

# **Economics: Good Choice of Major for Future CEOs**

By Patricia M. Flynn and Michael A. Quinn\*

## **Abstract**

It is often suggested that Economics is a good major for individuals interested in becoming business leaders. Despite this widespread assertion, little research has been conducted on this topic. Using the Standard and Poor (S&P) 500 companies, this paper examines the validity of such a claim. We find evidence that Economics is a good choice of major for those aspiring to become a CEO. Economics ranked third with 9% of the CEOs of the S&P 500 companies in 2004 being undergraduate Economics majors, behind Business Administration and Engineering majors, each of which accounted for 20% of the CEOs. When adjusting for size of the pool of graduates, those with undergraduate degrees in Economics are shown to have had a greater likelihood of becoming an S&P 500 CEO than any other major. That is, the share of graduates who were Economics majors who were CEOs in 2004 was greater than that for any other major, including Business Administration and Engineering. The findings also show that a higher percentage of CEOs who were Economics majors subsequently completed a graduate degree – often an MBA -- than did their counterparts with Business Administration and Engineering degrees. The paper demonstrates that while women now comprise over half of all bachelors and masters degrees awarded, they remain a minority in terms of undergraduate degrees awarded in Economics and in MBA degrees conferred. Economics programs may try to appeal to more women students as a stepping stone to becoming a CEO, especially as women continue to account for less than 2 percent of the S&P 500 CEOs.

Keywords: undergraduate major, CEO, economics degrees, gender mix of students  
JEL: A2

## **I. Introduction**

In discussing whether to major in economics as an undergraduate, the Princeton Review writes that “a thorough working knowledge of how Economics shapes businesses is necessary if you’re going to become a CEO one day” (Princeton Review 2006). This sentiment is echoed by numerous Economics Department faculty and websites. Common reasons given for the desirability of Economics in this regard are analytical and problem solving skills, knowledge of markets and the “big picture” perspective.

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In spite of these claims, and an extensive literature on trends in Economics majors, there has been little analysis on Economics being a good choice for achieving high-level business leadership positions. This paper helps fill this gap by analyzing the educational backgrounds of the CEOs of the S&P 500 companies in 2004, and by assessing the likelihood of Economics majors becoming CEOs, relative to other bachelor degree recipients.

While research is often hindered by the lack of a comprehensive data series on starting salaries and lifetime earnings, Economics majors have been shown to fare relatively well in several areas. Craft and Baker (2003), for example, found that lawyers with an undergraduate degree in Economics earn more than lawyers with other majors, *ceteris paribus*. Nieswiadomy (1998) shows that Economics majors rank first among the 14 most common majors taking the LSAT, and third among all majors taking the test. Black, Sanders & Taylor (2003) demonstrate that Economics majors earn more advanced degrees in business and in law than other majors. And among baccalaureate degree holders who do not earn a graduate degree, Black, Sanders and Taylor (2003) show that Economics majors generally earn more than their counterparts with other majors. In their study of CEOs, Boone and Kurtz (2001) note that business was the most popular undergraduate degree, but that Engineering, Economics and Humanities were also popular majors.<sup>1</sup>

In this paper we use CEO data for the Standard and Poor (S&P) 500 companies to explore the question: is an undergraduate Economics degree a good predictor for becoming a CEO? To address this question, we use statistical and econometric techniques, including logistic analysis. We find evidence to support the claim that Economics is a good choice for graduates who aspire to become a corporate CEO; especially for Economics majors who complete an MBA degree.

The paper proceeds with a discussion of the educational backgrounds of S&P 500 CEOs in 2004. This is followed by a review of trends in the absolute and relative size of undergraduate degrees awarded in Economics since 1960, and a discussion of the patterns by gender for undergraduate and MBA degrees. Thereafter, the paper examines the likelihood of individuals with Economics degrees and other degrees becoming a CEO.

## **II. Educational Backgrounds of the S&P 500 CEOs<sup>2</sup>**

Over 98 percent of the S&P 500 CEOs in 2004 had a bachelor's degree. Liberal Arts, Science & Engineering, and Business graduates are all well-represented among these CEOs. Liberal Arts graduates comprise the largest group with just over one-third (34.3%) of these business leaders. Economics majors are the largest subset of the Liberal Arts graduates, with approximately nine percent (9.2%) of the CEOs holding an undergraduate degree in Economics. Liberal arts majors in History and Political Science follow with 5.0% and 4.2% of the CEOs, respectively. Twenty-eight percent (28.1%) of the CEOs have Science & Engineering degrees, approximately three-quarters of which are in Engineering. Another 28.5% of the CEOs have undergraduate degrees in Business fields. Dominating the Business graduates are Business Administration majors, who comprise 20.7% of the CEOs; just fewer than five percent (4.8%) of the CEOs are Accounting majors, and 3.0% majored in Finance.

Thus, the three most prevalent undergraduate majors among these CEOs are Economics, Engineering and Business Administration. See Table 1 for the distribution of majors of all the S&P 500 CEOs.

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<sup>1</sup> Their article, however, does not provide the relevant share statistics.

<sup>2</sup> This section is based on data on the S&P 500 CEOs as compiled by Spencer Stuart, a leading executive search firm that annually conducts research on the backgrounds and professional experience of CEOs in the United States. Spencer Stuart provides this data free of charge on its website [www.spencerstuart.com](http://www.spencerstuart.com).

Table 1. S&P 500 CEOs by Undergraduate Major, 2004

|                                  | Number     | Percentage  |
|----------------------------------|------------|-------------|
| <u>Science &amp; Engineering</u> | 141        | 28.1%       |
| Biology                          | 6          | 1.2         |
| Computer Science                 | 6          | 1.2         |
| Engineering                      | 103        | 20.5        |
| Health Sciences                  | 6          | 1.2         |
| Sciences, n.e.c.                 | 20         | 4.0         |
| <u>Liberal Arts</u>              | 172        | 34.3        |
| Economics                        | 46         | 9.2         |
| English                          | 9          | 1.8         |
| History                          | 25         | 5.0         |
| Liberal Arts, n.e.c              | 46         | 9.2         |
| Math                             | 17         | 3.4         |
| Political Science                | 21         | 4.2         |
| Psychology                       | 4          | 0.8         |
| Sociology                        | 4          | 0.8         |
| <u>Business</u>                  | 143        | 28.5        |
| Accounting                       | 24         | 4.8         |
| Business Administration          | 104        | 20.7        |
| Finance                          | 15         | 3.0         |
| Other (Education)                | 1          | 0.2         |
| Unspecified                      | 37         | 7.4         |
| No Degree                        | 8          | 1.6         |
| <u>Total</u>                     | <u>502</u> | <u>100%</u> |

Note: There are 502 observations due to 2 companies having more than one CEO in 2004; "n.e.c" stands for not elsewhere classified.

S&P 500 CEOs received their undergraduate degrees from over 200 colleges and universities. Nineteen institutions have five or more of these CEOs as undergraduate alumni. The University of Wisconsin leads the list with 17 graduates (3.4% of the total), followed by Harvard University with 15. Princeton University, Stanford University and the University of Texas, each have 10 graduates among the S&P 500 CEOs. Approximately one in ten (11.2%) of the S&P 500 CEOs graduated from an Ivy League college or university (See Table 2).

Table 2. Dominant Undergraduate Colleges & Universities, S&P 500 CEOs, 2004

| <u>Institution</u>           | <u>Number of CEOs</u> |
|------------------------------|-----------------------|
| University of Wisconsin      | 17                    |
| Harvard University*          | 15                    |
| Princeton University*        | 10                    |
| Stanford University*         | 10                    |
| University of Texas          | 10                    |
| City University of New York  | 8                     |
| University of North Carolina | 8                     |
| University of Washington     | 8                     |
| Yale University*             | 8                     |
| U.S. Naval Academy           | 7                     |
| University of Pennsylvania*  | 7                     |
| University of Missouri       | 6                     |
| Dartmouth College*           | 5                     |
| Duke University              | 5                     |
| Michigan State University    | 5                     |
| Northwestern University      | 5                     |
| University of Notre Dame     | 5                     |
| Ohio State University        | 5                     |
| University of Alabama        | 5                     |

Note: \* Denotes Ivy League institution

Over sixty percent (61.9%) of the S&P CEOs have an advanced degree (See Table 3).

By major category, CEOs with Science and Engineering degrees led the way in obtaining advanced degrees (69.5%), followed by Liberal Arts majors (61.5%). Approximately half (49.6%) of the CEOs with bachelor's degrees in Business, subsequently earned a graduate degree.

