

ECONOMIC DIRECTIONS

CENTER FOR ECONOMIC AND POLICY EDUCATION, SAINT VINCENT COLLEGE, LATROBE, PENNSYLVANIA

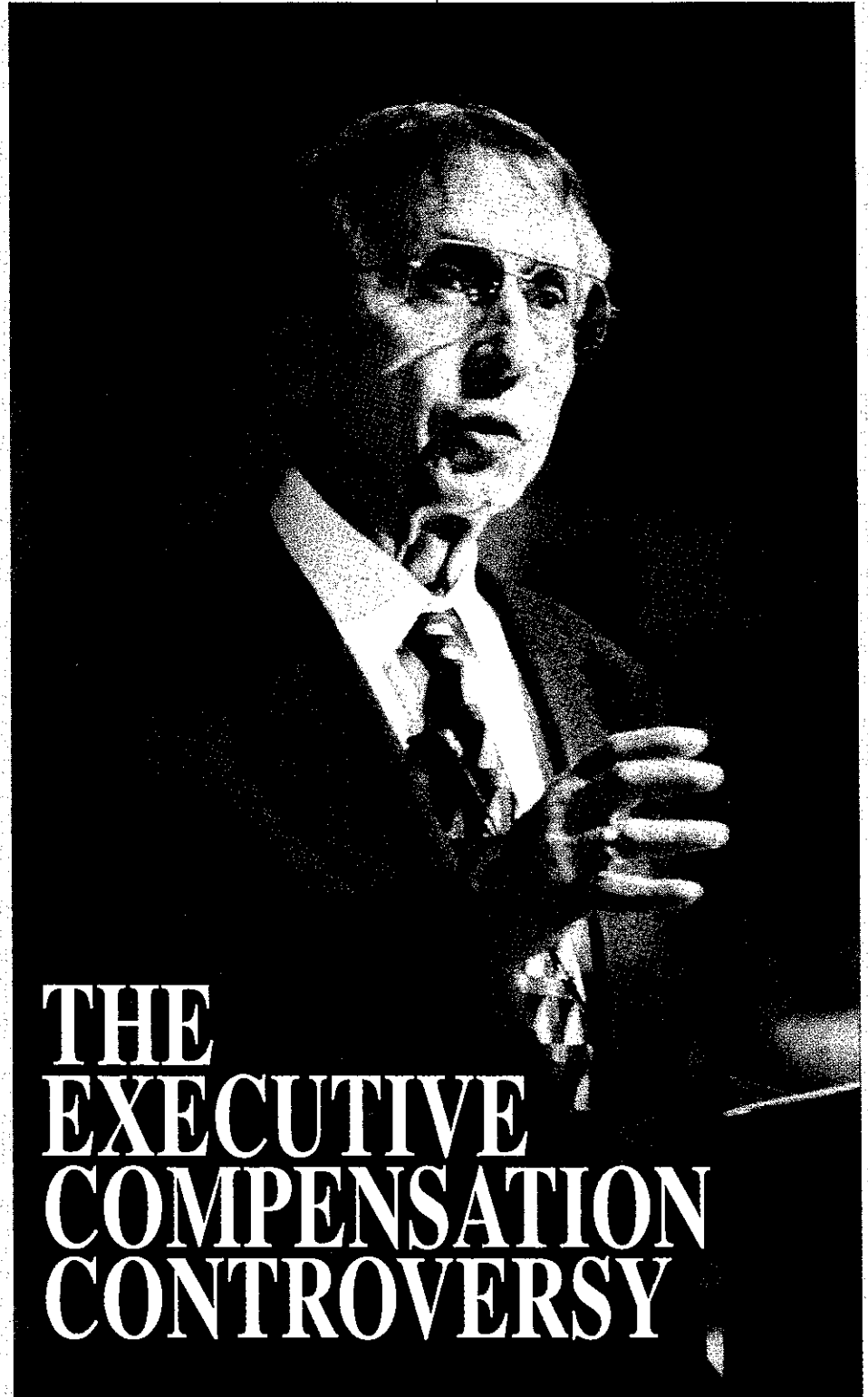
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(The following is a lecture delivered by Dr. Richard M. Cyert, President Emeritus and Margaret S. Cyert, Professor of Economics and Management at Carnegie Mellon University, at Latrobe Pennsylvania, on October 29, 1997 as the 39th lecturer in the Alex G. McKenna Economic Education Series.)

