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Public Companies with Broad-Based Stock Options: Corporate Performance from 1992-1997

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Executive Summary

This report compares the performance of corporations that offer their employees broad-based stock option plans to those that do not offer their employees broad-based stock option plans. Broad-based stock option plans are important to study because of their possible role in aligning worker and shareholder interests, encouraging job creation in knowledge-related industries, helping corporations cope with tight labor markets, and involving more citizens in sharing the fruits of capitalism. Nevertheless, little is actually known about their objective performance beyond the case histories of specific companies.

The analysis is based on a study of 490 companies: a survey of 105 corporations with broad-based stock option plans and 385 additional companies that were identified as offering broad-based stock options to a majority of their full-time employees. A broad-based stock option plan is one in which a majority of the full-time employees of a corporation actually receive (rather than are merely eligible for) stock options over a reasonable period of time. Unlike corporate plans that only include a small number of top executives, the broad-based plans included in this survey actually distributed an average of 45% of recent stock option grants to non-management employees. The figure is 55% in the biotechnology and computer industries. We compare stock option companies to all public companies that do not have broad-based stock option plans using Standard and Poor's Compustat database as a source of financial information, and to pairs of similar companies in their industry groups. The performance criteria used were productivity,

annual and cumulative total shareholder return over the 1992-1997 period, Tobin's q, return on assets, and fixed wage compensation per employee.

The results of this study suggest that there is no systematic evidence publicly-traded corporations with broad-based stock option plans had worse performance than the larger group of publicly-traded corporations that did not adopt the plans or industry group pairs regarding productivity, total shareholder return, Tobin's q, or return on assets. Indeed, there is a lot of evidence that the broad-based companies performed better. There is unambiguous evidence that broad-based stock option companies had statistically significantly higher productivity levels and annual growth rates compared to non-broad-based stock option companies in general and among their peers. This is clearly demonstrated by evidence comparing the broad-based companies to the non-broad-based firms before they instituted the plans and after they instituted the plans.

The total shareholder return findings are that over the 1992-1997 period broad-based stock option companies perform as well as non-stock option companies in Compustat in general and among their peers and sometimes exceed the total shareholder returns of these comparison groups. The actual average and median cumulative total shareholder returns for all groups of broad-based stock option companies from 1992-1997 exceed those of all non-broad-based stock option companies in Compustat. The average cumulative total shareholder returns of all broad-based stock option companies in the study statistically significantly exceed those of all non-broad-based Compustat companies. And the actual average and median cumulative total shareholder returns for all broad-based stock option companies in the study as a group also exceed those of the Compustat 500 from 1992-1997. For another measure of market value, Tobin's q, the levels of Tobin's q of broad-based stock option companies in general tend to be higher than the Tobin's q levels of the non-broad-based stock option companies although there is some mixed evidence and this is not the case regarding annual growth rates in Tobin's q. The available evidence suggests that the levels of return on assets of broad-based stock option companies may be significantly higher than that of the non broad-based stock option companies although there is inconclusive evidence regarding annual growth rates in return on assets and some mixed evidence of this effect remains.

Our interpretation of these findings is that the performance of the firms using broad-based stock options appears to equal or exceed the dilution that these plans initially would have caused. As noted, we are not analyzing data on the specific expectations articulated by each of the firms in our samples adopting broad-based stock options. Obviously, dilution may have occurred in certain individual cases. But the systematic analysis of broad-based stock option companies yields little evidence of dilution to shareholders over this period and much evidence of opportunities for shareholders and employees. It appears that a large sector of the U.S. economy has used broad-based stock options to restructure compensation so that the interests of shareholders and broad groups of employees are aligned. The study indicates that the performance of the firms after the introduction of the broad-based stock options essentially paid for the stock options. If these firms installed broad-based stock options in order to attract and retain workers in a tight labor market in order to secure their expectations of continued returns to

shareholders, then the broad-based stock options can also be viewed as a success for that reason.