The MBA is the most common graduate degree, held by 38.3% of the S&P 500

CEOs.<sup>3</sup> Approximately nine percent of the CEOs hold law degrees; another six percent have a Ph.D. Almost fifteen percent (14.9%) of the Science and Engineering graduates went on to complete a Ph.D., compared to 2.7% of the Liberal Arts and 2.3% of the Business majors.

Of the CEOs with undergraduate degrees in Economics, almost three-quarters (73.9%) earned a graduate degree. Over half (54.4%) of the CEOs who majored in Economics completed an MBA degree. Four percent of the CEOs with Economics majors earned a law degree; another four percent completed a Ph.D.

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<sup>3</sup> In their analysis of *Business Week's* top 1000 American corporations in 1987, Rose and Wong (1989) also found the MBA to be the most common graduate degree of CEOs. At that time, approximately 19% of the CEOs had earned an MBA.

Table 3. Graduate Degree Attainment by Undergraduate Major, S&P 500 CEOs, 2004

|   | Percentages |     |     |       | Total |
|---|-------------|-----|-----|-------|-------|
|   | MBA         | Law | PhD | Other |       |
| <b><u>Science &amp; Engineering</u></b> | 33%         | 4%  | 15% | 18%   | 70%   |
| Computer Science                        | 17          | 0   | 0   | 17    | 33    |
| Biology                                 | 33          | 17  | 0   | 16    | 67    |
| Engineering                             | 39          | 2   | 12  | 20    | 72    |
| Health Sciences                         | 17          | 0   | 17  | 0     | 33    |
| Physical Science                        | 15          | 10  | 40  | 15    | 80    |
| <b><u>Liberal Arts</u></b>              | 48          | 13  | 4   | 8     | 71    |
| Economics                               | 54          | 4   | 4   | 11    | 74    |
| English                                 | 22          | 22  | 0   | 11    | 56    |
| History                                 | 52          | 20  | 4   | 8     | 80    |
| Liberal Arts,n.e.c.                     | 55          | 19  | 4   | 6     | 83    |
| Math                                    | 35          | 0   | 0   | 6     | 41    |
| Political Science                       | 43          | 19  | 5   | 5     | 62    |
| Psychology                              | 50          | 0   | 0   | 25    | 75    |
| Sociology                               | 0           | 25  | 0   | 0     | 25    |
| <b><u>Business</u></b>                  | 37          | 7   | 2   | 7     | 50    |
| Accounting                              | 38          | 8   | 8   | 9     | 54    |
| Business                                | 36          | 7   | 1   | 7     | 49    |
| Overall                                 | 38%         | 9%  | 6%  | 11%   | 62%   |

Note: Some individuals have more than one graduate degree. Because of rounding, not all rows sum across to the total number.

### III. The Larger Context: Trends in Undergraduate Degrees in Economics and in MBAs.<sup>4</sup>

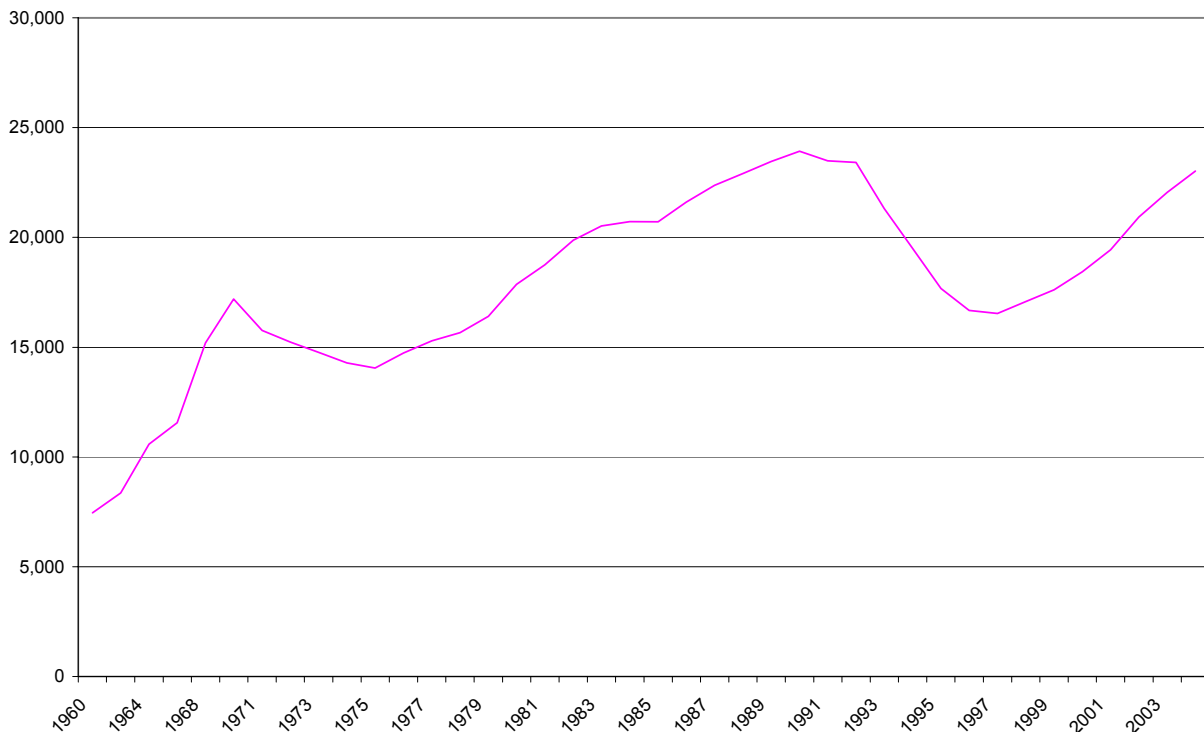
This section looks in more detail at trends in degrees awarded at the undergraduate level in Economics. Given the importance of the MBA degree, especially to CEOs who are Economics majors, trends in MBAs also are highlighted.

<sup>4</sup> The source of data in this section is the National Center for Educational Statistics, U.S. Department of Education.

## Undergraduate Degrees Awarded in Economics

The number of undergraduate degrees awarded in Economics since 1960 has risen overall, but not consistently (See Chart 1). By 2004, approximately 23,025 students graduated annually with a bachelor's degree in Economics, more than triple the number in 1960. There were, however, two major periods of decline during this period. The first was in the early 1970s, when Economics graduates fell by over 18% (from 17,197 in 1970 to 14,046 in 1975), after a decade in which their number had more than doubled. The second decline occurred from 1991 to 1997, when Economics graduates fell by almost a third (30.9%) after a 15-year period of expansion. From 1997 to 2004, Economics degrees awarded rose again, during this time by 39.2%. By 2004, the number of undergraduate Economics degrees awarded annually almost equaled those in the peak year of 1990.

Chart 1. Bachelor Degrees Awarded in Economics, 1960-2004

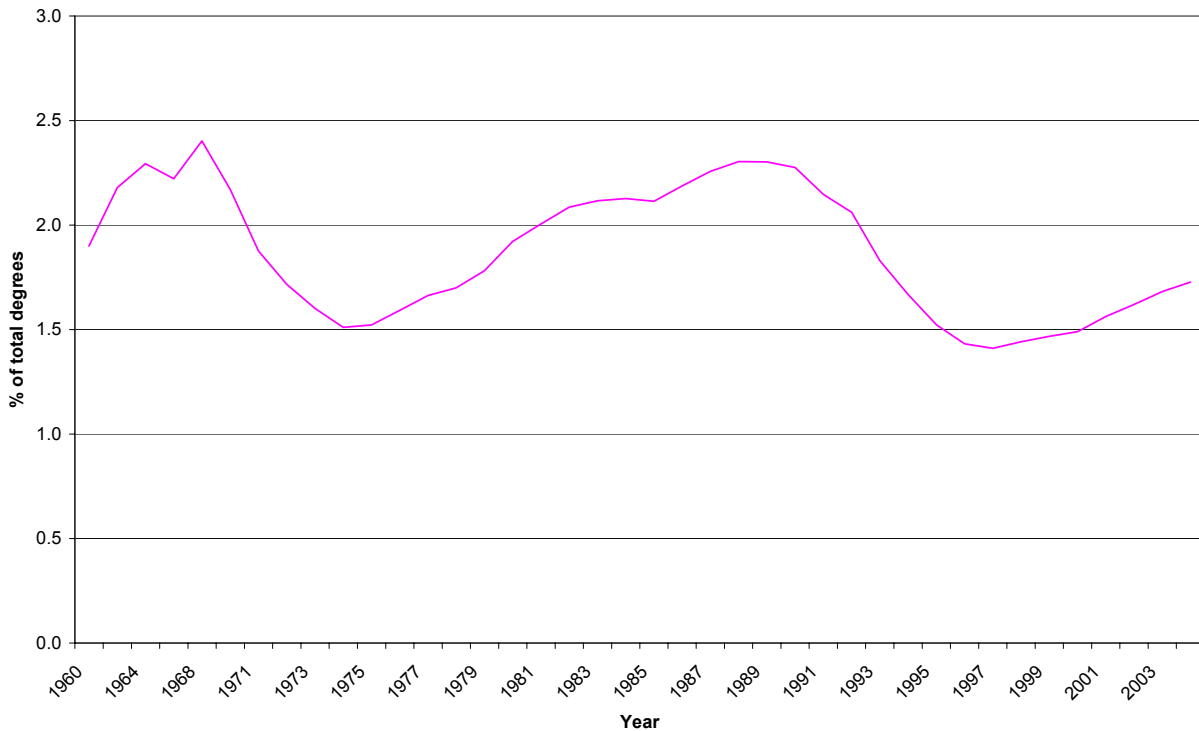




More telling is the status of Economics degrees relative to other fields. The above noted swings in Economics majors occurred during a period of long-term growth in college graduates, with the number of bachelor's degrees awarded growing by over 240% from 1960 to 2004. The share of undergraduate degrees awarded in Economics during this period fell from 1.90% to 1.73%