In recent years there has been a loud outcry about the size of executive compensation, particularly the compensation of chief executive officers. More generally, management compensation has been a topic of public interest since Berle and Means pointed out the problems that arise from the separation of ownership and control, which is the essence of the modern corporation. Because of this separation, executives can control vast resources of which they are only partial owners at best. Executives are rewarded for this control by directors who are elected by the owners. These directors determine the compensation that the executives receive. The seemingly high level of compensation, and its alleged weak relationship with performance, have caused a furor and have excited public interest generally.

There are a number of theories in the literature on the determination of top management compensation. In the economics literature there is the marginal productivity theory and, more recently, agency models. In the organizational theory literature, top management compensation has been related to the number of levels in the organizational hierarchy. All of these have given interesting and enlightening insights into the problem. None, however, get into the process by which CEO compensation is determined. In principle, the stockholders (i.e., the owners) determine compensation. In practice, the shareholders delegate the decision-making authority to the board of directors (BOD). In turn, the BOD delegates to a compensation committee, with ultimate approval remaining with the BOD.

The reasons for vesting this discretionary power in the board are fairly obvious. Uncertainties of the business environment make it difficult to anticipate future decisions and the circumstances in which they will have to be made. The CEO cannot return to the



THE EXECUTIVE COMPENSATION CONTROVERSY

shareholders on a continual basis to get their approval of decisions. Even if such direct participation of shareholders were feasible, there is no obvious mechanism by which thousands of shareholders could collectively make complex business decisions of the firm. Thus, it is clear that the personal interaction between the members of the BOD and the executive will likely influence compensation apart from productivity and incentive considerations.

This interaction can be viewed as kind of a bargaining relationship between the CEO and the members of the BOD. While I do not fully agree with this concept, I will go along with it and will critique the concept after I have given some of the empirical results. One hypothesis derived from viewing the setting of compensation this way is that there should be an inverse relationship between the CEO compensation and the size of the equity holdings of the compensation committee of the BOD. The hypothesis is derived from the fact that increases in compensation are a cost to the shareholder. Of course, the incentive benefits of increasing compensation with the resulting benefits to the shareholder also have



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to be recognized.

We have attempted to test this hypothesis by a lab experiment as well as statistically with a new pool of data which will be described shortly. First, we will discuss the experiment. Experimental economics has come a long way, and, with proper design, experiments can throw light on a number of important questions. In this particular case, a business game was designed.



There were five firms, each operated by a CEO. The firm was a computer program. In addition, there was a stock market consisting of ten traders. Some investors also served as directors for the firms. All participants earned game dollars (G\$) on the basis of their own as well as others' actions. In order to induce rational behavior, game dollars were converted to real dollars at the end of the experiment, at a pre-specified rate, and paid out in cash to the participants. The currency used was named game dollars (G\$). Cash incentives were used to ensure rational behavior.

The game consists of a number of periods. In each period the following actions occur:

1. Directors are appointed, one to a firm.
2. CEO compensation is determined by the director.
3. CEOs make production decisions and pay dividends.
4. Shareholders trade shares of the five firms.
5. CEOs announce earnings and closing capital of the firms.

A number of hypotheses were tested with this game by Anish Shah for his Ph.D. thesis. We will not go into detail about the game but will concentrate on the work that tested the hypothesis relating to compensation and stock holdings of

