduates in technical disciplines such as MIS faced especially weak job markets and experienced a sharp drop in starting salaries [NACE, 2003]. While the sharp decline in market for MIS graduates was unfortunate for those unlucky enough to graduate during the bust, it does provide us with an unusual opportunity to examine how the labor market treats MIS graduates during two distinctly different job markets.

Previous studies examined job placement of college graduates in a number of academic fields, but relatively little previous research focused specifically on MIS graduates. Given the applied orientation of many MIS jobs, it is possible that the relative importance of factors influencing starting salary for MIS positions may be different than that of other academic fields. For example,

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we heard from numerous industry contacts and recruiters that internship experience may be just as important to a MIS graduate's job placement success – and in some cases more important – than an academically-based measure such as grade point average (GPA). Recent articles and publications provide additional anecdotal evidence that internships significantly improve the job prospects of MIS graduates [Hoffman, 2005; Quittel, 2003]. However, the benefits of MIS internships were not rigorously explored. Furthermore, no previous research examined the relationship between the strength of the job market and the factors that affect MIS graduate placement and salaries.

In our role as faculty advisors we would like to provide useful guidance to our students about job placement. A college degree is a large investment that can yield a highly variable return. However, it is difficult to know which factors are the most influential if we only rely on anecdotal reports and observations. In an effort to understand the determinants of starting salary for MIS graduates better, we undertook a longitudinal study at our university. The objective of the study was to examine the influence of GPA, internship experience, and job market conditions on starting salary for our MIS graduates. We also explored the moderating effect of the job market conditions on the relationship of GPA and internship experience on starting salary. To address potential confounds, several control variables were included in the study. The data for the study was collected over a seven-year period from 1997 to 2003. During this period, our regional job market experienced a dramatic downturn resulting in distinct “boom” and “bust” job markets. To our knowledge, our study is the first to explore the influence of determinants of starting salary of MIS graduates during different job market periods.

The next section of the manuscript reviews the literature on MIS starting salaries and develops hypotheses for the study. Section III describes the research setting for the study and Section IV describes the methods used to address the hypotheses. The results of the research are summarized in Section V. Section VI discusses the findings and implications of the study.

## II. BACKGROUND AND HYPOTHESES

Not all college graduates enjoy the same success with respect to job placement. Some graduates will find desirable, high-paying jobs even during poor job markets, while other graduates will find placement difficult during healthy economic periods. Several factors can influence college graduates' job hunting success and starting salary. Academic major is a well known factor that affects starting salary. Students who major in engineering, health fields, business, or science will, on average, earn more than those who major in education, social sciences and humanities [Rumberger and Thomas, 1993]. For example, the National Association of Colleges and Employers (NACE) 2003 Salary Survey [NACE, 2003] indicates that electrical engineering graduates in the United States earned well over twice as much as pre-elementary education graduates (average starting salary of \$50,615 vs. \$22,279). Significant differences in starting salaries can occur within the graduating class of a specific academic major. For example, in the 2003 graduating class at our institution in the United States, starting salaries for MIS graduates ranged between \$22,000 and \$46,000, a difference of over 100%, whereas computer science graduates ranged between \$30,000 and \$78,000, a difference of over 160%. The large salary spreads observable across and within specific academic majors underscores the findings from past research on student job placement that starting salaries are influenced by numerous factors [Roth et al., 1996]. These factors include academic major, individual student attributes (e.g., GPA, internship experience, communication skills), and employer/market-related attributes (e.g., labor market demand, employer size).

Little previous research focused specifically on the starting salaries of MIS graduates. For purposes of our literature review, we include studies that involved students graduating from all business majors and concentrations. MIS programs are often located within business schools and MIS students generally take numerous business courses. Our expectation was that this body of research would provide a relevant basis for our exploration of the determinants of starting salary for MIS graduates.

## **GRADES AND STARTING SALARY**

College GPA as a predictor of earnings for business graduates was studied by several authors. In general, research involving business graduates found a positive relationship between GPA and starting salary. For example, Knouse et al. [1999] studied 1,117 business administration alumni who graduated from a public university from 1993 to 1997. They found a strong positive relationship between GPA and starting salary. Jones and Jackson [1990] examined the relationship between GPA, starting salary and salary five years after graduation for 811 business administration graduates from a large public university. GPA was identified as a significant predictor of starting salary and earnings five years after graduation for both men and women. A one-point increase in GPA raised starting salaries by 8.9%. Similar results were found by Fuller and Schoenberger [1991] for a study of 230 business administration students who graduated in 1983-1985. They determined that a one-point increase in GPA increased starting salary by approximately 10%. Another study of business administration graduates, by Dowlatshahi [1994], examined all business graduates from the University of Wisconsin-Platteville from August 1989 to May 1991 and also found GPA to be a significant predictor of starting salary.

We uncovered only one recent study that focused on determinants of job placement for MIS graduates. Fang et al. [2004] surveyed 213 MIS seniors from three public universities in the United States during the spring of 2002. In this study, no significant relationship was found between GPA and starting salary for MIS graduates. However, GPA was related to the number of job offers received by a student. Although the one study that focused on MIS students did not find a relationship between GPA and starting salary, the other studies reviewed (which involved business students) did find a significant relationship. It is unclear whether the finding by Fang et al. is an anomaly or reflects a generalizable trend for MIS graduates. Despite the finding of the Fang et al. study, the preponderance of findings reported by the other studies for business students leads to the following hypothesis:

*Hypothesis 1: MIS students' starting salary is positively related to GPA.*

## **INTERNSHIPS AND STARTING SALARY**

An internship may include such experiences as a paid full-time work program conducted at a large corporation (e.g., a summer internship), as well as an unpaid part-time work experience for a non-profit company. For purposes of this study, the term "internship" carries a relatively broad meaning referring to a student's work experience while in school. The National Society for Experiential Education reported that approximately 33% of undergraduates participate in internships [Watson, 1995]. The results of employer surveys regarding internships emphasize the overall value of the internship experience [Raymond et al., 1993; Oliver et al., 1996]. Internship experience can help prepare undergraduates for the reality of full-time employment, improve their employment opportunities, and help them crystallize their vocational abilities, interests and work values [Taylor, 1988].