This share pattern, too, is cyclical (See Chart 2). Economics increased its share of bachelor degrees awarded to 2.40% in 1968, before losing ground and falling to 1.51% in 1974. Economics then gained share reaching 2.30% in 1988, but fell to a low of 1.40% in 1997. Thereafter, Economics degrees expanded relative to other majors, rising to 1.73% in 2004.

**Chart 2. Economics Majors as Share of Total Bachelor's Degrees Awarded, 1960-2004**



The cycles in Economics degrees awarded, especially the declines, have been the focus of considerable attention.<sup>5</sup> While a review of this literature is beyond the scope of this paper, the Siegfried (2005) and the Margo and Siegfried (1996) studies are worth noting here as they focus on the share of Economics degrees. These authors demonstrate that undergraduate degrees awarded in Economics exhibit a “reversion to the mean” pattern, with a long-term steady-state level of approximately 2.1%. Chart 2 provides support for this hypothesis. In this paper, we focus on Economics majors vis-à-vis their counterparts from other majors.

### **Where Did Potential Economics Majors Go?**

Which fields were students selecting instead of Economics during these periods of relative decline? The patterns in undergraduate degrees awarded during these two periods differ significantly. (See Chart 3.) In the 1970s, for instance, burgeoning student interest in business and in business degrees dominates the story resulting in the share of most non-business fields falling (Green 2002). Economics is often viewed as a substitute for a business degree, especially in liberal arts colleges that do not offer a business major (Siegfried and Wilkinson 1982; Salemi and Eubanks, 1996; Brasfield et al., 1996). From 1968 to 1975, while Economics share of total degrees was declining, the number of students graduating with bachelors degrees in business (including Business Administration, Accounting and Finance) rose by over 80%. With 76,000 additional students, the share of undergraduate degrees awarded in business rose from 12.5% to 14.4% during that period.

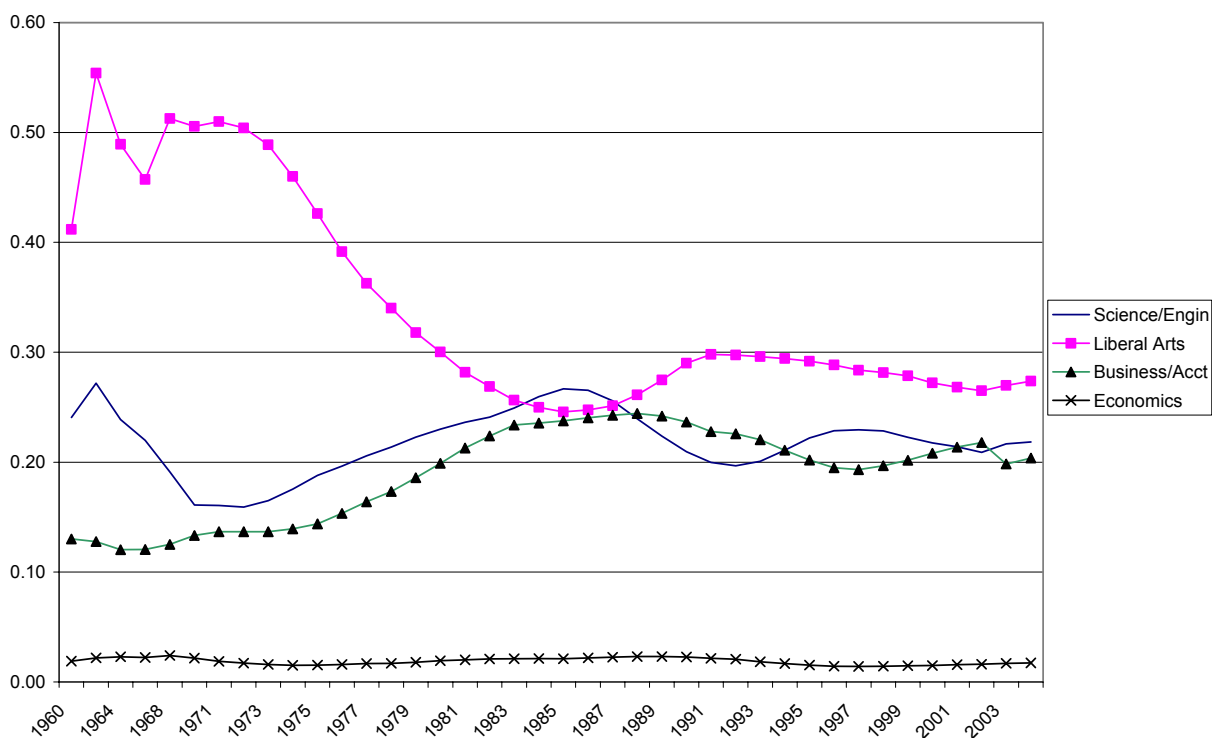
This was not the case in the 1991 to 1997 time frame. Undergraduate degrees awarded in business peaked in absolute terms (309,923) in 1992; their relative share had peaked back in

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<sup>5</sup> See, for example, Conrad, 1996; Salemi, 1996; Willis and Pieper, 1996; Siegfried and Round, 2001; Worthington

1988 (at 24.4%). The discouraged business major (DBM) hypothesis demonstrated by Salemi and Eubanks (1996) helps to explain why Economics degrees might still be considered a substitute for business and continue to fall even when Business degrees are in decline. The DBM hypothesis suggests that requirements for entry to business majors rise in periods of excess demand, as business schools exercise control over the quantity and quality of their business majors. In these situations, students who are turned away from business majors might opt for Economics as an alternative. Thus, when the number of undergraduate business degrees awarded declined in the early 1990s, students who might have been turned down in an earlier period may have been accepted as business majors, and hence not majored in Economics.

**Chart 3. Share of Bachelor Degrees Awarded, by Field, 1960-2004**



Annual surveys of college freshmen also demonstrate the decline in interest in business careers and majors following significant public attention to corporate scandals.

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and Higgs, 2004; Skoorka and Condon, 2003; and Siegfried, 2004.

Interest in business careers fell considerably in the late 1980s and early 1990s: peaking in 1987 at 24.2%, then dropping to about 14% in the early 1990s (Astin, *et. al* 2002). By 2001, interest in business careers was at a 25-year low. Interest in choice of business as a major showed a similar pattern of decline (dropping from 25.7% in 1987 to 16.6% in 2001). After 1988, teaching and medical careers became more popular, while interest in business, law and engineering fell. By 2005, there had been slight increases in interest in business careers and business majors, which rose to 15.0% and 17.5%, respectively (Pryor *et al* 2005).

Historically, freshmen have shown considerably less interest in majoring in Economics than in business, with less than one percent of college freshmen in any given year indicating intent to select Economics as a major in any given year. Freshmen interest in Economics peaked in the late 1980s (at 0.7%); after falling to a low of 0.4% in the mid 1990s, it rose to 0.6% in 2005 (Pryor *et. al* 2005).

Given Economics' unique status as a liberal arts degree as well as a substitute for business, it is also useful to see how other liberal arts degrees fared during this period. Liberal arts degrees (not including Economics) rebounded in the late 1980s and early 1990s, with 78,000 more degrees awarded in 1992 than in 1988; Sociology, History and English majors, in particular, experienced relatively high growth during that time. However, the share of liberal arts degrees awarded also fell after reaching 29.9% in 1989. Liberal arts degrees remain considerably below their peak of over 50% of all bachelor degrees awarded in the early 1970s.