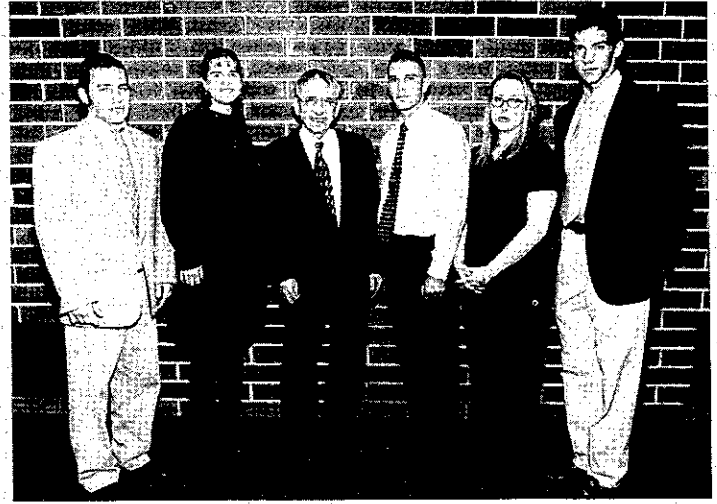
the directors. In the first case, each CEO appoints one of the ten shareholders to serve as the director of his/her firm without knowledge of the number of shares the director holds in the company. In the second case, the director is picked by the game administrator on the basis of the number of shares held in the firm. More specifically, the largest shareholder is picked as the director. The same procedure for picking a director is repeated at the beginning of each period. Each experiment consists of 8 to 10 periods. At the end of an experimental run, the results can be summarized. The results on CEO compensation were rather startling in the two versions of the experiment. In the case where the CEO appointed the director, the average compensation for the five firms over the periods played was G\$3,752. In the second case, where the largest shareholder is appointed the director, the average compensation is G\$882, a rather spectacular difference. Compensation is over four times as great when the director is appointed by the CEO as when the largest shareholder is the director. One cannot draw inferences directly from such a result developed in artificial conditions, but it certainly increases the desire to see how the hypothesis fares with data from the real world.

The bargaining approach also suggests an interesting link between the tenure of the CEO and the level of equity-based and cash-based compensation. If the CEO has produced a good performance record over time, he or she has accumulated goodwill with the board. More generally, working together builds good feelings between the BOD and the CEO. A friendly atmosphere is clearly a factor that may lead to larger CEO compensations, everything else being equal. Given this environment, it is also natural to expect some weakening of the link relationship between pay and performance. Good performance is given a strong weighting even in the face of a current poor performance. Thus, reasoning from this basis, we can hypothesize that the level of total compensation is an increasing function of the tenure, but the level of equity-based compensation does not increase with longer tenure of the CEO.

Two factors that are considered important by a number of writers in determining CEO compensation are the business risk of the firm and the growth opportunities. Thus, we have four determining factors of CEO compensation; namely, firm size, equity ownership of the BOD and the CEO, risk and growth opportunities. We have to consider these four jointly when we do the statistical testing, because the four are significantly correlated. For example, firm size is inversely related to the stock ownership of both the CEO and the BOD as well as risk and growth opportunities. On the other hand, risk varies



Program participants included, from left, Mrs. Christine M. Dumm, Program Manager, Center for Economic and Policy Education; Fr. Paul Taylor, Director of Admissions and Financial Aid, Saint Vincent College; Mr. William H. Isler, member, Saint Vincent College Board of Directors; Dr. Richard M. Cyert; Dr. Gary M. Quinlivan, Executive Director, Center for Economic and Policy Education; Dr. Andrew R. Herr, Fellow in Economics and Policy, Center for Economic and Policy Education.



Students who greeted Dr. Cyert (third from left) included, from left, Troy A. Ovitsky, a junior economics major from Mt. Pleasant; Ann Marie Lund, a senior political science major from Gibsonia; Ryan Kist, a senior political science major from Blairsville; Elizabeth Mary Appel, a junior business finance major from Venetia; and Robert C. McBride, a junior biology major from Melmoth, South Africa.

directly with growth opportunities and share ownership. But with the proper statistical tools, we can isolate the impact of each of these four factors while controlling for the others.

We analyze top-management pay-performance sensitivity using a new database on managerial compensation with a sample of over 2,000 firms for the years 1992 and 1993. Various characteristics of our data allow us to shed new light on compensation questions. First, while most prior studies focus on large firms, we examine a cross section of over 1,700 large and small firms, with sizes ranging from \$1.6 million to \$164 billion in total assets, and with industry profile representative of all U.S. public companies. Second, our definition of executive compensation is more comprehensive than that used in prior cross-sectional studies. Data availability has restricted prior investigations to relatively small samples or to analyses where compensation is computed using only salary plus cash bonuses. Stock options have become increasingly significant in executive compensation and must be included in any study of the area. Third, since a compensation package will emphasize different compensation vehicles for each firm, it is useful to isolate the behavior of each component. SEC requirements on disclosure make it possible to isolate the behavior of the components in a reasonably accurate manner. Unfortunately, we cannot observe a long time-series of data because the SEC's regulations on disclosure of executive compensation took effect in 1992.

