Models for estimating compensation for college graduates entering careers in business

Charles F Barr

University of Nevada, Las Vegas

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Models for estimating compensation for college graduates entering careers in business

Barr, Charles F., M.A.
University of Nevada, Las Vegas, 1992
MODELS FOR ESTIMATING COMPENSATION
FOR COLLEGE GRADUATES ENTERING
CAREERS IN BUSINESS

by

Charles F. Barr

A thesis submitted in partial fulfillment
of the requirements for the degree of

Master of Arts

in

Economics

Department of Economics
University of Nevada, Las Vegas
May 1992
The Thesis of Charles F. Barr for the degree of Master of Arts in Economics is approved.

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University of Nevada, Las Vegas
April, 1992
This paper examines the influence of six personal and human capital characteristics on incomes of college graduates in five different business occupational categories. The characteristics studied are age, race, sex, marital status, bachelors or advanced degree, and employment in the private or public sector. The influence of these characteristics are examined in the fields of management, marketing, accounting, banking and economics.

A theoretical earnings model is constructed and tested using regression analysis of annual earnings against the above characteristics. Separate regressions are applied to each of the five occupational categories. The results are then compared across categories to demonstrate the varying income effects of personal attributes in each profession.

Age-earnings profiles are shown for each occupation, and representative starting salaries are estimated. The thesis concludes with a discussion of how college graduates can employ the data when choosing a career path.
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INTRODUCTION

Many high school graduates planning a career in the business world decide to invest the time, effort and money to obtain one or more college degrees before entering the work force. They expect that a college education will provide them with additional marketable skills, and will result in more career advancement and higher compensation than if they enter the business world with only a high school diploma.

Their expectation is justified. According to Gary Becker,¹ the rate of return on a college education is significant (between 11 and 13 percent for white males), although the rate of return declines for those who choose to pursue advanced degrees. However, the amount of compensation can vary enormously, depending upon the personal circumstances of the graduate and the type of career that he or she elects to pursue.

The purpose of this paper is to study five different occupational categories in the business world, and assess how they differ from each other in terms of potential earnings, based upon personal circumstances such as age, sex, race, marital status, the presence or absence of an

advanced degree, and whether one chooses to work in government or the private sector. The categories to be studied are management, accounting, banking, marketing and the economics profession.

Such a study requires a database that is comprehensive and current. For this paper, the data has been taken from the March 1991 Current Population Survey, produced by the U.S. Department of Commerce, Bureau of the Census. The survey includes employment and personal data on over 57,000 randomly selected households living in the United States.

With the aid of multiple regression analysis, formulas will be developed to predict a college graduate’s future earnings, based on his or her personal characteristics and career choices. Age-earnings profiles will also be presented for each of the five occupational categories. It is hoped that this study will aid students in assessing their future education and career options.
REVIEW OF THE LITERATURE

Many books and papers have been published during the past three decades on the subject of "human capital," defined as the skill, knowledge, experience and other personal resources that can enhance an individual's productivity and income. A significant portion of the literature addresses topics that have a direct bearing on the subject of this study: factors that can influence the future earnings of college graduates.

Although this study does not compare college graduates with non-graduates, it is worth noting that a degree itself is considered a worthwhile investment. Gary Becker calculated that the return on investment for a college education was 11 to 13 percent for white males, and somewhat less for women and minorities. This return may actually be higher today, as Becker noted recently that the present income differential between high school and college graduates is the highest in the last 50 years. "Many studies have shown," says Becker, "that high school and college education in the United States greatly raise a person's income, even after netting out direct and indirect costs of schooling, and after adjusting for the better

\(^2\text{Ibid., pp. 5, 172, 178.}\)
family backgrounds and greater abilities of more educated people."

Human capital studies also show a person's age to be an important determinant of his or her current income. For example, Becker analyses the net after-tax income for white males grouped by age and education level. He finds that incomes rise sharply during the first several years a person is employed, then continue rising more slowly, peaking in the 45-54 age group, and showing a slight decline thereafter.

Becker relates this income curve to the acquisition of human capital over time, in the form of on-the-job training and improvements in job-related skills. Becker differentiates between general training, which is useful at many firms, and specific training, which is mainly of use only in the employer's firm. Employees initially pay part or all of the cost of their general training in the form of lower wages, then receive higher wages later as their productivity increases and cost of training them drops.