Regarding the compensation levels and growth of broad-based stock option firms, this analysis found that broad-based stock option companies did not substitute stock options for fixed wage cuts and that they continued to maintain a compensation edge in fixed pay that they had before the introduction of broad-based stock options. However, broad-based stock option companies did not continue to increase wages beyond their earlier edge. This can be viewed as evidence that firms that were high compensation firms before the introduction of broad-based stock options may have used the program to restructure their compensation systems and align them with shareholders by perhaps abandoning further increases in their fixed wage compensation edge and providing these further increases in the form of broad-based stock options.

While our data have distinct limitations, they certainly lend some support to the position that broad-based stock option payments during the period studied may have significantly contributed to unmeasured and hidden wage inflation. Both the U.S. Federal Reserve Board and the Bureau of Labor Statistics of the Department of Labor have raised this issue. The reason is that this study found no systematic evidence of any kind that companies that adopted broad-based stock option plans reduced their fixed compensation in any significant way. There was no wage substitution according to this evidence. This suggests that stock option payments were on top of fixed wages for a set of companies that the evidence establishes as already being compensation leaders. Indeed, this story is consistent a number of reports of a tight and tightening labor market where broad-based stock options are playing a role in attracting and retaining employees. Some reports suggest that some employers are frantic and that the situation especially in technology companies is reaching crisis proportions. (Richtel 1999)

The report is written for the non-technical reader and includes a detailed Appendix at the end to assist the non-technical reader in reviewing our data in more detail. This report can be used by outside shareholders, executives and boards of directors, employees, and unions to assess the effectiveness of the broad-based stock option phenomenon in retrospect. The average performance effects we have described can be used to benchmark companies. The findings are also relevant to: 1) shareholder/company conflicts over evaluating past stock option programs or approving new programs; 2) legislative and public policy discussions in the U.S. Congress about whether to encourage stock options; and 3) questions by the U.S. Federal Reserve Board and the U.S. Department of Labor about the impact of stock options on corporate performance, U.S. compensation systems, and ultimately the Employment Cost Index.

Introduction

This study reports on the financial performance of public corporations with broad-based stock option plans in comparison to corporations without such plans using a recent survey and public information on companies that have announced such programs. The authors first presented these findings at an academic conference in 2000 (Sesil, Kroumova,

Kruse, and Blasi 2000). Broad-based stock option plans are important to study because of their possible role in aligning worker and shareholder interests, encouraging job creation in knowledge-related industries, helping corporations cope with tight labor markets, and involving more citizens in sharing the fruits of capitalism. Nevertheless, little is actually known about their objective performance beyond the case histories of specific companies. Scholars and institutional investors and other observers have been properly cautious about ascribing broad-based stock options a role in positive company performance during a long-running bull market without careful studies. Nevertheless, the plans now appear to be ubiquitous with regular media stories about stock option bargaining by job seekers with prospective employers, the new Internet rich, high-tech stock option compensation, millionaire janitors, and high school students who get stock options for summer work. The National Center for Employee Ownership estimates that there are over 3,000 active stock option plans in which a majority of full-time employees participate as of May of 2000.

The New York Stock Exchange classifies as "broad-based" those plans that offer options to 20% or more of a company's employees. According to the National Center for Employee Ownership, a reasonable definition of a broad-based stock option plan is one where a majority of the full-time employees of a corporation actually receive (rather than are merely eligible for) stock options over a reasonable period of time. (Weeden, Carberry, and Rodrick 1998: 185) This study imposes a stricter definition: a broad-based plan includes a majority of non-management employees. Aside from how many employees are included in such plans, a key metric is what percent of the stock options in a plan actually go to non-executives. Unlike corporate plans that only include a small number of top executives and give them all or most of the stock options, the broad-based plans included in this survey actually distributed an average of 45% of recent stock option grants to non-management employees. In fact, in the biotechnology and computer industries, the corporations in the survey actually distributed 55% of recent stock option grants to non-management employees. (Weeden, Carberry, and Rodrick 1998) The performance measures that are examined are productivity, return on assets, Tobin's q (a measure of market value) and total shareholder return over the period 1992-1997. This report is written for the non-technical reader and includes a detailed Appendix at the end to assist the non-technical reader in reviewing the data in more detail.