It appears that internships have long been considered to be an important factor for employers in the information technology area. For example, in a 1989 survey of employers, the most frequently mentioned requirement for new graduates entering the computer industry was "practical experience" [Friedman and Friedman, 1989]. A more recent survey of employers of MIS graduates [Cappel, 2001-2002], found that the number one recommendation of employers was to "get experience through internships, co-ops, class projects, volunteering." These survey findings are supported by several other research studies involving business students. For example, Fuller and Schoenberger [1991] found that internship experience increased starting salary by approximately 10%. In a study focusing on the benefits of internship experience for business undergraduates, Gault et al. [2000] surveyed 223 students who graduated during 1994-1996. They found that those with internship experience required less time to find their first position, 1.9 months versus 4.3 months. They also received 9.2% higher starting salaries and reported greater overall job satisfaction. The Knouse et al. [1999] study cited earlier found that

students with internships were more likely to be employed upon graduation than those without internships; it did not, however, examine the impact of internships on starting salary.

Despite the intuitive notion – and research findings – that suggest that internships will lead to enhanced job placement, not all studies found internships to be related to a higher starting salary. A study of business graduates conducted by Dowlatshahi [1994] did not find a significant relationship between starting salary and internship, previous work experience, or extra-curricular school activities. Also, Fang et al. [2004] did not find significant relationships (at the 0.05 level of significance) between MIS internships and starting salary, or MIS internships and number of job offers. However, two types of MIS internships (“IT help desk related internships” and “Networking related internships”) were found to be significantly related to number of job offers at the 0.10 level of significance.

As suggested by the foregoing discussion, the research findings about the impact of internships are somewhat mixed, varying from very strong relationships in some studies to no statistically significant findings in others. The following hypothesis is based on the strong findings from the studies that found a positive relationship:

*Hypothesis 2: Starting salary is positively related to internship experience for MIS students*

### **JOB MARKET CONDITIONS: BOOM AND BUST**

The economic boom of the late-1990s, now known as the “dot com bubble,” and the economic downturn that followed it (the “dot com bust”) represented an unusually sharp transition between two distinctly different job markets. Graduates in MIS and other technical majors who graduated during the bust faced a very difficult job market. Between March 2001 and April 2003 the U.S. job market for high-tech workers shrank by 18.8%, corresponding to a loss of 403,300 jobs [Anonymous, 2004]. The National Association of Colleges and Employers (NACE) observed in its Spring 2003 Salary Survey that starting salaries for MIS graduates in the United States dropped by a total of 15.4 percent during the prior two years, a “further indication of the tough times for these grads” [NACE 2003, p. 39].

The regional job market for our MIS students was particularly weak. In an article published in 2001, the *Wall Street Journal* noted that beginning in early 2000 “the Northwest has taken the brunt of just about every major hit absorbed by the U.S. economy,” including the dot-com bust, the west-coast energy crisis, and massive layoffs in commercial aviation [Gavin, 2001, p. B7]. The article also noted that “What was once one of the nation’s most vibrant economies is now among its shakiest.” The sharp downturn of the regional economy created a difficult job market for MIS graduates.

The influence of the business cycle on wages is studied extensively. Solon et al. [1994] found that real wages rise and fall with the business cycle. In a Danish study, Belzil [2000] found that the wages of new-hires and entry-level workers were particularly sensitive to the business cycle, with wages for new hires increasing at a higher rate than experienced workers during expansions and decreasing more rapidly during contractions. Based upon the strong economic downturn and the findings by Belzil and others, we propose the following hypothesis:

*Hypothesis 3: MIS starting salaries will be lower during a weak job market.*

Examining unemployment rates, Gautier et al. [2002] found that during difficult economic times more educated workers “crowd out” lower educated workers, leading to a higher cyclical unemployment rate of lower educated workers. While all of our MIS graduates have an equal number of years of education, the wide range of starting salaries between graduates strongly suggests that the labor market finds some graduates more desirable than others. If Gautier et al. [2002] are using education as a surrogate for “worker desirability” we might anticipate that more qualified MIS graduates with respect to GPA or internship experience may “crowd out” their peers during an economic downturn. The reasoning for this assertion is that the more qualified

graduates will be placed in the few good jobs available and the less-qualified graduates may be forced to accept less desirable, lower-paying jobs. We thus offer the following hypotheses:

*Hypothesis 4:* The nature of the job market will moderate the relationship of GPA on MIS starting salary such that the positive effect of GPA on starting salary is stronger during a poor job market than it is during a strong job market.

*Hypothesis 5:* The nature of the job market will moderate the relationship of internship experience on MIS starting salary such that the positive effect of internship experience on starting salary is stronger during a poor job market than it is during a strong job market.

### III. RESEARCH SETTING

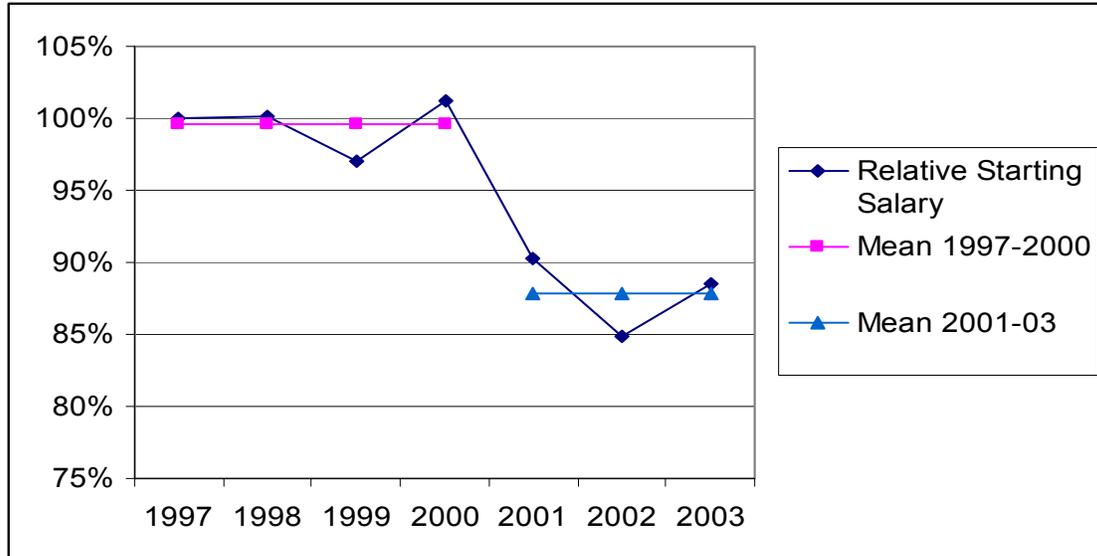
The study was conducted using data from students who graduated during the years 1997-2003 with a MIS concentration at Western Washington University (WWU), located in Bellingham, WA approximately 100 miles north of Seattle. The MIS program at WWU is part of the AACSB accredited College of Business and Economics. Graduates of the MIS program receive a bachelor's degree in Business Administration with a concentration in MIS. The MIS concentration consists of five required MIS courses and two MIS electives, for a total of seven courses. The number of courses required by WWU's MIS program is similar to the median of eight MIS courses for AACSB accredited MIS programs reported in a survey by Gill and Hu [1999]. The types of courses included in WWU's MIS concentration are also typical, consisting of courses in MIS principles, systems analysis and design, programming, database management and MIS strategy. Electives include technical topics such as telecommunications, network administration, web development, advanced database systems and expert systems. Students are not restricted in the number of MIS electives that they may take, and many take more than the two required.