Tenure on one's current position also shows a significant relationship to income, according to a recent study, which found that women's wages increased by

---


5 Ibid., pp. 17-27.
approximately three percent for each year they had been in their current job."

Numerous studies have analyzed the higher incomes of whites over minorities, and men over women. Some of these studies show that inequalities in income vary widely with occupational demographics. Elaine Sorensen, for example, has uncovered evidence that earnings for men, women and minorities are highest in what she describes as "White Male Dominated Jobs," and lowest in "Minority Female Dominated Jobs." This implies that minority and female college graduates can improve their chances for high incomes by applying for jobs that have the highest concentration of white males.

In a more recent book, Sorensen points out that women have significantly narrowed the earnings gap. She reports that in the period 1978-1989, women working full-time saw their earnings rise from 61 to 70 percent of those of men. She also has good news for women college graduates

---


preparing to enter business careers: During the years 1988 to 2000, more than 40 percent of newly created jobs will be in management, professional or technical fields. "Hence," she says, "it is predicted that new jobs created over the period 1988-2000 will require substantially more education than is currently expected of workers." 9

Wage discrimination against women is lower in occupations experiencing rapid growth in employment, according to a study by Judith Fields and Edward Wolff.10

The extent to which additional education will contribute to additional earnings for women remains a matter of conjecture. A recent study of experience-earnings profiles of men and women determined that, given similar educations, men were more easily able to obtain jobs with steeper earnings profiles (i.e., higher rates of annual increase in earnings) than were women.11 Both groups benefitted from higher starting pay as a result of additional education; however, the pay gap between men and women widened as additional experience was accumulated.

Calculation of the desirability of obtaining a masters

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9Ibid., p. 53.


degree can be difficult. One study of agricultural economists reported that "assistantship levels, cost of borrowed and human capital, and nonmonetary benefits were relevant in decisions to attend graduate school."\(^{12}\) They concluded that to a significant degree, costs and benefits were both subjective.

Studies have found wage differences between private sector and public sector employment to be significant. A recent article\(^{13}\) analyzed wages in Canada, and concluded that the public sector conferred a wage advantage of 4.2 percent for men and 12.2 percent for women. No comparable study was found for the United States; however, it is possible that the results would differ considerably, since Canada's social and political system is substantially more egalitarian than our own.

In researching patterns of discrimination in the public and private sectors, John Heywood found evidence that suggests that local governments discriminate less than the federal government, and that "the federal government appears


to discriminate at least as much as the private sector.\textsuperscript{14}

Income differences arising from marital status are significant, although there is currently no consensus as to the reasons. Korenman and Neumark point out that the premium for being married goes almost exclusively to men: "Marital status coefficients for men are large and positive, while those for women are typically close to zero."\textsuperscript{15}

Their analysis of data from a large company revealed that married men were given more favorable performance reviews by their superiors than single men, with the result that they received more promotions and dominated the higher-paying jobs. The authors further discovered that the marriage premium grew with the increase in the number of years a man had been married.

While not defining a clear-cut cause-and-effect relationship, the data suggest that men can augment their income by being (and staying) married, while women can augment theirs by entering occupations and industries in which the male marriage premium is less pronounced.

It should be noted that the above studies dealt with the population at large. Since all persons studied in this paper are college graduates, the effects of the above


parameters on their incomes may differ from the effects on the rest of the population.
THE EARNINGS MODEL

Using variables discussed in the Review of the Literature, and derived from the Current Population Survey (CPS), a model has been constructed to predict earnings for college graduates in the five occupational categories under study. The empirical model is as follows:

\[ Y_i = X_i\beta + \varepsilon_i \]

where:

- \( Y \) is expected earnings.
- \( \beta \) is a vector of parameters, including a constant, to be estimated.
- \( X \) is a vector of personal and human capital characteristics: age, age squared, sex, race, marital status, bachelors or advanced degree, and employment in the private or public sector.
- \( \varepsilon \) is a vector of error terms.

Assumptions underlying the above formula are: Earnings will increase with age, but at a decreasing rate (hence the inclusion of the quadratic function). Statistically significant differences in earnings will exist due to a
person's race, sex, educational status, whether that person works for government or private industry, and whether that individual is married.

An additional variable, length of time employed by current firm (a proxy for firm-specific human capital), has not been included because the CPS database does not contain that information.

For studies of this type, regressions are often performed using the natural logarithm of earnings as the dependent variable, rather than the dollar amount. For this study, the dependent variable is actual earnings in dollars. The advantage of using actual income as the dependent variable is that the differentials represented by the dummy variables will appear as dollar amounts, allowing more meaningful comparisons of income among the occupational groups.
THE DATA

The source of the data for this study is the March 1991 Current Population Survey (CPS), produced by the United States Department of Commerce, Bureau of the Census. This extensive database, updated annually, contains comprehensive employment and other data on 57,000 households (more than 158,000 individuals) in the United States. The size and scope of the database makes it possible for the researcher to extract samples using highly specific criteria (such as age, sex, race, educational level and occupation category) while allowing most of the resulting samples to remain large enough to yield statistically meaningful results.