Over the last ten years a quiet shift has been taking place from the exclusive dependence on a system of fixed wages and benefits to a greater role for equity stakes in companies. While the shift originally began with the rapid growth of stock option grants to executives, companies are structuring remuneration for broader groups of employees using stock options. While these may not be accompanying wage cuts, they may be substituting for wage increases. The phenomenon includes union as well as nonunion employees. In 1995, 8200 Bakery, Confectionery & Tobacco Workers International employees at Phillip Morris ratified a contract that gives them small fixed wage increases and potentially lucrative stock option-like promissory shares out into the future. (Somasundaram 1995) A 1998 survey of 98 companies found that 36% of the firms had union employees and 58% made them eligible to receive options. (Weeden, Carberry, and Rodrick 1998: 17) Another study of 20 firms with \$1-50. billion in revenue found that

half of those with union employees made them eligible for stock options. (Hewitt Associates 1997: 20). The National Center for Employee Ownership (NCEO) in Oakland, California estimates that 7-10 million employees actually receive stock options as of May of 2000. This represents a substantial increase since 1991 when the NCEO estimated there were about 1,000 companies with 1 million employees in such plans. This number of employees probably surpasses the 7.7 million employees in ESOPs and stock bonus plans.

Part of the reason for the rise in stock options is the tight and tightening labor market and the explosion in high technology job creation. And economic growth. American companies expect to create 1.6 million new information technology jobs this year according to a recent industry survey. While many jobs are in the software and Internet industries, the Information Technology Association of America (ITAA) said that about a third of the openings will be for technical support workers, who help companies install, maintain and troubleshoot new high-tech equipment. Companies are concerned that they will not be able to fill these new positions, the survey found. Based on the qualifications of current applicants, they estimated that more than half of the openings--or about 843,000--may be difficult to fill. (Associated Press 2000) This has led some journalists to write about "frantic" competition for workers. (Richtel 1999) Some observers believe that the health of the economy is directly related to how workers are recruited and compensated in the high tech industry. As the ITAA President, Harris Miller said: "IT workers represent a much bigger slice of the total work force than previously imagined and, as we have stressed over the years, the nation's economic future is tied to the availability of appropriately skilled workers." According to the Associated Press, the ITAA estimates that a total of 10 million Americans work in information technology jobs. Behind tech support, the fastest-growing jobs categories are database developers and administrators; programmers and software developers; and people who design and manage Internet sites. Among other categories included in the survey were technical writers, digital media specialists and systems integrators. Recently, these developments have initiated a debate in the European Union and several countries in Latin America and Asia over whether their economic and legal systems have made sufficient room for stock-based compensation. There have been claims that traditional compensation systems are hurting high technology development and job creation in these countries. These additional developments make an objective assessment of broad-based plans highly relevant.

While the precise incidence of broad-based in the nation as a whole and different size categories of companies remains an open question, research on the incidence of broad-based stock option plans from many quarters suggests that it is a significant phenomenon. One of the problems in these estimates is that the studies often do not distinguish between employees eligible for stock options and those who actually received them. In 1998, the U.S. Federal Reserve Board's economists in 12 regions surveyed 415 companies in varied industries and found that about a third had broad-based programs and 37% had broadened the participation in the last 2 years. And 6.7% of companies offered stock options to employees of lower occupational levels such as managers and professionals. The Federal Reserve Board study concluded that, "Over the past few years, stock option

grants to employees have become an increasingly common method of compensation." (Lebow, Sheiner, Slifman, and Starr-McCluer 1999: 11) A survey in 1995 by the Association of Quality and Participation found 13% of Fortune 1000 companies offer stock options to 60% or greater of their employees. While it is hard to distinguish in the surveys between companies that merely make employees eligible for broad-based stock options versus companies that actually offer the options themselves to the employees, these and other surveys suggest increasing popularity for this practice. Arriving at the definitive national estimate of non-managerial employees receiving stock options will ultimately be determined by the results of a survey of a national random sample of about 2000 establishments that is now being carried out by the Bureau of Labor Statistics of the U.S. Department of Labor. Nevertheless, there appears to be no question that this phenomenon constitutes an important societal development.