Almost all of WWU's MIS graduates are placed in jobs located in the northwestern United States, many in the Seattle metropolitan area. The demand for MIS graduates in the region is served primarily from three state universities, including WWU. All three MIS programs at these universities are AACSB accredited and none require internship experience as a graduation requirement. Our discussions with local industry recruiters indicate that the proportion of graduates with internship experience (approximately half) is similar at all three institutions.

The study period includes four years of a healthy regional job market (1997-2000) and three years of a weak regional job market (2001-2003). The regional job market for WWU's graduates followed a pattern similar to that of MIS starting salaries nationally. During the "boom" years of the late 1990s, MIS graduates enjoyed plentiful job opportunities throughout the United States and within WWU's job market region. In the United States starting salaries for MIS graduates increased at a rate of 6.7% annually between 1996 and 2000 [NACE, 1997, NACE, 2001]. The largest increase in MIS starting salaries, 11.7%, occurred at the beginning of the "boom" (1997-1998 academic year) followed by more modest increases during each of subsequent boom years. Salaries for WWU's MIS graduates followed a similar pattern. The average annual growth rate was 5.3% during the boom years. The largest increase, 10.7%, occurred in 1997 followed by smaller increases during subsequent boom years. During the "bust" years, 2001-2003, MIS jobs were scarce and MIS starting salaries declined both nationally and for WWU graduates.

Figure 1 shows the relative starting salary for WWU's MIS graduates over the period of 1997-2003 (mean starting salary for each year was adjusted to constant dollars using the consumer price index (CPI) and then divided by the mean starting salary in 1997). As indicated in Figure 1, after the "bust" of the regional job market in late 2000, the mean adjusted starting salaries immediately dropped by 10% and remained 10-15% below the starting salary levels that existed during the "boom" period. When compared to the national findings reported by NACE [NACE, 2001], it appears that the regional job market for WWU's MIS graduates was hit particularly hard. This data may reflect the severity of the economic recession in the northwestern United States, which was particularly hard-hit because of the area's high dependency on the aerospace and high technology industries [Stepankowsky, 2003].

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Note: Mean starting salary for each year was adjusted by CPI index and then divided by mean starting salary for 1997. Based on N=126 MIS graduates from Study University.

Figure 1. Relative Starting Salary (CPI-Adjusted) vs. Graduation Year for WWU MIS Graduates

**IV. METHOD**

Student demographic and academic records were obtained from WWU’s administrative information system. All academic records were coded with a special identity code to preserve the anonymity of the students. Student records included demographic information and grades for all courses taken at WWU. In addition, name of employer and starting salary data were obtained from annual surveys administered by WWU’s Career Services Center. The survey was mailed every Fall to all students who graduated from the university during the previous academic year. A second mailing was then sent to all non-respondents. The survey included questions related to internship experience, employment status, employer, and annual starting salary.

**SAMPLE AND RESPONDENTS**

During the study period of 1997-2003, 403 MIS students were graduated at WWU. The average age of the MIS graduates was 24.6 years, with 25% being female and 75% being male. The median and modal age for a MIS graduate was 23 years. The typical graduate was a student who entered the university system shortly after high school and completed the university degree program within five years. However, 26% of the graduates were 25 years or older when they graduated. Based on survey data collected by the MIS department, very few of the older graduates had prior job experience in the MIS area. The average overall GPA was 2.95 on a 4.0 scale (i.e., “A” grade = 4 points, “B” grade = 3 points, etc.). The overall response rate for MIS graduates who provided starting salary data in the Career Services survey was 33%. Over half (53%) of the students in the sample gined internship experience. A very large fraction (95%) of the MIS graduates who responded to the salary survey were placed in jobs in the regional job market of the northwestern United States. The companies that hired WWU’s MIS graduates were quite diverse in terms of size and industry. No employer dominated. The largest single employer was a large insurance company that employed less than 5% of WWU’s graduates during the study period. The data set was inspected for outliers by means of standard regression diagnostics [Fox, 1991]. Following the recommended procedures [Fox, 1991; Joy, 2003; Judd and McClelland, 1989], the detected outliers were dropped from the analysis, resulting in a usable data set of 126 observations.

Statistical tests were conducted to determine if there were any differences between the respondent group and the non-respondent group with respect to the demographics. No significant differences were found between the two groups.

## MEASURES

Starting salary for MIS graduates was modeled using a regression equation similar to the model used by Agarwal and Yochum [2000] in their study of the academic labor market for new PhD students. In our model, starting salary was a function of several factors. The model variables investigated in this study are summarized in Table 1 and include variables that address both individual and employment-related characteristics. As indicated in the table, the dependent variable was starting salary adjusted by the Consumer Price Index [Bureau of Labor Statistics 2001-2002] and expressed in terms of 2003 United States dollars.