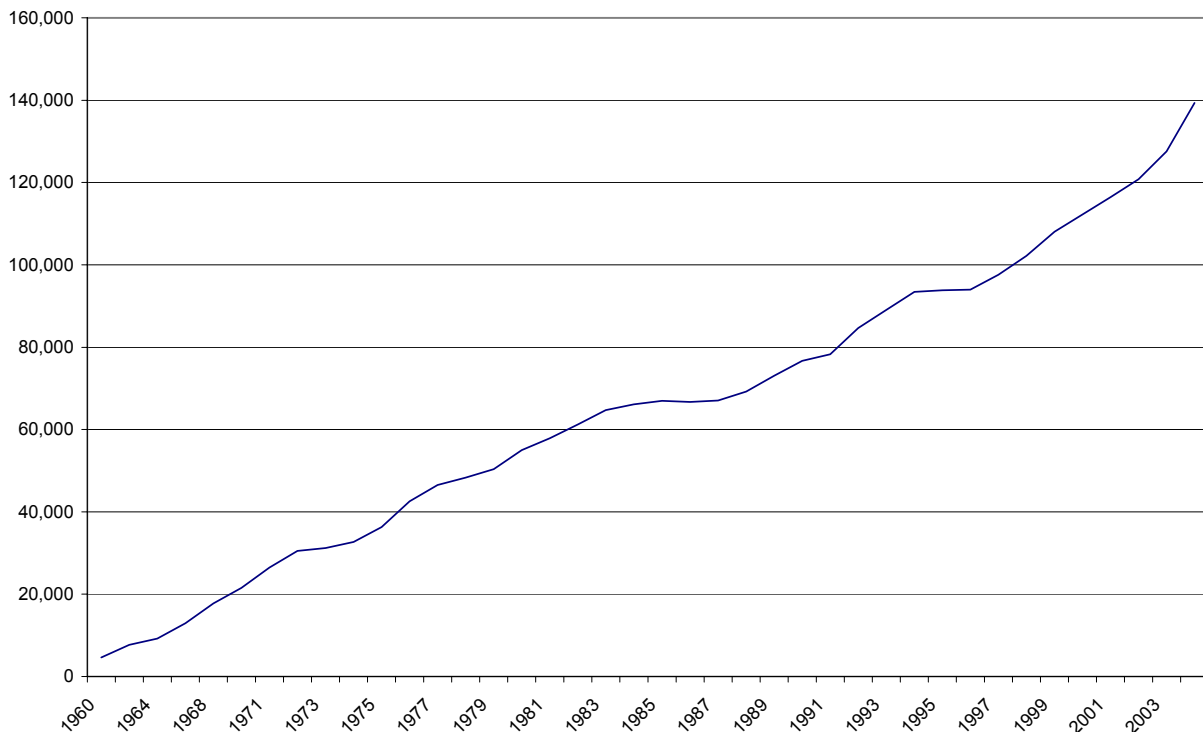
In contrast, Science degrees expanded significantly from 1992 to 1997, in both absolute (from 146,178 to 193,905) and relative (from 12.9% to 16.1%) terms. Degrees in Biology (+48.9%) and Health Sciences (+38.7%), in particular, gained in popularity during these years

and could have been the choice of students who might otherwise have selected Economics as a major.

### **MBA Degrees**

As noted above, the majority of the S&P 500 CEOs who were Economics majors also earned an MBA degree. MBA degrees awarded have continued an upward trend since 1960 (See Chart 4). They grew at a double-digit pace annually in the 1960s and throughout much of the 1970s. Their growth slowed to between 4 and 6 percent a year from the late 1970s to the mid-1980s. After a couple of years of expanding by less than one percent, they resumed their annual rate of growth of 3% or more until stalling out to growth rates of near zero in the mid-1990s. In 1997, the number of MBA degrees began to rise again and continued through 2004 to increase at annual growth rates of between 4 and 9 percent.

**Chart 4. Number of MBA Degrees Awarded, 1960-2004**



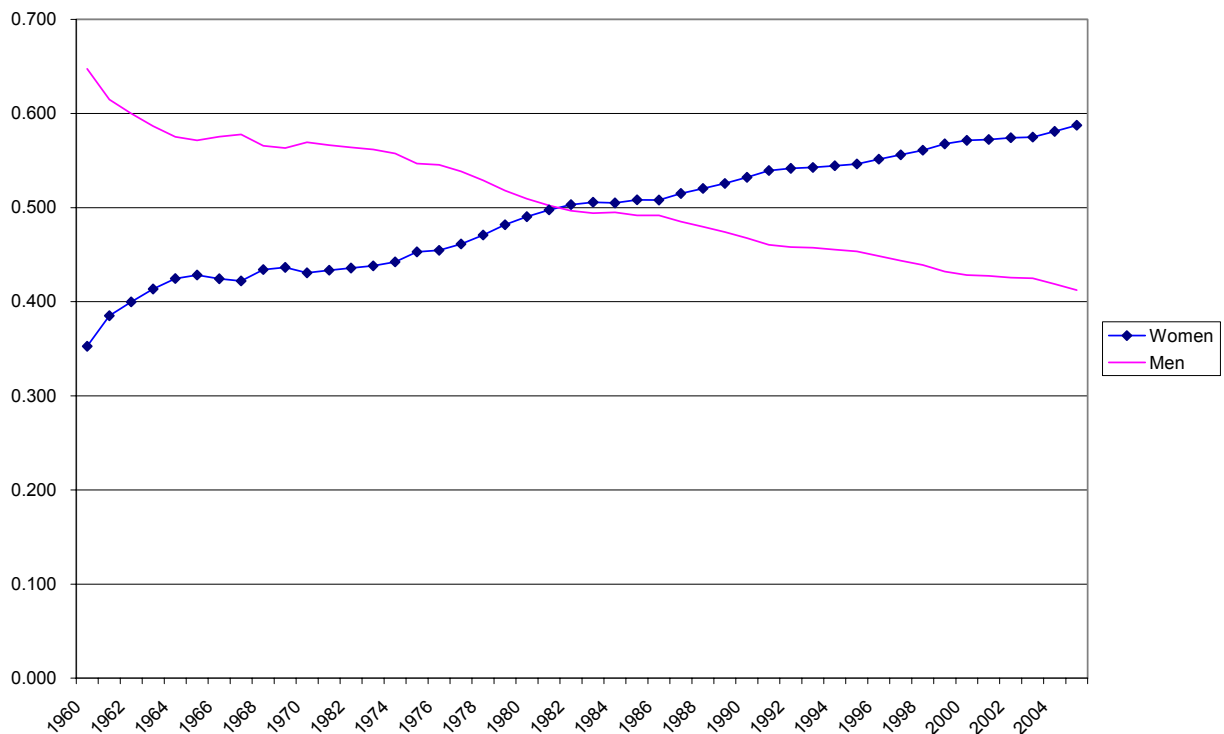
## The Changing Gender Mix

The major shift in the gender composition of college graduates in recent years has implications for both undergraduate Economics and MBA degrees awarded, and thus for the preparation of potential women CEOs.