Five mutually exclusive samples have been derived from the CPS, one for each of the occupational groupings studied. All five samples are composed of college graduates who are currently employed full time. Self-employed persons have been excluded from the study, as their compensation and working conditions are more varied and less standardized, and thus the impact of non-quantifiable exogenous variables would be more pronounced by including such persons.

The five occupational groups sampled are in banking, marketing, accounting, management and economics. The banking sample includes all college graduates working full
time within the banking industry; the other samples includes all college graduates working full time within their respective professions, except for those in the banking industry.

For all occupations except marketing (in which commissions play a prominent role), persons reporting annual earnings of less than $15,000 have been excluded from the study, as such persons are unlikely to have been employed full time for a full year at such a low rate of pay.\textsuperscript{16}

Seven variables have been obtained for each observation: Age, earnings, and dummy variables for sex, race, marital status, education level (bachelors or advanced degree), and industry type (government or private).

The earnings variable is five digits long; therefore, any person earning $100,000 or more is represented by the figure $99,999. Fringe benefits are not calculated as part of earnings.

Sample sizes obtained for each of the five occupational groupings are as follows: management, 2,374; marketing, 1,443; accounting, 461; banking, 316; and economics, 62.

\textsuperscript{16} The regressions were also run with persons making under $15,000 per year included. The resulting sample sizes showed an increase of 8 to 12 percent; mean ages registered a small drop of 0.3 to 0.5 years; and mean income fell by factors of 6.5 to 8.5 percent. Increases in the sex and marriage differentials were recorded, while the private sector advantage declined. The effects on the remaining variables were mixed.
RESULTS OF THE STUDY

Comparison by Regression

Table 1 shows results of regressions of the earnings models applied against each of the five samples. By comparing the coefficients of the independent variables against their standard errors, it can be seen that not all independent variables are significant in all of the regressions. Nevertheless, Table 1 provides a rudimentary comparison of earnings components among the five career paths.

For the five categories taken as a whole, the dummy variable with the largest coefficient is the one that measures differences in earnings by sex. The earnings advantage of men over women averages $8,704. This is more than four times as large as the coefficient for race, and implies that, for college graduates, being a woman is a more serious bar to high earnings than being a member of a minority race.

By combining all five samples and running the regression across different age groups, it can be shown that the difference in earnings attributed to sex increases with age. Table 2 and Figure 1 show the extent of this increase. In the 20 to 29 age group, the difference is only $3,855, or 13 percent of the mean salary of $29,754. After that the
Table 1. Coefficients and Standard Errors () in Each Occupational Category Using Earnings as Dependent Variable