Table 1. Variable Definitions

	Description of Variable
<b>Dependent Variable</b>	
Starting Salary	Student's starting salary adjusted to year 2003 using the Consumer Price Index [Bureau of Labor Statistics 2001-2002]
<b>Main Effect Variables</b>	
Overall GPA	Grade Point Average (GPA) for all courses taken at the university. Scale ranges from 0 to 4. ("A" grade = 4 points, "B" grade = 3 points, etc.).
Internship	Indicates whether a student did or did not report job internship experience prior to graduation (No internship experience = 0, Internship experience = 1)
Job Market	Indicates job market condition (Boom = 0, Bust = 1)
<b>Control Variables</b>	
Gender	Indicates gender (Female = 0, Male = 1)
Age at Graduation	Student age at time of graduation
Size of Employer	A measure of the size of an employer based on the "Fortune 1000" list published by Fortune magazine [Fortune, 2000]. (Organization not listed in Fortune 1000 list = 0, Organization appears on Fortune 1000 list = 1)
County Income Factor	A relative measure of the average income in the county of employment (based on 2000 census data for the United States). Measure is the ratio of average county income in employment location divided by average county income for King County, WA (location of largest city in the regional job market area: Seattle, WA)

The main effect variables included grade point average (GPA) for all courses taken at WWU, internship experience, and job market period. GPA was expressed using a four-point scale ranging from 0 to 4. To investigate for any potential confounding effects associated with grade inflation or grade deflation at WWU over the study period, we conducted an analysis of mean GPA for all university and MIS graduates from 1997 to 2003. No evidence of confounds due to grade inflation or deflation were found.

In our MIS program, students who wish to receive academic credit for an internship may enroll in an independent study course, which requires the student to combine the internship experience with an extended research paper. A small subset of the students in our sample (less than 10%) received credit and a grade for the internship course. To eliminate the possibility of a confound

associated with students who did an internship and also received course credit, student GPAs were calculated without including the internship grades.

Internship experience was a categorical variable that was measured based on a student's self-report on the Career Services survey. The question on the survey was "Did you have an internship experience while you were in school?" A student who indicated no internship experience was coded as a "0," while a student who indicated internship experience was coded as a "1."

Job market period was a categorical variable that was determined based on a student's graduation year. Based on regional economic trends [Gavin, 2001] and the MIS starting salary information presented in Figure 1 for our regional job market, we defined the years of 1997-2000 to be a "boom" period and the years 2001-2003 to be a "bust" period. As indicated in Figure 1, the discontinuity across these time periods was sharp. The CPI-adjusted starting salaries for our MIS graduates stayed relatively constant within each of these periods. During the boom job market, starting salaries ranged from 0.97 to 1.01 of the 1997 starting salary level and during the bust job market the starting salaries ranged from 0.85 to 0.90 of the 1997 starting salary.

### **CONTROL VARIABLES**

To capture other personal and job-related factors that may be related to starting salary, our regressions included the following control variables: gender, age at graduation, county income for employment city, and size of employer.

Many past studies suggest that gender influences expected earnings, with male college graduates earning, on average, more than female college graduates [Fuller and Schoenberger, 1991; Jones and Jackson, 1990; Loury, 1997; Weinberger, 1998]. However, the size of the gender-earnings gap was observed to diminish over time, as findings from two recent papers suggest that the size of the gender gap shrank during the 1990's [Finnie and Wannell, 2004; Joy, 2003]. To account for the gender factor, we used a dummy control variable to indicate whether a graduate was female or male.

Previous research investigating the relationship of age to starting salary for business graduates offers mixed results. Horn and Zahn [1997] found that starting salaries for graduates over age 30 were approximately 42% greater than those of graduates under age 25. On the other hand, Fuller and Schoenberger [1991] found that age did not significantly influence starting salary. Also, a study of MIS students at an American university conducted during the period of 1999-2000 found no significant relationship between based on age [Davis, 2003]. Because it was not known whether age would be a factor for our study, we included age as a control variable.

Past studies showed that the location of an employer can influence salary levels. Using data from the U.S. Bureau of Labor Statistics, Beeson and Groshen [1991] found that incomes in large metropolitan areas average up to 36% higher than those in rural areas. Other studies also found similar effects based on employer location [Davis, 2003; Formby et al., 1993]. Although our regional job market was relatively localized, sizable differences exist in cost of living factors (e.g., housing) across the job market region. We wanted to control for this factor. The city location of each MIS graduate's place of employment was known. To provide a relative index measure for this factor, we calculated a relative income factor that was determined by dividing county income for an employer's office location by the county income associated with the largest city in the region (Seattle, WA). Data required for this calculation was determined from the year 2000 United States census findings [United States Census Bureau, 2005].

Larger employers tend to pay higher salaries than smaller employers, a differential known as the "employer size-wage" effect [Brown and Medoff, 1989]. A 1990 study found that employees of firms that employ more than 500 people earn an average of 35% higher wages than those that work in smaller firms [Brown et al., 1990]. Other studies also saw this type of effect [Barron et al., 1987; Troske, 1999]. Given the reported importance of this factor on starting salary, it was

important to find a way to control for size of employer. The name of each graduate's employer was available. To indicate whether a graduate worked for a small or large company, we used a categorical variable that classified the graduate's employer based on the "Fortune 1000" list of companies ["Fortune 1,000: Ranked within Industries," 2000]. The "Fortune 1000" list identifies the top one thousand public owned for-profit United States companies based on market capitalization and is published annually by *Fortune* magazine. .

## ANALYSES

Hierarchical multiple regression analysis using CPI-adjusted starting salary as the dependent variable was conducted to test the hypotheses. In the first step, the control variables of gender, age, county income of employment site, and size of employer were added as one block to the regression equation. We then added the variables of GPA, internship, and job market on the second step. Hypotheses 1, 2, and 3 were tested by examining the statistical significance of the  $t$  statistic for the beta coefficients for each relevant variable. In the third and fourth steps, following the approach of Cohen et al. [2003], the moderating effects of the job market variable were evaluated by adding the terms representing the interaction of the proposed moderator variable (i.e., job market) with GPA (step 3) and internship (step 4). Hypotheses 4 and 5 were tested by examining the significance of the beta for each interaction term. Any significant interactions were further explored by plotting slopes of the regression line for different values of the moderator [Jaccard and Turrisi, 2003]. To aid in the interpretation of the regression equation [Aiken and West, 1991], all continuous independent variables (i.e., age, county income, and GPA) were centered about the mean. Centering about the mean also helps to address multicollinearity issues that may be associated with moderated regression analysis [Aguinis, 2004]. The assumptions underlying the statistical tests of hypotheses were examined and no major violations were found (e.g., deviations from normality). Based on regression analysis and the review of the variance inflation factor (VIF) indices for the regression coefficients [Cohen et al., 2003], multicollinearity was not found to exist for this set of variables.

## V. RESULTS

Mean values, standard deviations, and correlations for all variables in this study are shown in Table 2<sup>1</sup>. As noted earlier, three of the variables – age, county income factor, and GPA – were centered on the mean for analytical purposes. Hence, the mean value indicated in Table 2 for each of these centered variables is zero. The unadjusted means for these variables were: age at graduation of 24.7 years, county income factor of 0.96, and GPA of 3.00 (standard deviations are the same as those indicated in Table 2).