### Undergraduate Female Students and Economics

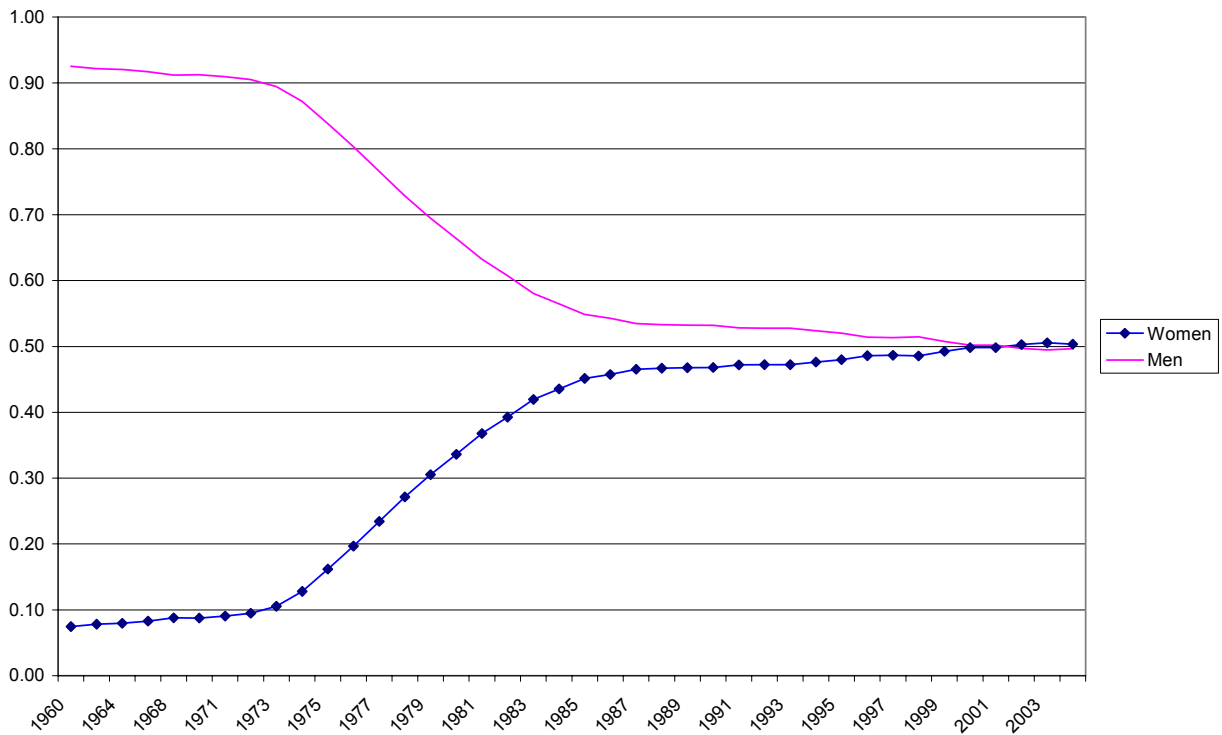
Female students have been the major thrust behind the growth in college enrollments in recent decades. Women earned 35.3% of the undergraduate degrees awarded in the United States in 1960; half (50.3%) by 1982; and 58.1% by 2004 (See Chart 5).

Chart 5. Undergraduate Degrees Awarded (Percentage), by Gender, 1960-2005



Business degrees have proven attractive to undergraduate women students. Whereas women earned just 7.5% of the bachelor's degrees in business in 1960, more women (50.3%) than men were awarded bachelor degrees in business in 2004 (See Chart 6).<sup>6</sup>

**Chart 6. Bachelor's Degrees Awarded (%) in Business, by Gender, 1960-2004**



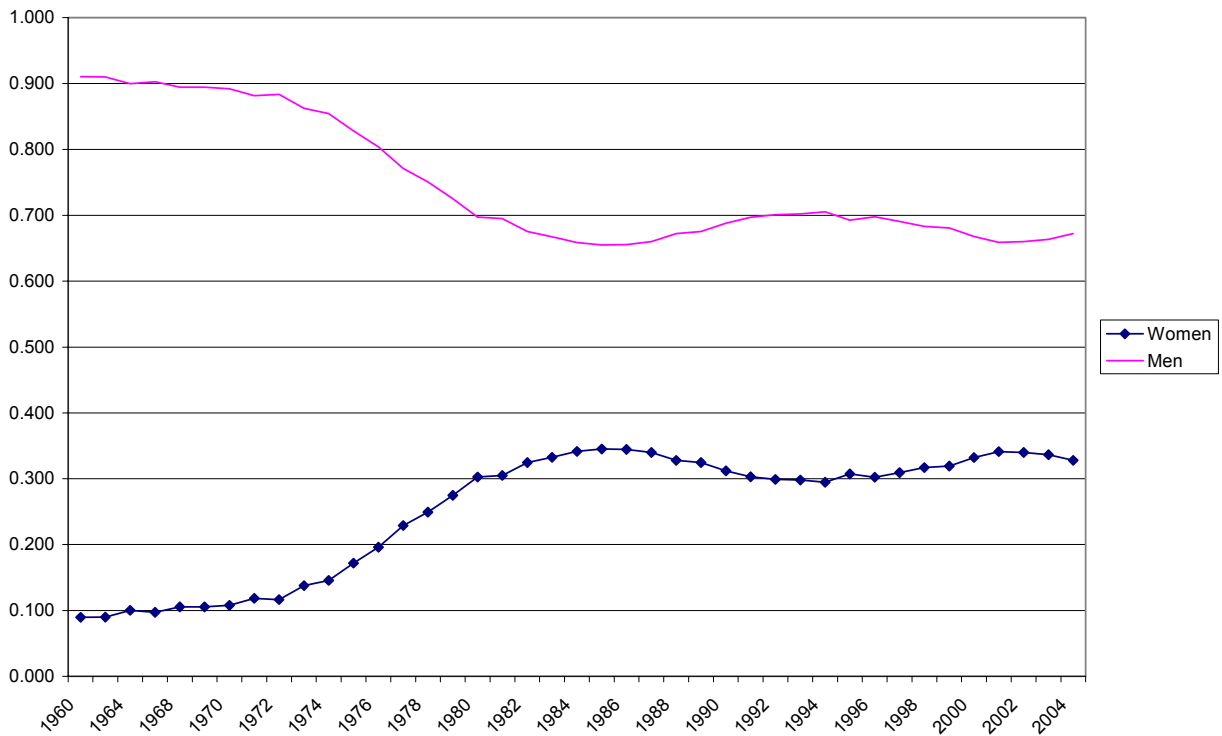
In contrast, women remain the minority in Economics (See Chart 7). Women peaked at 34.5% of Economics bachelor degree earners in the mid 1980s. After dropping in 1994 to 29.5%, women's share of bachelor's degrees awarded in Economics rose to 32.8% in 2004.

A variety of factors have been attributed to the relatively low participation of women majoring in Economics. These include a lack of female role models, a chilly and unwelcoming

<sup>6</sup> This definition of business includes Finance and Accounting, in addition to Business Administration degrees.

classroom climate, significant peer group effects, overt and more subtle discrimination, less quantitative preparation, evaluation methods that favor male learning styles, and less interest in the topics and methodologies of the field.<sup>7</sup>

**Chart 7. Bachelor's Degrees Awarded in Economics, by Gender, 1960-2004**



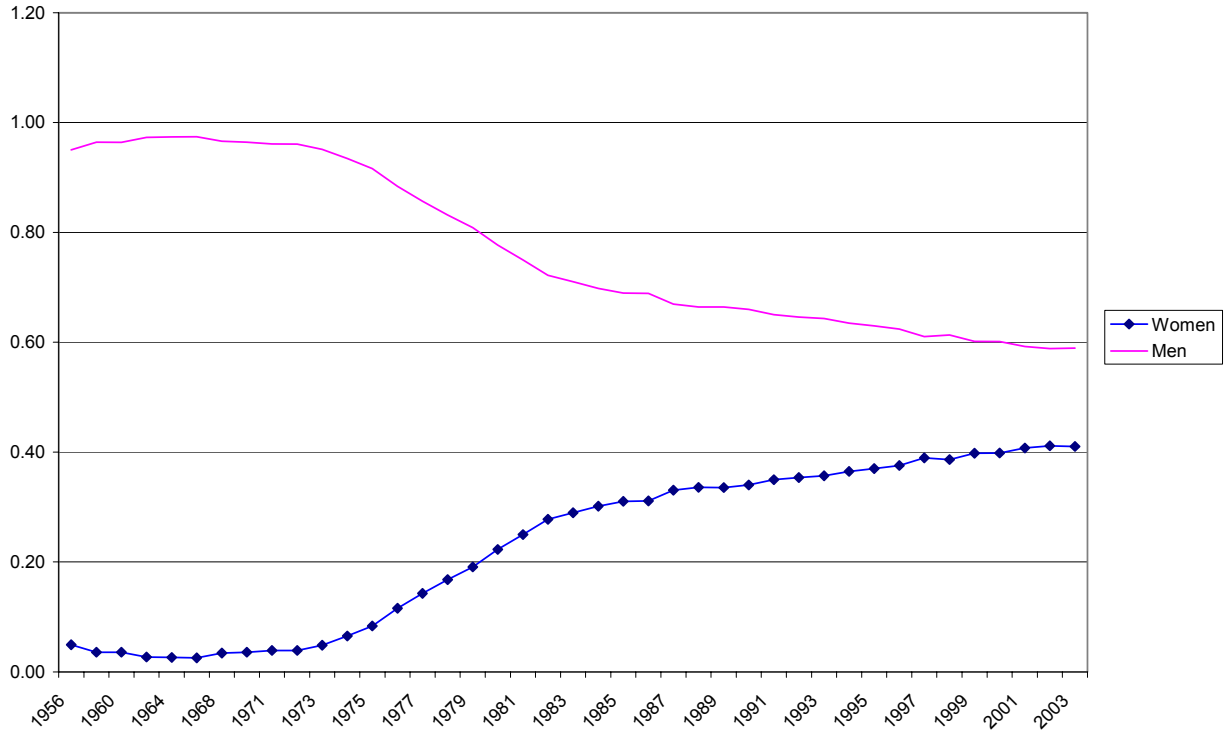
### **Women MBAs**

Women have earned more masters degrees than men since the mid 1980s. However, while more women than men earn business degrees at the undergraduate level, women are still the minority in MBA degrees awarded (See Chart 8). They have, however, risen to 42.0% in 2004 up from 33.9% in 1990 and 22.3% in 1980.