Nevertheless, despite this growing importance, we actually know very little about these broad-based stock option programs beyond the few details about them that have been contained in the public announcements of many public companies in the press. Typically, newspaper accounts focus on the experiences of one or just a few companies. Most of what we know about these broad-based stock option plans has to do with how they function rather than how they influence company performance or affect individual workers. This is ironic given the fact that the assumption is that they do improve company performance. A detailed report on the functioning of these plans was issued by the National Center for Employee Ownership in 1998 based on surveys filled out by 141 companies of 1,360 companies that were identified as possibly having such plans. That report, *Current Practices in Stock Option Plan Design*, (Weeden, Carberry, and Rodrick 1998) provides detailed information on who gets stock options, how they are allocated, how they are distributed between managers and non-managers, the type of options, the vesting periods, and company issues such as repricing, overhang, dilution and related communication and employee participation programs.

A further limitation in understanding the performance of broad-based stock option plans is the environment in which they diffused as a corporate innovation. Stocks have performed particularly well during this period and we have witnessed an explosion in the growth of technology companies, an Internet revolution, an Internet start-up boom, and huge run-ups in the stocks of many of these companies. Indeed, irrational exuberance has characterized this market until recently. In this context, it can be very difficult to draw conclusions from the experiences of one or two companies. Indeed, the general press and to some extent the business press have adopted a formulaic of broad-based stock options: "companies use options to attract the best employees, companies are exploding with growth, stock prices soar, thus workers get richer and shareholders benefit." Oddly enough, virtually a decade in broad-based stock option boom has taken place without an extensive public assessment of this mantra.

This current report uses the 1998 detailed data from the NCEO survey on 105 companies with broad-based stock option plans along with additional data on an additional 385 public companies that have been publicly identified as having broad-based stock option plans in order to provide the first comprehensive analysis of the impacts of these plans on

company-wide performance in the U.S. economy. This is accomplished by using company performance data from Standard & Poor's Compustat and merging it with data from the surveys and public information on broad-based stock option plans.

The shift toward stock option compensation originally began with the rapid spread and the rapid growth of stock option grants to executives. Then, it spread throughout the management and professional ranks of mainly high technology companies. Gradually, many companies applied portions of future remuneration for broader groups of employees to stock-based compensation. In the last decade many large corporations that are household names such as Pepsi, Microsoft, Delta Air Lines, Wendy's, Starbucks, Merrill Lynch, Proctor & Gamble, and Oracle Computers, implemented broad-based stock option programs for their employees. Indeed, at one extreme of this phenomenon, a 1998 survey of the top 250 corporations in the U.S. found that fifteen companies had set aside over 25% of their weighted average shares outstanding for equity incentives for upper management and employees. (Weeden, Carberry and Rodrick 1998: 185). This study found that the average percent of total shares outstanding allocated for compensation has increased from the 0.3%-0.5% range in the 1960s to 2% on average in 1998. The reasons listed in this study include a combination of a corporate commitment to management ownership, a growing practice of extending stock participation lower and more broadly in corporate ranks, and the widespread use of equity as a recruitment and retention tool to hold employees with critical knowledge in a competitive labor market. In a separate survey, 83% of mutual fund managers said they were favorably influenced, at least sometimes, when a company grants stock options to rank and file employees (Pearl Meyer, 1998: 5). More recently, the rapid development of hundreds of Internet, e-commerce, and Internet-infrastructure-related public companies has led to a further explosion of broad-based stock option plans whose full extent may be staggering.

As we have noted, it is noteworthy and somewhat surprising that there has been little systematic empirical investigation of the implications of these programs for company performance. Occasionally, institutional shareholder leaders such as Warren Buffett or important economic leaders such as Federal Reserve Chairman Alan Greenspan have commented critically on the phenomenon, but little systematic evidence has been presented in the public domain.

Some Thinking About Stock Options and Stock Ownership

A variety of theories appear to predict different effects of broad-based stock options on company performance. Agency theory predicts incentive conflicts arise because the interests of senior managers are not aligned with the interests of shareholders. In order to bring the interests of the two parties into closer alignment owners incur cost in the form of incentive contracts (Jensen and Meckling, 1976). However, the notion that broad-based stock options might increase firm performance is based on extending the rationale of incentive contact theory to employees beyond the executive suite. Certainly, it is at least debatable whether the levels to impact the company are available to a large group of employees. Some other theories suggest that stock options might lower the information costs in a company because managers' and employees' interests become more closely

aligned. This recognises that employees have access to information that may be valuable to management. The presence of a broad-based stock option group incentive scheme may result in employees having the necessary incentive to communicate, or act on their superior information. Additionally, an argument from efficiency wage theory may apply to broad-based stock option plans: the theory says that due to the higher wage rate, employees who work for firms which pay above the market rate may be less likely to quit and more likely to exert maximum effort. Thus, it is possible that high effort-exerting employees are attracted to companies that pay higher compensation as a result of broad-based stock options.