Results obtained from the hierarchical multiple regression equations appear in Table 3. Regression coefficients and the change in  $R^2$  are shown for each step of the analysis. In the first step, the control variables were added to the regression. The  $R^2$  for this step was 0.20 and was significant ( $F = 7.39$ ,  $df = 4,121$ ,  $p < 0.001$ ). The size of employer was the only control variable found to be significant predictor of starting salary.

In the second step, the GPA, internship, and job market variables were added to the equation, resulting in a 0.29 increase in  $R^2$  ( $\Delta F = 22.54$ ,  $df = 3,118$ ,  $p < 0.001$ ). For the total equation represented by Model 2 (see Table 3), 49% of the variance in starting salary was predicted ( $F=16.14$ ,  $df = 7,118$ ,  $p < 0.001$ ).

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<sup>1</sup> Salary statistics are reported using averages (means), which is consistent with all of the literature cited in the literature review. While government reports frequently use medians to describe incomes, we found that the average absolute difference between salary means and medians was less than 3%.

Table 2. Means, Standard Deviations, and Correlations

Variables	1	2	3	4	5	6	7	8	9	10
<b>1. Starting Salary</b>	–									
<b>2. Gender</b>	.06	–								
<b>3. Age at Graduation</b>	-.02	-.03	–							
<b>4. County Income</b>	.20*	-.04	-.15*	–						
<b>5. Size of Employer</b>	.42***	-.03	.12	.20*	–					
<b>6. Overall GPA</b>	.47***	.00	.03	.13	.28***	–				
<b>7. Internship</b>	.50***	-.10	-.12	.09	.11***	.38***	–			
<b>8. Job Market</b>	-.31***	-.03	-.07	-.08	-.19	-.12	-.05	–		
<b>9. GPA * Job Market</b>	.40***	.12	-.05	.06	.20***	.63***	.34***	-.12	–	
<b>10. Internship * Job Market</b>	.17*	-.06	-.13	.02	.01*	.20*	.43***	.63***	.36***	–
<b>Mean</b>	40,246	.70	.00	.00	.40	.00	.53	.35	-.02	.17
<b>Std Deviation</b>	7,957	.46	4.65	.10	.49	.38	.50	.48	.24	.38

Notes:

- N = 126
- Starting Salary adjusted by CPI (Base year of 2003)
- Values for Age, County Income, and GPA have been transformed to be centered on the mean
- Table reports Pearson’s correlation coefficient.
- One-tailed tests of significance: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

Table 3. Results of Hierarchical Regression Analysis for Starting Salary

Variable	Model 1			Model 2			Model 3			Model 4		
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE(B)</i>	$\beta$
Constant	36761	1304		35286	1359		35497	1390		36274	1409	
Gender	1301	1409	.075	1746	1147	.10	1599	1165	.09	1847	1151	.11
Age at Graduation	-83	143	-.05	-18	117	-.01	-11	117	-.01	-1	116	.00
County Income	9260	6583	.12	5873	5344	.08	6102	5362	.08	5553	5276	.07
Size of Employer	6493	1365	.40***	4271	1155	.26***	4236	1158	.26***	4004	1143	.25***
Overall GPA				4528	1541	.22**	3727	1872	.18*	4430	1866	.21*
Internship				6076	1149	.38***	5955	1162	.37***	4375	1340	.28***
BoomBust				-3394	1121	-.20**	-3341	1125	-.20**	-6436	1762	-.39***
GPA * BoomBust							2201	2906	.07	1262	3243	-.04
Internship BoomBust *										5655	2506	.27*
<i>R</i> <sup>2</sup> for total equation (Adjusted <i>R</i> <sup>2</sup> )	0.20 (0.17)			0.49 (0.46)			0.49 (0.46)			0.51 (0.47)		
<i>F</i> for total equation	7.39 ***			16.07 ***			14.08 ***			13.52 ***		
$\Delta R^2$				0.29			0.00			0.02		
<i>F</i> for $\Delta R^2$				22.40 ***			0.57			5.10 *		

Notes:

-- N = 126

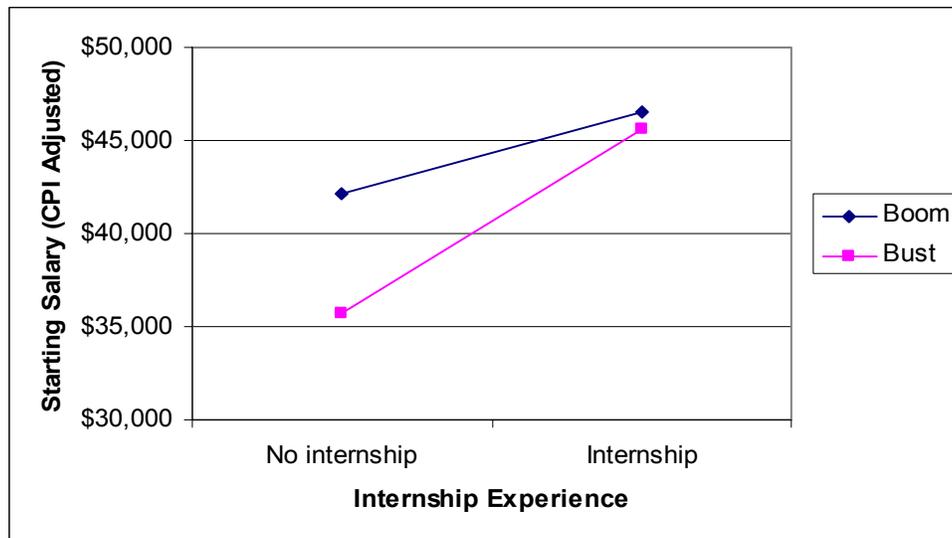
-- \* p &lt; .05, \*\* p &lt; .01, \*\*\* p &lt; .001.

Model 2 supports hypotheses 1, 2, and 3 as each of the variables added in this step were found to be significant predictors and the direction of each relationship was consistent with the hypotheses. Based on the sign of the coefficients, an increase in GPA was found to increase starting salary ( $\beta = 0.22, p < 0.01$ ), internship experience was associated with higher starting salary ( $\beta = 0.38, p < 0.001$ ), and a poor job market was associated with lower starting salary ( $\beta = -0.21, p < 0.01$ ).