<sup>7</sup> See, for instance, Horvath et al., 1992; Ferber, 1995; Nelson, 1995; Anderson & Siegfried, 1997; Becker, 1997; Dynan and Rouse, 1997; Siegfried, 1997; Haslehurst, Hopkins and Thorpe, 1998; Hughes, 1998; Richardson, 1998;



**Chart 8. Masters Degrees Awarded (%) in Business, by Gender, 1960-2004**



#### IV. The Likelihood of Economics Graduates Becoming CEOs

As noted above, undergraduate degrees awarded in Economics are well-represented among the leading CEOs, with 9.2% of the S&P 500 CEOs in 2004 having majored in Economics. This statistic is even more compelling given the relatively small share of undergraduate degrees accounted for by Economics (around 2.0%). When adjusting for size of the pool of graduates, Economics majors are shown to have had a greater likelihood of becoming an S&P 500 CEO in 2004 than any other undergraduate major. That is, the share of Economics majors who became

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Chizmar, 2000; Jensen and Owen, 2000; Ashworth & Evans, 2001; and Worthington and Higgs, 2004.

CEOs was greater than that for any other major, including Business Administration and Engineering.

Using the data on S&P 500 CEOs in 2004, this section of the paper analyzes the likelihood of Economics majors becoming a CEO relative to their counterparts in other fields.

### **Empirical Methods and Results**

Two empirical methodologies are used to analyze the data. The first involves calculation of a ratio of relevant majors to determine the probabilities of being a CEO. The second employs a logistic regression (logit) to determine the impact of major on being a CEO.

#### *Probabilities of Becoming a CEO*

Tabulations of the number of CEOs by major tell us how many events occur, (i.e., the number of CEOs who have an undergraduate degree in Economics). However, to determine the probability of an event occurring, (i.e., the likelihood of an Economics major becoming a CEO), requires the size of the sample from which the CEOs are drawn. A ratio is calculated comparing the number of all bachelors degrees awarded in Economics as compared to each other major. This ratio varies both by major and by year. For instance, in 1971, there were 15,758 graduates in Economics and 92,285 graduates in Business Administration, resulting in an Economics/Business Administration ratio that year of 0.171. The numbers of CEOs by major and by year of graduation are then tabulated and multiplied by the appropriate ratio. The resulting ‘adjusted’ numbers of CEOs by major are then summed for the 39 years (in which CEOs in the sample were awarded their degrees) and compared to Economics (as the base category) to determine the probabilities.

Table 4 provides an example using this methodology, assuming just two majors and two degree years.

| Degree Years: $t = 1, t = 2$                                   | $t = 1$          |                | $t = 2$          |                |
|--|------------------|----------------|------------------|----------------|
|  | <u>Economics</u> | <u>Major X</u> | <u>Economics</u> | <u>Major X</u> |
| Number of CEOs   | 15               | 30             | 4                | 3              |
| Total # of Degrees Awarded (in each major)                     | 2,000            | 8,000          | 4,000            | 4,000          |
| Number of Degrees in Economics / # of Degrees in Major X       |                  | 0.25           |                  | 1.00           |
| Probability of CEO (compared to Economics) in that degree year | 1.00             | 0.50           | 1.00             | 0.75           |
| Overall Probability of CEO (compared to Economics, both years) |                  |                |                  | 0.55           |

Notes:  $0.50 = (30/15) \times 0.25$ . In  $t=1$ , there are twice as many CEOs from X but four times as many graduates, resulting in a probability =0.50. For the combined probability, the calculation is  $(30 \times 0.25 + 3 \times 1.00) / (15 + 4) = 0.55$

In this example, the probability for being a CEO from Major 'X' as compared to Economics is 0.55. This means that a student majoring in 'X' would have 55% as good a chance of becoming an S&P 500 CEO as would a student graduating with a degree in Economics. In the analysis of the S&P 500, we use this method with 14 majors (13 excluding Economics which is the base category) summed across 39 degree years.<sup>8</sup>

### *Probability Results*

The probabilities for the 14 majors are shown in Table 5 and Chart 9. The results show that individuals with an undergraduate degree in Economics had the highest probability of attaining the status of an S&P 500 CEO in 2004. Engineering is second, with 66% as high a probability as an Economics major, followed by Business Administration (42%), Physical Sciences (31%) and Political Science (31%).

Thus, while Engineering and Business Administration majors have the largest number of CEOs among the S&P 500, the probability of a graduate with an Economics major becoming a

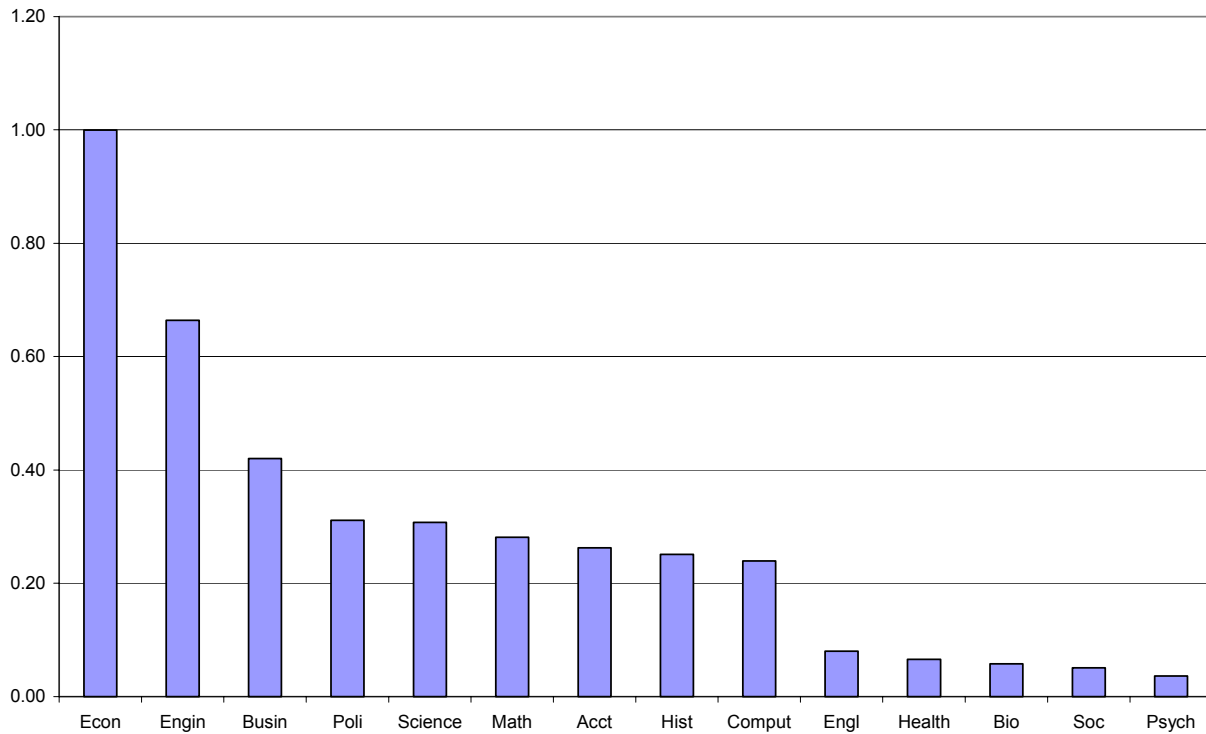
<sup>8</sup> The Education major, with only one observation, was excluded from this analysis.

CEO surpasses that of all other majors including Engineering and Business Administration. In other words, a greater proportion of graduates with an Economics major became an S&P 500 CEO than any other major. The results by major are shown in Table 5, with the percentage showing the probability by major of becoming an S&P 500 CEO, as compared to Economics.