Profit sharing theories would also tend to predict a positive connection between broad-based stock options and corporate performance. (see Kruse 1993). Profit sharing theory is also relevant to broad-based stock option plans because of the empirical evidence indicating that lower level employees do essentially use such plans like cash profit sharing plans. Profit sharing theory thus suggests a more positive prediction. A number of microeconomic studies have found that profit sharing companies are more productive than firms without profit sharing although researchers have noted that it is hard to distinguish the effects of profit sharing from other human resource management practices. (Ichniowski, Shaw, and Prennushi 1997; Kruse 1993; Weitzman and Kruse 1990). These studies have been cited in a recent U.S. Federal Reserve Board review of the subject. (Lebow, Sheiner, Slifman, and Martha Starr-McCluer 1999: 7-8)

Other theories appear to predict zero or negative impact on performance. Attempting to extrapolate theoretical considerations from executive share schemes to broad based schemes may not be an accurate comparison because the incentive effects of broad-based stock options would be more prone to the incentive diluting effects of the free-rider or 1/n problem. For example, this means that if there are 100 employees in a company, any individual employee is only likely to see the impact on his or her compensation of 1/100. Some theorists have questioned whether that employee is likely to exert real effort as a result and some suggest he or she is more likely to be a free rider on the efforts of others. On the other hand, some thinkers believe that more fluid work organizations that are less hierarchical, more team-based work organizations with more employee involvement and empowerment, and more knowledge-based work organizations with highly trained workers, would be more likely to have workers to are not free riders but who actually monitor one another and facilitate one another's efforts.

Some scholars (Conte and Svejnar 1990) suggest that more productive employees may sort themselves into firms where more compensation is placed at risk. Another consideration is if workers are in a flat (or negative) real fixed wage environment, any gains associated with broad-based stock option plans may be perceived as an annual cost of living adjustment. The provision of such plans can be seen as compensating employees for taking on the risk of working in a flat fixed wage environment and may not result in an incentive effect. From this perspective, one would not expect that such plans would automatically result in statistically significant positive firm performance impacts. Their purpose may be to attract and retain employees in a tight labor market and not to create a framework for a high performance workplace. Given recent data on the value of stock

options, this may be plausible. The NCEO's 1998 study found that the average value of the most recent stock options granted for nonmanagement employees in 1998 was \$37-41,000 for professional and technical employees and around \$12,500. for administrative employees. (Weeden, Carberry and Rodrick 1998: 9).

Some observers predict that stock options may actually hurt corporate performance. Commenting on the executive stock option research tradition, Kevin J. Murphy says that the academic evidence "directly linking current grants to future performance is, frankly, rather flimsy." (Murphy 1998) One common objection to the positive spin put on stock options is the observation that a firm with a broad-based stock option plan may experience significant increases in its shareholder value over a certain time period. But if this company is compared to its entire industry group, the rosy story that employees did well and shareholders did well, may be revealed to be a hoax if the company actually did worse than the rest of its industry group. For this reason, some companies have structured their stock option programs so that they assure some type of above average performance:

- Some options have a premium price set higher than the market price of the common stock on the date the option is granted and include the possibility that no options will be earned;
- Some options will not vest until certain strict performance targets are met by the company;
- Some options index their exercise price to a market or industry group average to insure that profit from the options comes as a result of the company's performance rather than the performance of the market or the firm's industry group.