For the third step, the addition of the interaction term for job market and GPA did not yield a significant increase in  $R^2$ . Hence no support was found for Hypothesis 4. It may be that there was not enough statistical power to identify an effect. Based on a 30-year review of social science research, Aguinis [2004] reported that moderated multiple regression analysis often fails to find statistically significant effects for moderators due to problems with statistical power. Using an approach described by Aguinis, the statistical power associated with the test for this proposed moderator effect was found to be low.

For the fourth step, the addition of the interaction term for job market and internship did result in a significant increase in  $R^2$  of 0.02 ( $\Delta F = 4.89, df = 1,116, p < 0.03$ ). This value for  $R^2$  falls within the typical range for the effect of a significant moderator in a non-experimental study [Champoux and Peters, 1987]. Hypothesis 5 was thus supported as this finding indicates that job market moderated the relationship between internship and starting salary. For the total equation represented by Model 4 (Table 3), 51% of the variance in starting salary was predicted ( $F=13.55, df = 9,116, p < 0.001$ ).

To explore the interaction between job market and internship, the regression equation for Model 4 was plotted for the two values of the categorical job market variable (i.e., 0 = boom period and 1 = bust period). As indicated in Figure 2, the plot provides further support for Hypothesis 5. When the job market is in a bust period, the positive slope of the line is much steeper than the slope during a boom period. For our set of data, this indicates that the positive effect of internship experience is stronger during a poor job market.



Notes:

1. Plot lines in Figure 2 correspond to the “Step 3” regression equation in Table 3 for the two different values of Job Market (0=Boom market and 1=Bust market).
2. The plot lines assume a male student (Gender =1) working for a Fortune 1000 organization (Employer size = 1) with mean-centered values of 0 for age, county income index, and GPA.

Figure 2. Starting Salary Regressed on Job Market Period: Boom and Bust Job Markets

## VI. DISCUSSION

Research that can provide insights into the predictors of starting salary for MIS graduates can help us to gain a better understanding of the ways that MIS students may best prepare themselves for the job market. The variations in findings of past studies involving business and MIS students may lead to considering the importance of factors such as GPA and internship experience on MIS starting salary. However, the findings for our study support the notion that these factors – as well as other factors – are associated with starting salary. Specifically, we found that that GPA, internship experience, job market conditions, and size of employer are all significantly related to MIS starting salary. We also found that the job market variable moderates the relationship between internship experience and starting salary. Overall, the regression model used for the study predicted over half of the variance in starting salary for MIS graduates. Key findings are discussed next.

### THE INFLUENCE OF INTERNSHIP EXPERIENCE

Based on the results of this study internship experience is the single most influential factor for predicting starting salary for MIS graduates, much more important than either GPA or the strength of job market. Internship experience is particularly important during weak job markets. As illustrated in Figure 2, we found that the job market variable moderated the relationship between starting salary and internship such that the favorable impact of an internship was stronger during a poor job market period than a good job market. Based on the regression equation represented by Model 4 in Table 3, after controlling for several factors including GPA and size of employer, internship experience during a strong job market increased starting salary by \$4,371 (US\$, CPI-adjusted to year 2003). For the conditions represented in Figure 2, the predicted starting salary for a MIS graduate with no internship during a boom period would be \$42,125, while the predicted salary for a graduate with internship experience would be \$46,496. This difference represents an internship premium of 10.4%. This difference is consistent with salary increases associated with internship experience reported for business majors. For example Gault et al. [2000] found a salary increase of 9.2%, while Fuller and Schoenberger [1991] reported an increase of 10%. However, using our regression model, the internship premium rises significantly during a poor job market. For the bust period, the predicted salary for a MIS graduate without internship experience would be \$35,727, while the predicted salary for a graduate with internship experience would be \$45,655. This difference represents an internship premium of 27.8%. Past research suggests that technically oriented internships are more valuable than non-technical internships [Carroll, 1996; Dennis, 1996]. The findings from our study indicate that technical internships may take on extra value during weak job markets.

Figure 3 illustrates the average annual salaries received by graduates with and without internship experience during the study period (left axis) as well as salary differential for the two groups (right axis). As indicated in Figure 3, the premium associated with an internship increases during the bust job market period of 2000-2003.

Participating in an internship also reduced the time it took students to find full-time employment. As shown in Figure 4, over half (52%) of the students who participated in internships were placed prior to graduation, while only 26% of those without internships were placed prior to graduation. Eighty-four percent of the students who participated in internships obtained full-time jobs within three months of graduation, while 40% of those without internships were still looking for a job three months after graduation. A chi-square test found these differences to be significant. This result is consistent with those of Gault et al. [2000].

Internship experience appears to be just as important for our older students as the younger students. Earlier, we noted that 26% of the students included in our analysis were 25 years or older upon graduation. While most of these “older” students reported that they worked prior to their university studies, very few of their jobs were in the IS field prior to entering our MIS program. Nonetheless, it might be expected that the general work experiences or maturity level of the older students would impact starting salary favorably. This expectation did not appear to