<table>
<thead>
<tr>
<th>Variable</th>
<th>Management</th>
<th>Mkthg</th>
<th>Accountg</th>
<th>Banking</th>
<th>Economics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-46164*</td>
<td>-29304*</td>
<td>-49816*</td>
<td>-27809</td>
<td>-111228*</td>
</tr>
<tr>
<td></td>
<td>(6543)</td>
<td>(11208)</td>
<td>(11391)</td>
<td>(15385)</td>
<td>(38949)</td>
</tr>
<tr>
<td>Age in Years</td>
<td>2823*</td>
<td>2393*</td>
<td>3321*</td>
<td>2423*</td>
<td>6577*</td>
</tr>
<tr>
<td></td>
<td>(291)</td>
<td>(390)</td>
<td>(547)</td>
<td>(771)</td>
<td>(1860)</td>
</tr>
<tr>
<td>Age Squared</td>
<td>-25*</td>
<td>-25*</td>
<td>-33*</td>
<td>-20*</td>
<td>-71*</td>
</tr>
<tr>
<td></td>
<td>(3)</td>
<td>(4)</td>
<td>(6)</td>
<td>(9)</td>
<td>(21)</td>
</tr>
<tr>
<td>Race(Dummy)</td>
<td>.3382*</td>
<td>.3838</td>
<td>.50</td>
<td>1.878</td>
<td>-.405</td>
</tr>
<tr>
<td>1 = white</td>
<td>(1358)</td>
<td>(1985)</td>
<td>(2282)</td>
<td>(2829)</td>
<td>(8456)</td>
</tr>
<tr>
<td>Sex (Dummy)</td>
<td>12091*</td>
<td>9749*</td>
<td>4952*</td>
<td>10636*</td>
<td>6094</td>
</tr>
<tr>
<td>1 = male</td>
<td>(1016)</td>
<td>(1497)</td>
<td>(1862)</td>
<td>(2245)</td>
<td>(6153)</td>
</tr>
<tr>
<td>Adv.Degree</td>
<td>3653*</td>
<td>2200</td>
<td>2794</td>
<td>10889*</td>
<td>757</td>
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<td>(1716)</td>
<td>(2157)</td>
<td>(2707)</td>
<td>(5495)</td>
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<tr>
<td>Priv.Sector</td>
<td>8903*</td>
<td>671</td>
<td>10489*</td>
<td>(N.A.)</td>
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<td>(1121)</td>
<td>(8026)</td>
<td>(2361)</td>
<td>(8399)</td>
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<tr>
<td>Married</td>
<td>4604*</td>
<td>6919*</td>
<td>4758*</td>
<td>-2030</td>
<td>5896</td>
</tr>
<tr>
<td>1 = yes</td>
<td>(1043)</td>
<td>(1520)</td>
<td>(1856)</td>
<td>(2504)</td>
<td>(5738)</td>
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<tr>
<td>Mean Income</td>
<td>48977</td>
<td>39408</td>
<td>39880</td>
<td>40907</td>
<td>45210</td>
</tr>
<tr>
<td>(Std. Err.)</td>
<td>(21221)</td>
<td>(23862)</td>
<td>(17559)</td>
<td>(18682)</td>
<td>(20222)</td>
</tr>
<tr>
<td>R-squared</td>
<td>.214</td>
<td>.111</td>
<td>.233</td>
<td>.275</td>
<td>.312</td>
</tr>
<tr>
<td>(Adjusted)</td>
<td>(.212)</td>
<td>(.106)</td>
<td>(.221)</td>
<td>(.261)</td>
<td>(.223)</td>
</tr>
<tr>
<td>Sample Size</td>
<td>2374</td>
<td>1443</td>
<td>461</td>
<td>316</td>
<td>62</td>
</tr>
<tr>
<td>Mean age</td>
<td>42.3</td>
<td>39.3</td>
<td>37.0</td>
<td>37.0</td>
<td>38.1</td>
</tr>
</tbody>
</table>

* Coefficients significant at 95 percent level of confidence.

Table 2. Mean Salary and Regression Coefficients for Sex Differentials by Age Category

<table>
<thead>
<tr>
<th>Age Group</th>
<th>20-29</th>
<th>30-39</th>
<th>40-49</th>
<th>50-59</th>
<th>60-69</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Salary</td>
<td>29754</td>
<td>42746</td>
<td>49804</td>
<td>51997</td>
<td>53381</td>
</tr>
<tr>
<td>Sex Diff.</td>
<td>3855</td>
<td>9631</td>
<td>12640</td>
<td>16682</td>
<td>15650</td>
</tr>
</tbody>
</table>

Sex Differentials in Earnings

![Graph showing sex differentials in earnings by age]

**Figure 1.**
differential steadily grows, peaking in the 50-59 age group at $16,682, or 32 percent of the mean salary of $51,997. It declines slightly thereafter. The growth of the differential over time may reflect a higher incidence of career interruptions for women than for men, and could also indicate the effects of past discrimination on older women who are now locked into lower-paying jobs.

In contrast to the Canadian findings discussed in the Review of the Literature, the regressions show Americans in the private sector earning more than their counterparts in the public sector. This discrepancy could be caused by differences in the two governments’ policies, or could reflect the bias toward high-paying jobs implicit in the samples selected for this study.

Advanced degrees and marriage generally have positive coefficients, in line with expectations. Positive coefficients are associated with age, while age squared produces negative coefficients, reflecting increasing returns to age, but at a decreasing rate.

The coefficients for age and age squared show that the effect of age upon earnings is greatest in the economics profession, least in marketing and banking occupations, and of moderate influence in the management and accounting fields.

The disadvantages of being a member of a minority race are most pronounced in the fields of management and
marketing, slight in banking and insignificant in both accounting and economics. (In the economics field, minorities appear to have a small advantage.)

The greater earnings of men over women is substantial in all five categories, but greatest in the fields of management, banking and marketing. It is considerably less in the economics profession, and least in accounting.

The premium for an advanced degree, compared to a bachelors degree, varies from over $10,000 in the banking industry to less than $800 in the economics profession.

Economists have the greatest incentive to work in the private sector rather than for government; the differential is over $12,000. In accounting, the private sector advantage is also in five figures, and in management a still respectable $8,903. By contrast, a mere $671 difference exists for marketing occupations.