**Table 5. Probability of Becoming a CEO in 2004, by Major, as Compared to Economics**

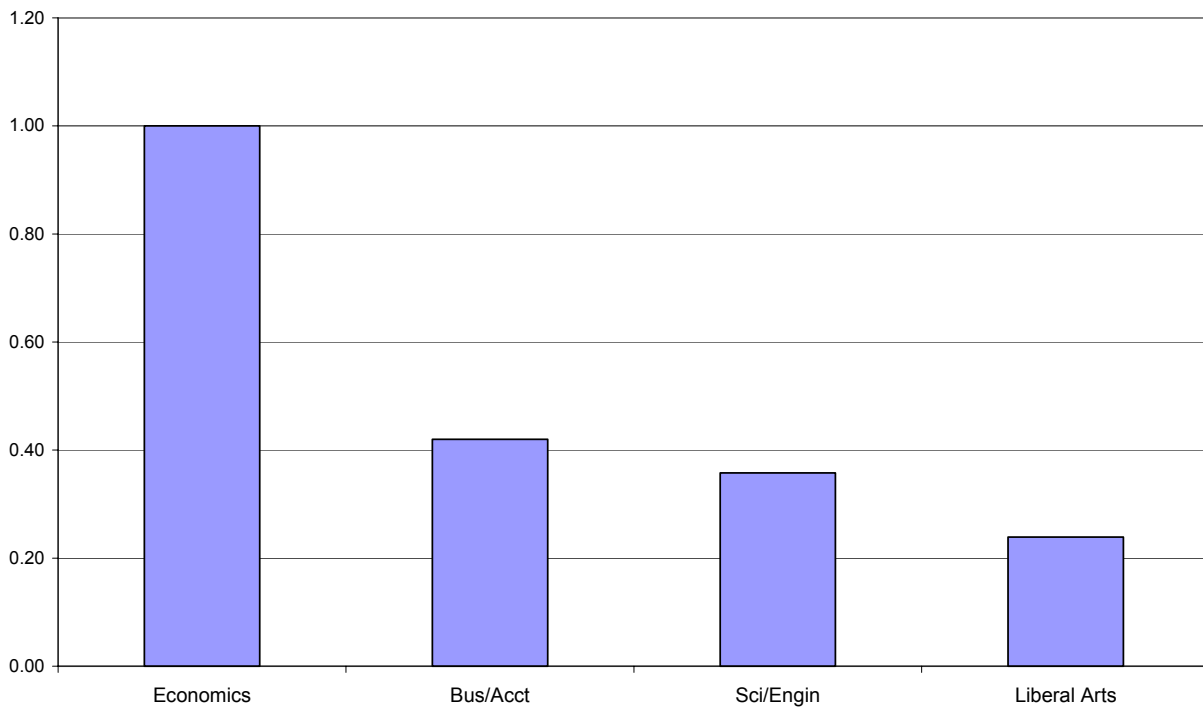
| <b>Rank</b> | <b>Major</b>      |      |
|-------------|-------------------|------|
| 1           | Economics         | 1.00 |
| 2           | Engineering       | 0.66 |
| 3           | Business          | 0.42 |
| 4           | Political Science | 0.31 |
| 5           | Physical Science  | 0.31 |
| 6           | Mathematics       | 0.28 |
| 7           | Accounting        | 0.26 |
| 8           | History           | 0.25 |
| 9           | Computer Science  | 0.24 |
| 10          | English           | 0.08 |
| 11          | Health Sciences   | 0.07 |
| 12          | Biology           | 0.06 |
| 13          | Sociology         | 0.05 |
| 14          | Psychology        | 0.04 |

**Chart 9. Probability of Becoming an S&P 500 CEO, by Major, as Compared to Economics**



Grouping the 14 majors into the four categories used earlier in the trend analysis, Economics, Business, Science & Engineering and Liberal Arts (excluding Economics), generates the results shown in Chart 10. When Engineering is combined with Science, it moves to third place, after Business.

**Chart 10. Probability of Becoming an S&P 500 CEO, by Major Category, as Compared to Economics**



*Logistic Regression: Impact of Major*

The second empirical method, a logistic regression, is used to determine the impact of major in becoming a CEO. The logit analysis, used in cases of a dichotomous dependent variable, has the dependent variable: whether or not an individual is an S& P 500 CEO. The sample used for this analysis is all individuals who graduated from U.S. colleges and universities in the same years as did the CEOs in the S&P 500 in 2004. This comprises a sample of over 15 million observations. Each of these observations is coded for major, degree year, and whether or not they were an S&P CEO in 2004.

The equation is

$$CEO_{i,m,t} = \alpha + \beta_1 Degreeyear_t + \beta_2 Major_m + \varepsilon_{i,m,t}$$

The unit of observation is an undergraduate  $i$  with major  $m$  in degree year  $t$ . The dependent variable is whether this undergraduate  $i$  with major  $m$  in degree year  $t$  is a CEO in 2004. The dependent variable is equal to 1 if the observation is a CEO and 0 if he or she is not. The independent variables are degree year and dummy variables for each of the 13 majors.

Economics is the base category, so the analysis is run excluding the dummy variable for Economics as a major. Thus, the results for other major dummy variables can be interpreted as how these majors affect the probability of becoming a (CEO=1) as compared to having graduated with Economics as a major.

### *Logit Results*

The results of the logistic analysis, shown in Table 6 and Chart 11, are consistent with the probability results provided above. All of the odds ratios are below 1.0, meaning that the base category (Economics) has the most positive impact on being CEO. The column Odds Ratio can be compared to the results in Table 5. As in the first approach, after Economics, Engineering is the highest scoring major. The odds ratio of 0.55 is interpreted as Engineering being 55% as likely as being CEO as an Economics major (or as 45% less likely). Third place is again held by Business majors.

The specific percentages by major differ for the two statistical approaches as the logit analysis, through its inclusion of dummy variables allows for major-specific intercepts, that is, other unobservable effects that the major may be having. The degree year variable is included in the logit analysis in order to capture time effects other than the changes in number of degrees,

such as the likelihood that people from certain degree years being more likely to be CEOs than individuals from other years. Including the degree year variable to account for time effects leaves the major dummy variables to capture the cross-sectional impacts of major choice. These features also account for some small differences in order of ranking of the majors, with the biggest gainer being History which rises from #9 to #5 in the relative rankings. One should note that since Economics is the base category of comparison, the Economics major dummy variable is excluded from the logit. All odds ratios are as compared to Economics. The z-statistics of all the majors variables are significant at the 1% level.

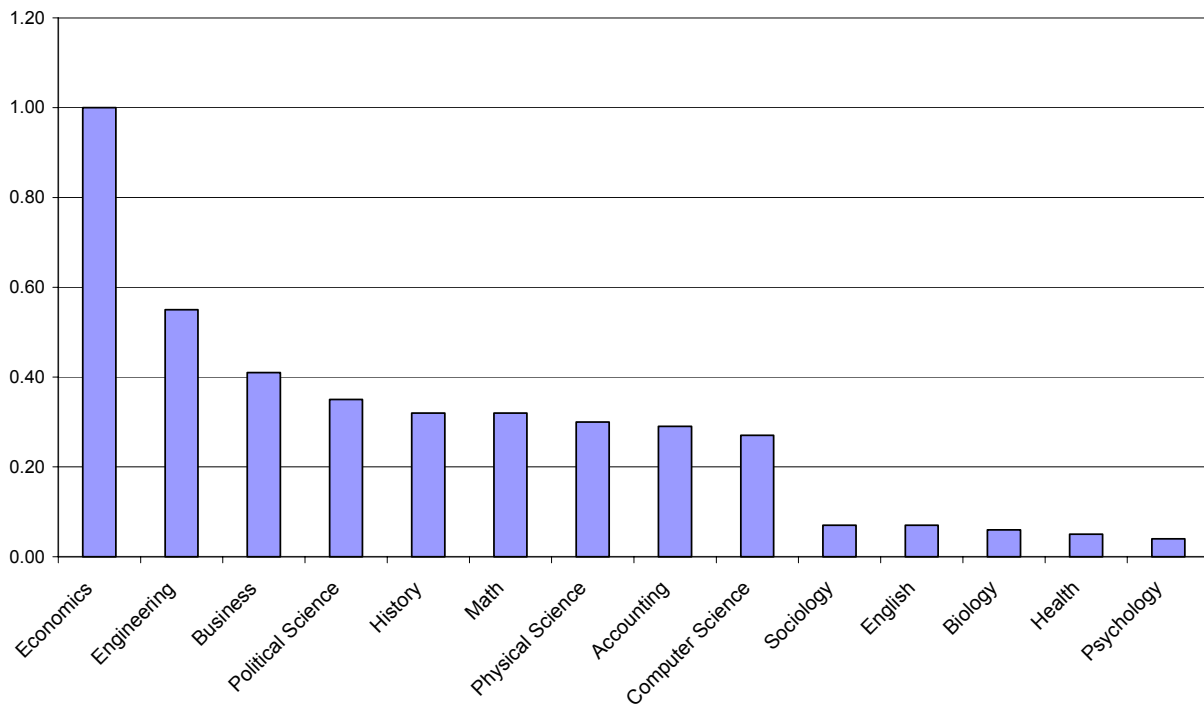
Table 6. Logit Analysis: Likelihood of CEO by Major Compared to Economics

| <u>Rank</u> | <u>Variable</u>   | <u>Odds Ratio</u> | <u>Z-statistic</u> |
|-------------|-------------------|-------------------|--------------------|
| 2           | Engineering       | 0.55              | -3.39              |
| 3           | Business          | 0.41              | -5.10              |
| 4           | Political Science | 0.35              | -4.02              |
| 5           | History           | 0.32              | -4.61              |
| 6           | Mathematics       | 0.32              | -4.06              |
| 7           | Physical Science  | 0.30              | -4.52              |
| 8           | Accounting        | 0.29              | -4.85              |
| 9           | Computer Science  | 0.27              | -2.99              |
| 10          | Sociology         | 0.07              | -5.06              |
| 11          | English           | 0.07              | -7.13              |
| 12          | Biology           | 0.06              | -6.52              |
| 13          | Health Sciences   | 0.05              | -7.06              |
| 14          | Psychology        | 0.04              | -6.02              |
|             | Observations      | 15,514,554        |                    |
|             | Log likelihood    | 4592.99           |                    |