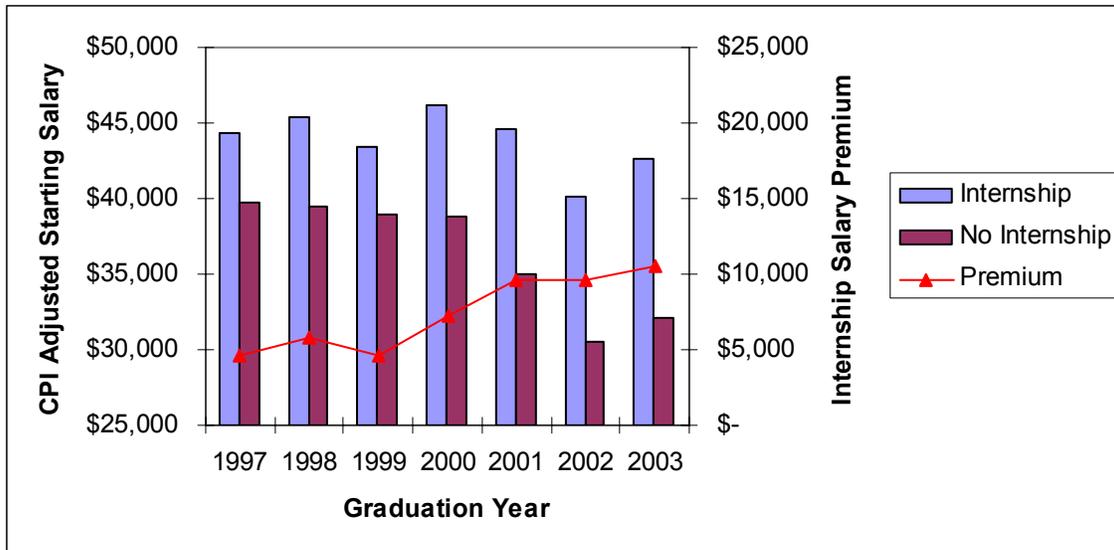


Figure 3. CPI Adjusted Salary by Graduating Year with and without Internship

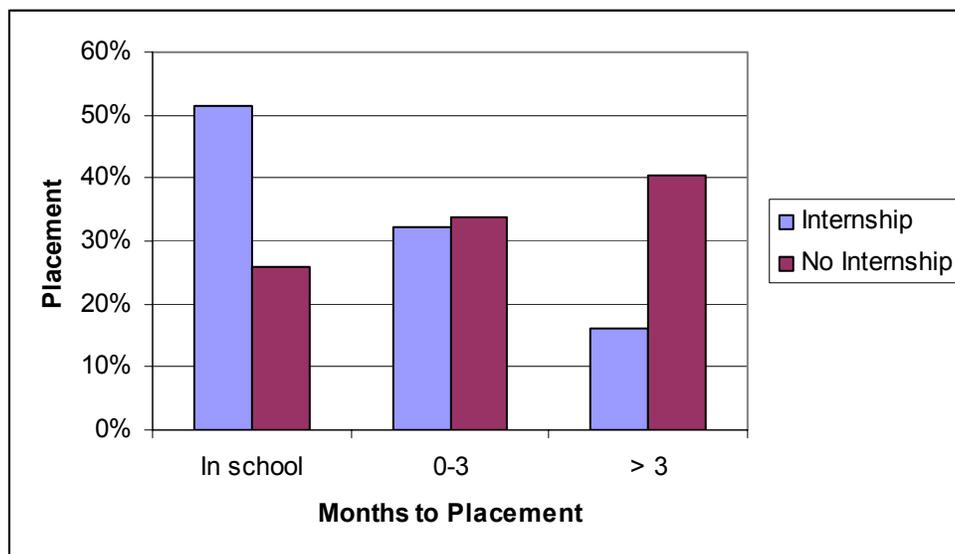


Figure 4. Time to Placement and Internship

be the case, as age was not found to be a significant factor in our regression findings. However, similar to the overall sample set, internship experience did seem to matter for the older students, because an internship was associated with a sizable increase in starting salary for them. However, older students in our study were less likely to obtain internship experience: 58% of the students who were 24 years or younger at graduation reported an internship, but only 39% of the older students. We do not know why this may be the case. It may be that some of the older students were not able to fit an internship into their schedule (e.g., a heavier class load, no

summer break), or it may be that some of them thought that they did not need an internship. Whatever the case may be, the results of our study indicate that an internship is potentially valuable for MIS students of all ages.

Our findings raise an intriguing question: If all MIS graduates obtained an internship experience, to what extent would the internship variable serve as a differentiator for predicting starting salary? The answer depends upon the underlying reasons that employers value internship experience. If employers use internship experience as a simple "screening" mechanism for selecting students who were motivated enough to seek internship experience, then requiring internship experience for all students may diminish its value relative to other characteristics of job applicants (e.g., GPA). However, if employers value the internship experience because it helps MIS graduates build or develop specific technical or interpersonal types of skills, then it is likely that the specific nature of a student's internship experience(s) would play a role in determining an internship's effect on starting salary. Some internship experiences, such as those that help a student to develop skills that are in high demand, may be more valuable than others.

### **INFLUENCE OF GPA**

While internship experience was a key determinant of starting salary, our study also found that GPA mattered. After controlling for numerous individual and employer-related variables, GPA was a significant predictor of starting salary. The positive relationship between GPA and starting salary is consistent with previous studies of business students [Dowlatshahi, 1994; Fuller and Schoenberger, 1991; Jones and Jackson, 1990]. However, our findings are not consistent with those of Fang et al. [2004] involving MIS graduates. It is difficult to ascertain why our study found significance, while the Fang et al. study did not. Differences in research design may have been a factor. The research by Fang et al. included student survey subjects from three universities and two different job market regions. It may be that disparities in grading standards across universities or disparities in the regional job markets introduced variations in the research data that masked a relationship between GPA and starting salary. Also, in the Fang et al. study, salary was measured using a Likert scale. As noted by Russell and Bobko [1992], measurement of a continuous variable by means of a Likert scale can result in information loss that can reduce the power of statistical findings. Lastly, our study design incorporated more control variables, which may help increase the chances for finding statistically significant results.

### **INFLUENCE OF SIZE OF EMPLOYER**

While not a primary focus of this study, we found that employer size was a significant predictor of starting salary. Forty per cent of the graduates in the study were employed by Fortune 1000 organizations (i.e., larger organizations) and earned CPI-adjusted starting salaries of \$44,400 during the boom period and \$44,000 during the bust period. The other 60% of the graduates were employed by non-Fortune 1000 organizations (i.e., smaller organizations) and earned CPI-adjusted starting salaries of \$39,900 during the boom period and \$34,300 during the bust period. This corresponds to an 11% salary premium for graduates who worked in Fortune 1000 companies during the boom period, and a 28% salary premium for those who worked for Fortune 1000 companies during the bust period. The employer-size premium found in our study for each of the job market periods was considerably smaller than the 35% premium reported by Brown et al. [1990]. However, there are some significant differences between the studies that may explain the differences. Brown et al. were looking at average wages for all employees in a variety of business areas, rather than the starting salaries of recent MIS college graduates. They defined a large company as 500 or more employees, where we defined it to be a Fortune 1000 company. They examined a different time period, 1983, while we examined the years 1997-2003.

As indicated by the mean salary results found, the starting salaries paid by Fortune 1000 organizations stayed quite stable during the bust years, while those of non-Fortune 1000 employers dropped sharply (Figure 5). While the Fortune 1000 organizations maintained a relatively stable starting salary rate during the bust period, it appears that the number of positions

available with these organizations decreased as the job market softened. During the boom years 46% of the graduating students were hired by Fortune 1000 companies. This proportion dropped to 27% during the bust period.