The financial advantage of marriage over single status covers a narrow range from $4,604 for management to $6,919 for marketing. The sole exception is banking, where marriage appears to be encumbered by a disadvantage of $2,030.

The results shown in Table 3 confirm the hypothesis, discussed in the Review of the Literature, that nearly all of the marriage premium goes to men. The regression is the same as that shown in Table 1, with the addition of an interactive dummy variable representing married men. Given
Table 3.  
Coefficients and Standard Errors () in Each Occupational Category Using Earnings as Dependent Variable (With Dummy Variable Added for Married and Male)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Management</th>
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<th>Accountg</th>
<th>Banking</th>
<th>Economics</th>
</tr>
</thead>
<tbody>
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<td>Y Intercept</td>
<td>-43082*</td>
<td>-24904*</td>
<td>-47956*</td>
<td>-24218*</td>
<td>-111073*</td>
</tr>
<tr>
<td></td>
<td>(6598)</td>
<td>(11199)</td>
<td>(11413)</td>
<td>(15586)</td>
<td>(39137)</td>
</tr>
<tr>
<td>Age in Years</td>
<td>2811*</td>
<td>2370*</td>
<td>3324*</td>
<td>2373*</td>
<td>6654*</td>
</tr>
<tr>
<td></td>
<td>(290)</td>
<td>(388)</td>
<td>(546)</td>
<td>(771)</td>
<td>(1872)</td>
</tr>
<tr>
<td>Age Squared</td>
<td>-25*</td>
<td>-25*</td>
<td>-33*</td>
<td>-19*</td>
<td>-72*</td>
</tr>
<tr>
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<td>(3)</td>
<td>(4)</td>
<td>(6)</td>
<td>(9)</td>
<td>(21)</td>
</tr>
<tr>
<td>Race (Dummy)</td>
<td>3302*</td>
<td>3909*</td>
<td>-125</td>
<td>1584</td>
<td>-224</td>
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<td>(1974)</td>
<td>(2279)</td>
<td>(2833)</td>
<td>(8501)</td>
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<tr>
<td>Sex (Dummy)</td>
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<td>1371</td>
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<td>2274</td>
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<td>(4043)</td>
<td>(8261)</td>
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<tr>
<td>Married Male</td>
<td>6906*</td>
<td>12568*</td>
<td>6394</td>
<td>6598</td>
<td>8483</td>
</tr>
<tr>
<td>1 = yes</td>
<td>(2115)</td>
<td>(3076)</td>
<td>(3633)</td>
<td>(4824)</td>
<td>(12168)</td>
</tr>
<tr>
<td>Mean Income</td>
<td>48977</td>
<td>39408</td>
<td>39880</td>
<td>40907</td>
<td>45210</td>
</tr>
<tr>
<td>(Std. Err.)</td>
<td>(21178)</td>
<td>(23733)</td>
<td>(17518)</td>
<td>(18655)</td>
<td>(20319)</td>
</tr>
<tr>
<td>R-squared</td>
<td>.218</td>
<td>.121</td>
<td>.238</td>
<td>.280</td>
<td>.318</td>
</tr>
<tr>
<td>(Adjusted)</td>
<td>(.215)</td>
<td>(.116)</td>
<td>(.225)</td>
<td>(.263)</td>
<td>(.215)</td>
</tr>
<tr>
<td>Sample Size</td>
<td>2374</td>
<td>1443</td>
<td>461</td>
<td>316</td>
<td>62</td>
</tr>
<tr>
<td>Mean age</td>
<td>42.3</td>
<td>39.3</td>
<td>37.0</td>
<td>37.0</td>
<td>38.1</td>
</tr>
</tbody>
</table>

* Coefficients significant at 95 percent level of confidence.

that a person is married, the coefficient for this dummy variable represents the advantage of being male over being female. This advantage varies from $6,394 in accounting to $12,568 in marketing.

The total marital premium for men (compared to being single) can be found by adding the coefficient for the "married" dummy variable to the coefficient for the "married male" dummy variable. The marital premium for women is represented by the coefficient for the "married" dummy variable. For marketing and banking occupations, the coefficient for married women is negative.

Mean income is highest in management, at just under $49,000. This is caused partly by the higher average age of persons in this field (about four years older than those in the other occupational groups), and partly by the concentration of high-paying jobs at management’s upper levels. Economists come in second at over $45,000, and the other three occupational groups are tightly banded in a $39,000 to $41,000 range.