DATA AND SUMMARY STATISTICS

The sample is drawn from 5,368 public companies listed on the New York Stock Exchange (NYSE), the American Stock Exchange (ASE) and the NASDAQ National Market System (NASDAQ). After removing 503 firms for various reasons, including being a non-U.S. firm, we solicited proxy reports for the fiscal years 1992 and 1993 from the remaining 4,865 firms in the database. Roughly 86 percent of these firms, i.e., 4,193 firms, responded to our request. Since our study requires CEO compensation data from at least two consecutive years, we excluded firms that provided proxy reports for only one year. We further removed 70 firms for a variety of reasons relating to data consistency. Our sample, therefore, consists of 2,006 firms that provided proxy statements for two full years. We further removed 263 firms for various reasons of data availability, leaving the final sample size at 1,743 firms. For exposition purposes, we will designate these firms as the "sample" and refer to the original 4,865 firms as the "population."

The measure of firm size is defined to be the book value of total assets. If the distribution of firms were evenly distributed in the population, we would expect to have 10 percent of the firms in each of the ten divisions for the sample; however, the sample is somewhat skewed toward larger firms, but still contains a significant number of small firms, that is, firms smaller than the median (43.6 percent of the sample). Distributions for exchange listing (i.e., NYSE, ASE, and NASDAQ) and industry classification indicate that the sample is similar to the population along these dimensions as well.

For our sample firms, the CEO's average age is 55 and has served as CEO for about eight years. Table 1 indicates fiscal 1993 distributions for compensation components. Since 1992, proxy statements contain information that permits the decomposition of executive compensation into five distinct components: salary, bonus, long-term incentive payout, value of stock options and restricted stock granted during the year and "other compensation," such as automobile usage.

The mean base salary is \$358,000, about 35 percent of average total compensation of \$1,012,600. Cash bonuses of \$190,300 are about 19 percent of total compensation and about 53 percent of the base. They were awarded by 67 percent of the firms in 1993. Stock options are about 31 percent of mean compensation and were awarded by about 52 percent of the firms, although 92 percent of the firms in the sample have stock option plans. If we consider just the firms that awarded stock options and do not include the 48 percent who did not, the average size of the stock option would be about one half of the mean total compensation.

There are at least two points worth noting about the distribution of the compensation components. First, three components (namely, base salary, bonuses, and stock options) dominate the composition of the total compensation package. Second, distributions of each of the components are skewed—the median is typically smaller than the mean. In other words, one-half of the firms are below the average, which means

that the large firms are significantly affecting the average. It is also the case that the variation in stock options is much greater among the firms than for any other component.

The average shareholdings of CEOs in our sample is about \$28 million which is 7.9 percent of the firm's equity and seventy times the 1993 salary and bonus. Again, the data are skewed with the median stock ownership being significantly less than the mean and only 7.6 times the salary and bonus. Insiders, including the CEO, directors and other corporate officers, hold substantial portions of the firm, an average of 17.9 percent and a median of 11.2 percent.

Table 2 provides an overview of the relationship between compensation components and firm size. The sample is divided into 10 size categories. One observation that stands out is the inverse relation between size and stock holdings of the CEO and the BOD. For the smallest 10 percent of U.S. public firms, the mean CEO stock ownership is about 11 percent and only



2 percent for the largest 10 percent. Finally, the last column shows that CEO compensation varies from less than 0.1 percent of the firm's equity for large firms to more than 2 percent of small firms.

Before we look at the specific tests of our hypotheses and the influence of the variables we have specified, it is informative to examine the basic problem that has aroused some of the controversy in executive compensation, and that is the relationship between pay and performance. Performance is measured in terms of stockholder return. It is shareholder value in most people's eyes that measures performance. Past studies that attempted to measure pay-performance sensitivity have used data that did not include stock options, since these data were not available in proxy statements until 1992. Since we are able to include stock options in our analysis, it is not surprising that we get a stronger relationship. Our estimate of the pay-performance sensitivity of total managerial compensation with respect to shareholder value is about 0.4. This measure implies that on average CEO total compensation increases by 4 percent for a 10 percent increase in shareholder value.