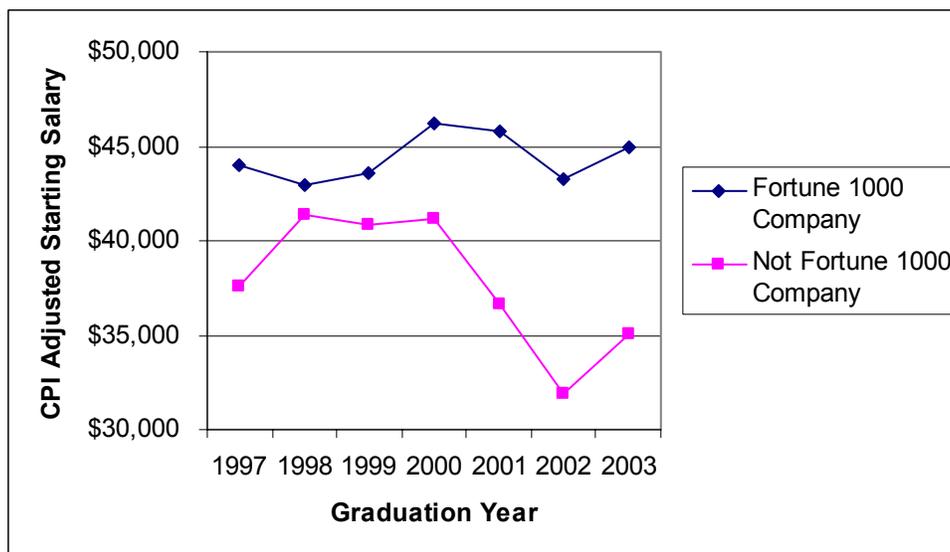


Figure 5. CPI Adjusted Salary by Employer Size

## BOOM AND BUST

As discussed earlier in this paper, MIS starting salaries dropped both nationally and for WWU graduates during the bust job market period of 2000-2003. However, a close examination of the data shows that not all students were affected equally by the downturn. In particular, graduates with higher GPAs were less affected by the economic downturn than lower-GPA graduates. For example, students in the top GPA quartile saw the mean adjusted starting salary drop from \$46,000 in the boom period to \$42,600 during the bust period, corresponding to a 7% drop from the mean pre-bust level. Students in the bottom GPA quartile saw the starting salary drop from \$37,500 to \$31,800, a 15% drop. This finding suggests that weaker students suffer more than stronger students during economic downturns.

## LIMITATIONS AND STRENGTHS

### Limitations

1. The information provided in the salary survey was self-reported data. While we have no reason to believe that graduates would knowingly misrepresent their job placement status or make errors in the self reports, it is possible that this happened for one or more survey respondents.
2. This study used a simple dummy categorical variable to describe internship experience. Although our study found significant effects for internship, it would be of interest to explore the internship factor using a more complex variable that includes greater detail on the nature of the internship.
3. Our study was conducted in a job market in which some, but not all, of the MIS graduates interned. In job markets where a higher proportion of MIS graduates gain internship experience, that experience may be a competitive necessity rather than a competitive advantage.

4. Our research sample was drawn from MIS graduates of a single institution and our results may not generalize to all types of university programs or job markets.

### **Advantages**

1. Our research setting allowed us to control for variability in starting salaries which could be a consequence of differences in program reputation, MIS curriculum, and the strength of the regional job market. The graduates of a single MIS program may also be more homogenous with regard to job experience, work habits, and academic achievement. For these reasons, several studies drew their sample from a single academic program, including Jones and Jackson [1990], Fuller and Schoenberger [1991], Dowlatshahi [1994], Knouse et al. [1999], Gault et al. [2000], and Davis [2003].

2. The longitudinal nature of the study, which covered seven years straddled the “boom-bust” periods associated with the rise and fall of the information technology industry in the United States at the turn of the century. This research study covered distinctly different job market periods in a regional area that was strongly impacted by the change in fortunes of the information technology industry. As a result, the research setting offered a strong contrast for investigating the main and moderating effects of job market conditions on MIS starting salary.

### **IMPLICATIONS FOR PRACTICE**

The practical implications of this study are that our regional labor market places a high value on MIS graduates with internship experience and strong GPAs. These benefits include higher starting salaries, faster job placement, and some protection from the negative effects of economic downturns. The significant benefits of internship experience suggest that faculty advisors and career counselors should strongly encourage MIS students to obtain internship experience prior to graduation. The value of internships appears to be even more important during poor job market conditions. Because internships are often in short supply, it can be difficult for MIS undergraduate students to find an internship on their own. To help students to gain on-the-job experience and enhance their job placement prospects, MIS programs may wish to be proactive in supporting student internships. For example, MIS programs may try to create more MIS internship opportunities by developing closer relationships with the business community using the methods described by Watson and Huber [2000]. They may also consider creating an internship office or coordinator (e.g., a MIS faculty member with a course release) and the addition of an academic requirement for a MIS internship or equivalent experience.

The study found that students who are interested in a higher starting salary may wish to target larger organizations for their job search. Large firms not only pay higher salaries, but they also appear to offer more secure employment during poor job markets. Fitzgerald and Ribar (2001) found that small firms tend to be much more dynamic than large firms, creating proportionally more jobs than large firms during economic upturns, and then eliminating more jobs during economic downturns.

### **IMPLICATIONS FOR RESEARCH**

The following are extensions of this research.

1. Increase the sample to include MIS programs in different geographic areas of the U.S. and internationally would make the results more readily generalizable and would improve our understanding of geographic location differences.

2. Examine the nature of the internship experience, such as its duration, application of MIS-related skills, industry, company size, and other variables. Such research would provide a better understanding of what types of internship experiences employers find the most valuable.

3. Broaden the subject sample to include other business majors and concentrations, such as finance, accounting, marketing, and management. This extension would make it possible to examine how the factors that were shown to influence the starting salaries of recent graduates differ across business disciplines.
4. Examine the academic records of the study's participants in greater detail to determine if starting salary is influenced by such factors as the number of MIS courses taken, which MIS courses were taken, particular course sequences taken, performance in specific courses and number of MIS and computer science electives taken.
5. Collect information for a longer time period to see if the factors that influence the starting salaries of MIS graduates change over time.

*Editor's note:* This article was received on May 31, 2005 and was published on October 1, 2005.

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- Editor's Note:* The following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web, can gain direct access to these linked references. Readers are warned, however, that
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