The standard errors of earnings (the dependent variable) for all five professions fluctuate around 44 percent of the mean, except for marketing at 60 percent. This indicates a wide variation in salaries, even after the independent variables are taken into account. The larger standard error for marketing may be caused by the diversity in commissions earned by individuals in that profession.
The adjusted R-squared (again with the exception of marketing) occupies a narrow band between .212 and .261, showing that all the variables, taken together, explain 21 to 26 percent of the variation in earnings. Other, less quantifiable factors, such as motivation, intelligence, personality, appearance and even luck (being at the right place at the right time) may be more significant in determining a given individual's earnings than the parameters measured in the above formula. The much lower adjusted R-squared for marketing, at .106, may also be a reflection of the importance of variations in commission earnings.

Regressions for two of the five occupations were tested for multicollinearity. The regressions tested were management, with the greatest number of observations, and economics, with the least number of observations. The regressions were each re-run six times, with a different independent variable removed each time, to test changes in the standard errors of the remaining variables. (Age and age squared were treated as a unit for this purpose.) The effects in all instances were slight, and varied in direction; in no case did the removal of a variable result in the lowering of a standard error by more than four percent. It was concluded that severe multicollinearity was not present in these regressions.

Heteroscedasticity at the five percent level of
significance was diagnosed for management occupations. A Park test was performed by regressing the log of the squared residual against the log of age squared. The resulting coefficient of 0.834 was used to transform the variables, and a weighted least squares regression was run. The resulting adjusted R-squared was lowered to .129, compared to .212 in the original regression. The coefficients of the independent variables did not deviate from the original coefficients by more than 21 percent, and they all remained significant at the 99 percent level of confidence, except for race, which remained significant at the 95 percent level. Heteroscedasticity was no longer significant.

Comparison by Age-Earnings Profile

Table 4 shows earnings by age group for each occupational category. The same data in graphic form is presented in Figure 2.

Although each category shows a unique age-earnings profile, a common pattern can be found by examining Figure 2. In all cases, earnings rise most rapidly during the early years of graduates' careers, then level off (and in some cases decline) during the later years.

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17 Heteroscedasticity tests were also run on the other four samples. For marketing, accounting and banking heteroscedasticity was not found at the five percent level of significance. For economics, heteroscedasticity was found to be present; the equation was rerun in log-linear form, and the resulting heteroscedasticity was found to be no longer significant.
Table 4.
Earnings by Age Across Occupational Groups

<table>
<thead>
<tr>
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<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>23204</td>
<td>19393</td>
<td>19424</td>
<td>27600</td>
<td>25000</td>
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<tr>
<td>25-29</td>
<td>34025</td>
<td>30740</td>
<td>28121</td>
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<td>26566</td>
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<tr>
<td>30-34</td>
<td>39190</td>
<td>38947</td>
<td>33649</td>
<td>36673</td>
<td>48101</td>
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<tr>
<td>35-39</td>
<td>48059</td>
<td>45124</td>
<td>41734</td>
<td>41073</td>
<td>60724</td>
</tr>
<tr>
<td>40-44</td>
<td>51208</td>
<td>44039</td>
<td>41164</td>
<td>47326</td>
<td>43857</td>
</tr>
<tr>
<td>45-49</td>
<td>55736</td>
<td>43465</td>
<td>46873</td>
<td>54675</td>
<td>55600</td>
</tr>
<tr>
<td>50-54</td>
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<td>41259</td>
<td>44374</td>
<td>50384</td>
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<td>55-59</td>
<td>56391</td>
<td>42528</td>
<td>53475</td>
<td>55890</td>
<td>57833</td>
</tr>
<tr>
<td>60-64</td>
<td>59897</td>
<td>45725</td>
<td>42089</td>
<td>59999</td>
<td>41000</td>
</tr>
</tbody>
</table>

Figure 2.
It should be mentioned that the categories with the greatest number of observations (such as management and marketing) show the smoothest age-earnings trend lines. The erratic behavior of the trend line for economics, on the other hand, may reflect the fact that the data set for that group contains only 62 observations.

By studying the regressions and the age-earnings profile for each category, it is possible to derive the advantages and disadvantages of each in terms of career opportunities. An overview of each category follows.

**Management**

The regression for persons in management occupations, presented in Table 1, shows all the variables to be significant at the 95 percent level of confidence, and all but race to be significant at the 99 percent level.

Management displays the highest average income of all the occupations studied. This is in part influenced by the high salaries paid to managers at the top of their profession, such as company chairmen and chief executive officers.

The age-earnings profile for management (Figure 3) shows incomes continue to increase up to retirement age, although the rate of increase slows during the later years.

Of the five categories studied, management shows the highest income differential between men and women, with a
Earnings by Age for Management

Figure 3.
$12,091 advantage to men. However, this should not necessarily discourage women from planning management careers. According to Sorensen (as cited in Review of the Literature), the income gap between men and women is continuing to narrow.