This striking impact of including stock based compensation on pay-performance sensitivity is related to the overall importance of stock-based components in top-management compensation. In our sample, the non-cash component of incentive compensation—such as stock options and restricted stocks—is on average twice as large as the cash bonus, even for small firms. In fact, the sample mean value of the stock options granted in 1993 are 90 percent of the mean salary.

RESULTS

The first striking result is the impact of the share holdings of the compensation committee. The estimates show a negative relationship between the fraction of the equity held by the compensation committee and the level of CEO compensation. In other words, the results of the experiment described earlier are confirmed by the statistical tests on the data of our large sample. The higher the

Table 1

1993 PROFILES OF SAMPLE CEO'S COMPENSATION AND STOCK OWNERSHIP

	COMPENSATION (\$)		
	Mean	Median	Std. deviation
(1) Salary	358,000	300,000	236,300
(2) Bonus			
- all observations	190,300	72,900	411,400
- positive observations only (67.2% of sample)	282,800	158,100	474,400
(3) Stock Option			
- all observations	316,700		1,022,000
- positive observations only (51.8% of sample)	610,000		1,354,000
(4) Restricted Stock			
- all observations	43,300	0	290,200
- positive observations only (9.7% of sample)	444,100	217,800	830,200
(5) Long Term Incentive Payouts (LTIP)			
- all observations	35,700	0	348,000
- positive observations only (6.5% of sample)	546,500	220,500	1,259,300
(6) Other compensation			
- all observations	68,400	11,900	475,400
- positive observations only (84.3% of sample)	81,300	16,800	516,600
Total Compensation	1,012,400	545,800	1,521,400

About the Series

The Alex G. McKenna Economic Education Series is presented by the Center for Economic and Policy Education at Saint Vincent College. These periodic lectures are open to the general public and their purpose is to explore the role of free markets in solving many of the social problems confronting the United States and the world today. Dr. Gary M. Quinlivan, professor of economics at Saint Vincent, directs the series.

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Table 2
1993 CEO COMPENSATION AND STOCK HOLDINGS BY FIRM SIZE DIVISIONS

	Total Assets (\$mil)	Base Salary (\$)	Mean Bonus (\$)	Equity based compensation (\$)	Total Compensation (\$)	CEO Stock Holding (\$)	Comp Committee's Holding (\$)	Insider Stock Holding (\$)	Tot. comp. as % of total equity value (%)
MEANS									
1	12.6	169,700	33,700	229,200	465,100	11.45	8.83	27.38	2.17
2	26.2	191,900	44,900	154,700	405,200	12.57	6.12	27.39	1.33
3	45.5	227,000	46,200	199,900	488,300	10.69	6.79	24.12	1.23
4	70.5	236,800	87,400	142,300	439,500	10.70	5.09	20.71	.58
5	118.4	284,700	125,600	230,700	675,200	9.87	5.31	21.17	.56
6	200.8	318,900	123,200	370,700	845,500	9.78	3.33	18.89	.56
7	353.4	358,800	168,700	501,900	1,106,600	7.11	3.73	15.49	.42
8	675.0	442,900	269,900	335,500	1,136,800	5.92	4.20	15.20	.35
9	1,767.5	507,100	310,900	447,900	1,554,300	3.33	2.53	10.04	.25
10	14,587.0	632,500	497,800	775,400	2,200,600	2.22	1.34	6.44	.10

a. Dollar values rounded up to the nearest hundred dollars

b. Option values are based on the Black-Scholes (1973) method adjusted for early exercise using the algorithm by Hemmer, Matsunaga, and Shevlin (1994).



fraction of the firm's equity held by the compensation committee, the lower the level of CEO compensation. Share holdings of insiders other than the CEO also exert a downward pressure on total CEO compensation, but not nearly as strong as the pressure from compensation committee holdings. Second, the relation of risk and compensation is strongly positive for total compensation. In other words, the CEO is

rewarded for taking risks. The greater the variation in stock price, the measure of risk used, the larger the total compensation of the CEO. Putting it another way, it is necessary to offer higher total compensation to a CEO that is managing a firm with great volatility than to one managing a firm in a fairly stable environment. Third, the estimates for tenure suggest that, as the CEO's tenure increases, base salary and perquisites (other

compensation) increase but the equity component does not. Firms are likely to offer smaller equity-based incentives as tenure increases.