Can broad-based stock options be expected to have a positive impact on shareholder value given the differences between CEOs and these employees? Comparing broad-based stock options to executive stock options may not be an accurate comparison because the incentive effects of broad-based stock options would be more prone to the incentive diluting effects of the free-rider or 1/n problem. Another problem is that theorists have stressed that a guarantee must be provided that the manager will retain the securities (stock options or stock ownership) during the period he or she is making decisions in order to maintain an alliance with outside capital contributors. If this is so, then the total benefits from reduced consumption of managerial perks are capitalized into the prices of the financial claims issued to outside equity holders. (Haugen and Senbet 1981). But the studies of Huddart and Lang (1996) suggest this is a problem with a broad-based employee group because they do not hold onto the stock options long enough.

Our study will try to determine if the theories predicting better or no or worse corporate performance from broad-based stock options are consistent with an analysis of the evidence. While we do not distinguish whether the companies offer broad-based stock option plans with "performance strings attached" our research approach is designed to rigorously separate out the performance of these broad-based stock option companies from the performance of the market as a whole and their industry group peers. Only such

a comparison can move the discussion of broad-based stock option programs beyond the level of individual cases, story-telling and outright boosterism.

WHAT DO WE KNOW ABOUT STOCK OPTIONS?

Past Research on the Incidence of Broad Based Stock Options

As noted, the available evidence provides support that broad-based stock options are increasing at a substantial rate. Unfortunately, many studies do not distinguish between companies that offer possible eligibility in broad-based stock option plans to employees versus those that actually provide stock options to non-management employees. With this caveat, Figure 1 reviews the mounting evidence on the incidence of such plans and the attention given to key issues such as dilution and repricing. None of the twenty surveys reviewed in Figure 1 estimate the incidence of such plans using national random samples. Indeed, the surveying of client organizations by self-interested consultants with clients who are likely to engage in the practices being surveyed has produced several quite large estimates of the incidence of these plans. Nevertheless, four of these studies sample important populations of companies and find an increasing use of such plans. The William R. Mercer studies of the proxies of the 350 largest public companies found an increase in the percent of companies actually granting stock options to all employees from 5.7% in 1993 to 10.3% in 1997. (Mercer 1997; Weeden, Carberry, and Rodrick 1998: 199) The Center for Effective Organizations of University of the University of Southern California studies of 279 of Fortune 1000 firms in 1993 and 212 firms in 1996 found that the percent offering such plans to 100 employees remained at 10%, but the percent offering broad plans to more than 20% of employees went up from 30% to 51%. Unfortunately, it is unclear what this survey means by "offering." Because the estimates are so high, they have a high probability of referring to eligibility. (Lawler, Mohrman, and Ledford 1998: 34) The Arthur Anderson survey of the largest 1250 global corporations found 33% offered such programs to all employees and 11% planned to add them in the future. Finally, in 1998, the U.S. Federal Reserve Board's economists in 12 regions surveyed 415 companies in varied industries and found that about a third had broad-based programs and 37% had broadened the participation in the last 2 years. (Lebow, Sheiner, Slifman, and Starr-McCluer 1999: 11) 2 Studies of particular industries -- like the ShareData/American Electronics Association and Westward Pay studies -- and industry analyses have indicated a high incidence among high technology firms. The ShareData study found a four-fold increase in the number of larger companies that made stock options available to all employees. (ShareData 1997). It is very common in the stock option literature to find that data on eligibility and use of stock options from some of these studies is systematically misquoted to represent actual grants to employees.

In Figure 1, only the William M. Mercer Company studies from 1993-1997 show a clear pattern of expansion of broad-based stock option programs that actually grant stock to employees. These studies indicate that a majority of employees were receiving stock options in 5.7% of the largest 350 companies in 1993 and that this almost doubled to 10.3% of the largest 350 companies in 1997. The Mercer data indicate how easy it is to over-rate the extent of broad-based stock option plans and confuse eligibility for options

versus actually getting options: while 30% of the largest 350 corporations make broad groups of employees eligible only a third of them actually gave options to a majority of employees. We have reviewed a number of executive briefing materials distributed to major corporations and discovered that they tend to exaggerate the extent of broad-based stock option diffusion as a result of this problem.

While it is tempting to ascribe the rising incidence of these plans to their economic performance, the recent U.S. Federal Reserve study underlines the widely-held view that such plans may be popular because currently generally accepted accounting principles allow firms to record the expense for these options as zero. While this favorable method of accounting has been controversial with the Financial Accounting Standards Board, institutional investors, and some shareholders, corporations have engaged in repeated successful struggles with these groups in the 1990s to retain the favorable practice.