Graduates planning management careers, who are concerned with maximizing their income, should look for private sector jobs, as the regression shows an income advantage of nearly $9,000 per year over public sector jobs.

The regression shows a positive coefficient of $4,604 for the dummy variable for marriage. As pointed out in the Review of the Literature, the marriage premium applies much more strongly to men than to women.

Marketing

When applied to individuals in the marketing profession, the model appears less predictive than when applied to persons in the other four categories studied.

The adjusted R-squared of .106 shows that all the variables in the regression together explain only 10.6 percent of the variation in earnings. This compares with 21 to 26 percent in the other categories.

The high standard errors associated with some of the variables result in low t-statistics, and thus low levels of confidence that the coefficients are different from zero. The most obvious example is the dummy variable for private
vs. government employment, which displays a coefficient of 671 and a standard error of 8026, producing a t-statistic of only 0.08. Re-running the regression without this parameter actually results in a very slight improvement in the t-statistics of the remaining variables, and a small increase in adjusted R-squared.

An advanced degree shows a $2,200 advantage over a bachelors degree, but at a mediocre confidence level of 80 percent. Racial differences, with whites earning $3,838 more than minorities, exhibit an improved confidence level of just under 95 percent.

The remaining independent variables, with confidence levels of more than 99 percent, show men earning $9,749 more than women, and married persons earning $6,919 more than single persons.

The weak predictive value of the model in this case, as demonstrated by the low R-squared, may be caused by the relatively higher importance attached to non-measurable differences in individuals' personalities in the marketing profession. Commissions are often a major portion of such persons' earnings, and characteristics such as an outgoing, extroverted personality and knowledge of sales techniques may have much more influence on the size of a marketing person's commission than the variables studied here.

Although the model is less predictive for this occupation, it is worth noting that the model's coefficients
for marketing personnel are generally in line with the coefficients generated for the other four groups.

The age-earnings profile for marketing (Figure 4) shows a low entry-level income, followed by a steep rise and an early plateau. After climbing from under $20,000 in the 20-24 age group to over $45,000 in the 35-39 age group, the curve flattens out and average incomes remain in the a range of $41,000 to $45,000 for the balance of marketers' careers. It is possible that this reflects a shift of more highly paid and more productive marketing personnel into management positions, especially sales management.

Accounting

The most striking characteristic of the accounting profession, according to this model, is its lack of race and sex bias when compared to the other four categories.

The regression shows an insignificant $50 difference in annual income between whites and minorities. And the male advantage of $4,952, while significant, is the lowest among all the five groups.

Accountants earn far more—over $10,000 more—in the private sector than when working for government. Married accountants earn a respectable $4,758 more than their single counterparts. An advanced degree is worth only $2,794 more than a bachelors degree in the accounting profession.

The age-earnings profile for accounting (Figure 5)
Earnings by Age for Marketing

Figure 4.
Earnings by Age for Accounting

Figure 5.
shows entry-level earnings below $20,000, with income generally rising to a peak in the 55-59 age group, and declining thereafter. Figure 1 shows that in every age range, accounting is always the lowest or second-lowest of the five categories in terms of income.

Accounting—especially in the private sector—may be the profession of choice for women and minorities who desire a more level playing field. However, the relatively low mean income of $39,880 reflects the limitations of a career based heavily on technical and rule-based skills.

**Banking**

Graduates who desire the greatest return on their advanced degrees would do well to consider banking. According to the model, banking professionals with masters degrees or better earn a substantial $10,889 more than those with only bachelors degrees. That is three times the differential for the next highest occupation, management.

The model credits banks with a low racial differential in annual earnings (a $1,878 advantage to whites), but a high sex differential (a male advantage of $10,636).

Banking is the only one of the five categories to show a negative earnings differential for marriage. However, the standard error of $2,504, compared to the differential of $2,030, makes this finding insignificant.

Except for a slight drop in the 50-54 age group, the
age-earnings profile for banking (Figure 6) shows incomes rising for each succeeding age group. Average annual earnings exceed $50,000 for banking professionals in the 45-49 and older age groups.

**Economics**

The sample size for economists, at 62, is smallest of all the five categories. This small sample may be responsible for the erratic trend line across the nine age categories in the age-earnings profile, shown in Figure 7.

The two independent variables with the highest t-statistics are age (with a positive linear relationship) and age squared (with a smaller negative relationship, representing decreasing returns to increases in age). The regression coefficients representing age and age squared show economists to have the steepest initial rise in earnings at the beginning of their careers, followed by a substantial drop during the last 15 years before retirement.