Our objective is to estimate CEO compensation, by utilizing standard statistical techniques of regression analysis, with the following explanatory variables: compensation, firm size, stock return, return on equity, CEO's stock holdings, compensation committee's stockholding, firm risk, growth opportunity, CEO tenure, and CEO age. Most of these variables have been mentioned, but it will be useful to describe how some of these will be measured. Size will be measured in terms of net total assets. The stock return will be measured in terms of the capital gain, plus dividends for the year. Return on Equity (ROE) will be computed by dividing net income for the year by the book value of the equity. All of the stock holdings—CEO's, compensation committee's, insiders'—will be measured as a percentage of total outstanding shares. The measurement of risk is difficult. We take the amount of variation in the returns on stock over the previous sixty months. In other words, the greater the variation, the greater the risk. Growth opportunity is also a little more difficult to measure. We use the total market value, total shares outstanding multiplied by the price plus the book value of debt, divided by the book value of the company. The higher the ratio, the greater is the growth potential of the firm. The tenure and age are clear.

In the case of opportunities and risk, compensation has a positive relationship. The greater the risk, the higher the compensation

and the greater the growth opportunities, the greater the compensation. As the CEO's tenure increases, base salary and perquisites (other compensation) are likely to increase but not the equity incentive components. Instead firms are likely to award smaller equity-based incentives as tenure increases. The age variable acts in much the same way. The interpretation of the effects of age needs some caution because of the close correlation between age and tenure.

CONCLUSIONS

We can now step back and assess these results. I have been on at least ten different compensation committees in a number of different industries—from investment banking firms to steel products—and I think I understand the compensation setting process. There is no question in my mind that compensation and performance are highly correlated. The relationship is not a simple one in the sense that the compensation each year is set by the performance of the previous year. When a CEO has performed well for a number of years, a stock of goodwill is built. A compensation committee is unlikely to penalize a CEO that has done well over a five-year period for one bad year. There is also no question that a personal relationship affects compensation to a limited degree, but that relationship is also usually based in quality performance. It is difficult for a poor CEO to maintain, for any length of time, a close relationship with the compensation committee members or the board in general. Each board member realizes that ultimately he or she is personally responsible for decisions that affect the profit of the firm. Law suits against directors have become common when a firm fails or performs badly for a period. Friendship and perks go out the window when one's reputation and resources are at stake. Much of the controversy that has been stirred up over CEO compensation has

been stimulated by stock options, particularly when a CEO exercises some options that he or she may have held for a number years. The net amount is treated by the press as compensation for the year and can be an astronomical number for an annual income. What is overlooked is that funds should be averaged over the years held and not treated as the year's income. If the company has had a bad year, then the argument that compensation does not relate to performance becomes a media scandal. Also overlooked is that the only way the CEO can benefit from stock options is by enriching the stock holders. So my overall view is that there may be poor judgments made by some compensation committees, but in general the system is healthy and performance and compensation are closely related. The statistical tests I have described certainly bear out my experience.

**The research for this talk relies on research that has been done by my colleagues Sok-Hyon Kang, Jinbae Kim, Praveen Kumar (now at the University of Houston), Anish Shah (Bain & Co.) and Shyam Sunder.*

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January 21, 1998 The Government and Political Education Series
Peter A. Lawler, Berry College

Feb. 18, 1998 The Alex G. McKenna Economic Education Series
"Searching for Common Sense and Common Law for the Environment"
Bruce Yandle, Clemson University

Mar 4, 1998 Government and Political Education Conference: An Analysis of the 105th Congress and Prospects for the 1998 Congressional Elections
David Mason, Heritage Foundation
John J. Pitney, Jr., Claremont McKenna College
James Gimpel, University of Maryland College Park
Douglas L. Koopman, Calvin College

Mar. 18, 1998 The Alex G. McKenna Economic Education Series
"Do Taxes Affect Entrepreneurs' Investments?"
Harvy S. Rosen, Princeton University

April 22, 1998 The Government and Political Education Series
Dr. James W. Ceaser, University of Virginia

May 12, 1998 The Government and Political Education Series
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