Notes: Economics, the base category, ranks 1. Degree year variable is included in logit. All odds ratios are as compared to Economics.

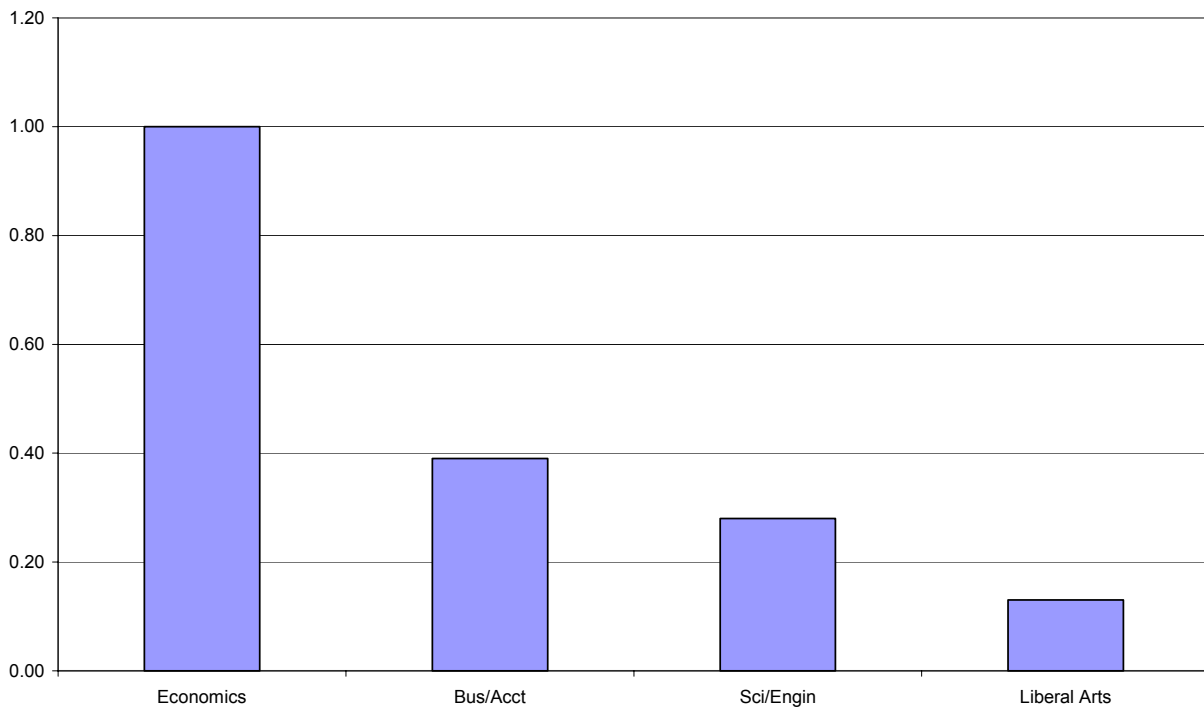


**Chart 11. Logit Results - Likelihood of CEO by Undergraduate Major as Compared to Economics**



Grouping the 14 majors into the four categories used earlier provides the results shown in Chart 12. These results are similar to those shown in Chart 10 using the probability ratios.

**Chart 12. Logit Results - Likelihood of CEO by Undergraduate Major Category as Compared to Economics**



### *Additional Analyses*

In order to test for robustness, several additional analyses were also performed. For the sake of brevity, these results are not included in the paper but are available on request. The first additional check for robustness is done by splitting the sample into two subsamples based on the degree year variable. The relative ordering of the top five majors is consistent based on several different break years. The different degree years tested as structural breaks were 1967, 1970, 1975 and 1978.

As a test of the Discouraged Business Major (DBM) hypothesis we split the sample based on whether the share of Economics' majors was rising or falling for that year. The analysis did find that the relative ordering of the top three majors was consistent across the two subsamples: Economics, Engineering and Business Administration (including finance). In trough (versus

peak) years for Economics, Engineering is eight points higher (.59 versus .51) but Business is two points lower (.40 versus .42). The Physical Sciences gained 14 points (.37 versus .23) and Political Science gained 14 points (.42 versus .28). The fall in the Business majors' likelihood during trough years for Economics goes against the prediction of the DBM hypothesis.

Economics did, however, fare slightly less well in trough years than in peak years but Business is not the field that seems to be benefiting from it.

The third additional test re-ran the analyses with the earliest year of data available from Spencer Stuart, which is 2000. The results are consistent to those from the S&P 500 for the year 2004 that are reported in the body of the paper. The probabilities of Engineering and Business fell from 0.66 to .62 and from .42 to .37, respectively. Economics maintained the highest likelihood.

## **Summary and Conclusions**

The Economics major is a good choice for prospective CEOs. When adjusting for the size of the pool of graduates, Economics majors are shown to have had a greater likelihood of becoming a CEO in 2004 than other majors. That is, the share of graduates who were Economics majors who became an S&P 500 CEO was greater than that for any other major, including Business Administration and Engineering. Engineering majors were 66% as likely as Economics majors to become a CEO; Business Administration majors, 42%.

Economics majors aspiring to become CEOs should plan on attending graduate school, and consider, in particular, earning an MBA. Almost three-quarters (73.9%) of the CEOs with

undergraduate degrees in Economics, also completed an advanced degree. The majority (54.4%) of the CEOs who had majored in Economics, held an MBA degree.

The CEOs who majored in Economics earned their bachelor and advanced degrees at a variety of institutions. At the undergraduate level, they graduated from 38 colleges and universities; 30.4% from Ivy League institutions. At the graduate level, 16 institutions were represented; in terms of just the MBA, 11 institutions had conferred their degrees.

Less than 2% of the S&P 500 CEOs in 2004 were female. One of these six women majored in Economics as an undergraduate. Women have been the major thrust behind the growth in college graduates in recent decades, and by 2004 accounted by 58.1% of bachelor's degrees awarded. Women remain, however, underrepresented in Economics. In 2004, women accounted for one-third of undergraduate degrees awarded in Economics, an increase over 1994, but below their peak (34.5%) in the mid-1980s. In contrast, women received just over half (50.3%) of the undergraduate degrees awarded in business in 2004.

Women also now earn more masters degrees than do men, but are still a minority (42.0%) in terms of MBA degrees awarded. Women's participation in MBA programs has, however, exhibited an upward trend, and their share of MBA graduates has almost doubled since 22.3% in 1980. Moreover, freshman surveys show females are now more interested than their male counterparts in obtaining a graduate degree. By 2005, two-thirds (75.5%) of freshman females expressed interest in pursuing an advanced degree, up from 45.0% in 1966. The comparable figures for freshmen males are 70.7% in 2005 and 62.4% in 1966. Freshmen females, however, showed the greatest interest in continuing their education in law and medicine, rather than business.

Economics programs and faculties can try to appeal to more women students as a stepping stone to a career as a CEO. They may, however, be more successful in attracting women students to Economics as a precursor to studying law, especially given the track record of Economics majors in excelling in the LSAT exam and in outperforming other majors in the earnings of lawyers.

Lastly, this research poses an interesting conundrum. Expanding the marketing of the Economics major as the one which has had the greatest probability of becoming a CEO relative to other majors, could expand the pool of Economics majors and possibly the number of CEOs with these degrees. If the share of undergraduate degrees awarded in Economics also increases, then this larger share could actually reduce the statistical likelihood of any given Economics major becoming a CEO relative to other undergraduate majors.

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