The five dummy variables exhibit high standard errors in relation to their size, decreasing the confidence levels associated with their coefficients. In particular, the racial coefficient, showing a disadvantage of $405 to whites when compared to minorities, and the coefficient showing a $757 advantage for an advanced degree over a bachelors degree, have such weak t-statistics that the adjusted R-squared shows a slight improvement (from .22 to .25) when
Earnings by Age for Banking

Figure 6.
Figure 7.
these two parameters are removed from the regression.

The coefficient representing the advantage of men over women, at $6,094 in annual earnings, is lower than all the other categories except accounting. On the other hand, the marriage premium of $5,896 is higher than all but the marketing category. And the advantage of private over government employment, at $12,167, is highest of all the categories tested.

Except for managers, economists have the highest mean income, approximately $5,000 more than the remaining three categories. This factor, combined with the economics profession’s low coefficients for differentiation by race and sex, makes the profession worthy of serious consideration by women and minorities with an interest in maximizing their opportunities for higher earnings.

Entry-Level Salaries

Table 5 shows mean salaries in each category for men and women under the age of 25. This table can provide an approximation of the expected incomes of college graduates during the first few years of employment.

In terms of immediate earnings, the table shows women college graduates to have the highest starting salaries in the accounting field, at $26,076. The lowest beginning salaries for women are in marketing, at $18,956. Men achieve the highest immediate income of $30,122 in the
Table 5.
Mean Salaries, Standard Deviations and Number of Observations for Males and Females 25 Years of Age and Under

<table>
<thead>
<tr>
<th>Variable</th>
<th>Management</th>
<th>Mktg</th>
<th>Accountg</th>
<th>Banking</th>
<th>Economics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WOMEN</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>6662</td>
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<td>6470</td>
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<td>866</td>
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<td>35</td>
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<td>9</td>
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<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>MEN</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Salary</td>
<td>30122</td>
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<td>26611</td>
<td>26678</td>
<td>25000</td>
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<tr>
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<td>12</td>
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management field. As with women, the lowest beginning wage for men is in marketing, at $23,263.

Standard deviations in each category (other than economics, which has only three observations for women and one for men) range from just over $5,000 to nearly $20,000. This indicates that college graduates can expect to find wide variations in starting salaries, both above and below the mean.
CONCLUSION

As this paper has shown, financial opportunities for college graduates in the business world vary widely. Some of the variation is due to circumstances beyond an individual's control, such as that person's race or sex. Other factors in the equation, however, depend upon the person's choices in areas such as marriage, the pursuit of a graduate degree, and whether to seek employment in the private or public sector.

Women and members of racial minority groups who are concerned with maximizing their income opportunities will need to examine typical earnings in each category, balancing them against the income differentials shown in the dummy variables for race and sex. Higher salaries in certain professions could more than compensate for higher income differences based on personal characteristics. The accounting profession, for instance, shows less discrimination than the other four categories, but the average income is among the lowest of the five groups studied. Management, on the other hand, combines high race and sex differentials with a high mean income. A career-minded graduate will need to evaluate the combination of income variables in each occupational category, without
assigning undue importance to any single variable.

Except in banking, an advanced degree appears to add only a modest amount to a person's annual earnings. If a person were to go to school full time for two years to obtain a masters degree, the direct costs and foregone earnings could easily top $60,000. Alternatively, this amount invested at 8 percent (the current government long-term bond rate) would yield $4,800 annually. Except for banking, the additional income attributed by the regressions to an advanced degree does not appear to justify the cost. On the other hand, if the cost is partially offset by scholarships, or a student is willing to forego leisure by working while obtaining an advanced degree part-time (or desires one for additional, non-economic reasons), the pursuit of an advanced degree may then become worthwhile.

Although job tenure was not measured in this paper, evidence cited in the Review of the Literature suggests that an earnings advantage is derived from long-term association with a single employer.

Income appears to be consistently higher in the private sector than in the public sector. Moreover, with state and local governments freezing (and, in some cases, trimming) wages, the public/private differential may grow during the next several years. From an economic perspective, it makes sense for graduates to aim toward careers in the private sector.
The relatively low R-squared resulting from the regressions demonstrates that many other variables than the ones studied here will influence an individual's financial returns from his or her chosen occupation. In the long run, a person's professional abilities, attitudes and habits may be more meaningful in predicting the degree of his or her financial success. However, allowing for its limitations, this study may profitably be used by college graduates to evaluate the potential financial consequences of their career choices, enabling them to make more informed decisions regarding their future in the world of business.
BIBLIOGRAPHY