Past Research on the Impact of Broad Based Stock Options on Firm Performance

While stock options do not create a significant accounting cost for companies as a result of the FASB rules, the impact on shareholders is very real. Writing in Forbes magazine, Gretchen Morgenson has said, "Options dilute per-share earnings because they increase the divisor applied to net profits to figure per-share earnings." (1998) The financial impact of these plans has been mainly evaluated in relation to their impact on outside shareholders although a few non-systematic studies have looked at other performance issues. Four studies have estimated the percent of market value represented by all outstanding options. In the late nineties, the percent of dilution ranged from 5.5% at the median to 17.4% with the higher estimates consistently coming from high technology company surveys, although a recent 1998 National Center for Employee Ownership study found the average dilution to be 12.6% with a third of the companies above 15% in their survey on which the data for this report is based. Another 1998 study of the 200 largest industrial and service corporations put the average at about 13.2% for all options outstanding for all equity programs except stock purchase plans and ESOPs. (Pearl Meyer, 1998). Given that most institutional investors object to dilution potential above 10%, it is clear that broad-based stock options could potentially represent a significant drain on total shareholder return. Indeed, there appears to be a brewing conflict with outside shareholders over options in general. The Investor Responsibility Research Center in Washington, D.C. has been monitoring shareholder votes on stock option plans and finds that rejections of the plans by shareholders are on the rise. (IRRC, 2000) According to Watson Wyatt Worldwide, the average overhang among major companies hit 13% in 1997, up from 5% in 1988. Some companies have adopted an evergreen provision for stock option share authorization whereby 1% of their shares is automatically added to the stock option pool annually. (Hewitt Associates 1997: 24)

Another way stock options affect corporate performance is through repricing. Four studies have examined the repricing of options where corporations change the option strike price after it becomes clear to them that their employees will not reap any financial benefit because the share price is not increasing as rapidly as they originally had hoped.

This issue is also very controversial with outside -- especially institutional -- investors because many believe that repricing stock options involves changing the rules of the fair game when a company's employees are clearly losing the fair game. Managers have responded that restless employees must be kept happy or they will walk out the door and take precious human capital -- so important to technology companies--out the door with them. Studies show that 15-36% of companies reprice their options with 36% engaging in repricing in the latest 1998 study. (Weeden, Carberry, and Rodrick 1998) A Business Week survey suggests that about 36% of companies reprice options. (Business Week 1998) After the U.S. Government formally proposed the breakup of Microsoft, the company took a step similar to repricing by rescuing all of its employees whose options were now underwater. Microsoft issued employees 70 million new stock options at \$66.625 each at an indicated value of \$1.6 billion. (Morgensen 2000) Since August 12, 1998, FASB says that companies that reprice their options need to charge their earnings to the extent that the share price exceeds the exercise price to which the option plan was lowered.

The key question about both the dilution and the repricing issues is whether broad-based stock option plans' dilution effect is greater than any observable positive effect on total shareholder return net of industry group performance, or not. Reporter Gretchen Morgensen of The New York Times has written clearly and bluntly about how shareholders approach this dilemma regarding Microsoft but it applies generally to companies with broad-based plans: "For years Microsoft stock climbed on the strength of enviable profits. One reason for its profitability was its reliance on stock options, which cut costs while keeping workers happy and rich. The rising stock also meant that few shareholders groused about the dilution to earnings presented by 1.1 billion shares Microsoft says it has issued since 1990, net of buybacks, under stock option and purchase plans." (2000: BU1) Indeed, the previous quotation underlines two possible sets of standards in separating out the dilution effect of broad-based stock option plans: first, shareholders can argue that if they make money they do not care if employees make money ("few shareholders groused about the dilution"); second, a tougher standard would be to argue that companies that issued broad-based stock options need to prove that their total shareholder return was not negatively affected relative to their industry group and the market as a whole, whether or not their shareholders also made some money. In this study we shall apply the second and tougher standard to evaluating the impact of broad-based stock option plans.

There are a few non-systematic studies of some aspects of the economic performance impact of broad-based options. Watson Wyatt's 1993 survey of 139 companies in 22 industries with stock option and stock purchase plans computed the median reduction in earnings per share (EPS) from all stock options would be 10.8% if they were expensed. For the high technology sector this reduction was 50%, although for other companies the median was 6%. The 1997 study of high technology public and private companies by WestWard Pay Strategies again found that the median reduction in EPS would have been 6% although it ranged from 1% to 78%! In their 1996 analysis of 434 of the fastest growing mostly private product and service companies, Coopers & Lybrand found that companies offering broad-based stock options experienced revenue growth of 37% in the

12 months preceding the survey compared to 25% for companies not offering stock options. And the stock option companies projected revenue growth of 40% in the next 12 months compared to 24% for the non-stock option companies. Unfortunately, this study dealt only with companies offering such options and provided no data on actual grants. (Coopers & Lybrands, 1996) But this trend was supported by the 1998 U.S. Federal Reserve Board study found that 44.1% of the fast growth offered broad-based stock options while only 32% of the moderate growth, no growth, or contracting firms offered such programs. (Lebow, Sheiner, Slifman, and McCluer 1999: 11). A 1997 study by Hewitt Associates examined 20 publicly-traded companies with over \$10 billion in revenues across many industries with non-executive stock option plans. Sixty-five percent of these companies offered the options to all employees. The study reports that "Companies are far less likely to think that their stock option program has a positive effect on their business results than any other kind of variable pay program." (Hewitt 1997:1) When Hewitt compared the self-reported business performance of these 20 companies with 173 companies using other types of broad-based variable pay plans in its Variable Compensation Measurement Database, the small sample of companies with non-executive stock option grants had less favorable results. Thirty five percent of the broad-based stock option companies reported that the plans did not meet expected results. Hewitt also found that fewer broad-based stock option companies actually believed the plan helped improve business results (59%) than companies with other variable pay plans. (75%). However, none of the stock option companies reported adverse results as was the case with 21% of the variable pay plan companies. (Hewitt Associates 1997: 14) Admittedly, this study was based on a very small sample and its findings need to be reconfirmed by a larger study. On the other hand, a different set of studies by the Center for Effective Organizations of management's subjective evaluations of the effectiveness of stock option programs in 1993 and 1996, found that they were rated second only to profit sharing plans in 1993 and above profit sharing plan in 1996 in management's opinions about their performance impacts. (Lawler, Mohrman, and Ledford 1998: 96.) Again, these observations should not be trusted unless they can be systematically confirmed. While the 1998 U.S. Federal Reserve Board study did not attempt to quantify these economic performance effects, the Board economists did ask compensation professionals at the firms which they surveyed to opine on this issue. They concluded:

Many of the firms we spoke with said that one reason for moving toward variable-pay plans was the hope that, by giving employees more of a stake in the firm's fortunes, employees would have more incentive to suggest productivity-enhancing changes. And, as we noted above, the literature contains some empirical support for the view that firms with profit-sharing plans are more productive than other firms. Our informal discussions with compensation professionals also seemed to point to a cautious optimism about the success of these experiments in variable pay. In some cases, firms seemed clearly to believe that these incentives to promote cost-consciousness on the part of employees were bearing fruit... Some firms suggested that productivity was improving; but the extent to which the improvement was due to the variable compensation schemes was hard to determine. None of the representatives we spoke with said that they think variable pay has harmed productivity... One issue that emerged from our discussions, and is reflected in some academic studies as well, is that disentangling the effect of pay practices per se from other aspects of the work relationship can be difficult. (Lebow, Sheiner, Slifman, and McCluer 1999: 11, 13, 25.)

Finally, depending on how one conceives of broad-based stock options, past research on both profit sharing and employee stock ownership may be relevant their performance

effects. Profit sharing research appears to be immediately relevant because the net effect of an employee exercising profitable stock options and selling them is a cash share in increases in a company's stock price. This is very similar to profit sharing. Profit sharing has been consistently linked to better firm performance. In a review of thirty studies with 345 estimates, 92% of the estimates indicate a positive relationship between profit sharing and productivity or profitability. (Bell and Kruse 1995). The findings are strongest for before and after studies where, productivity goes up an average of 4 to 5 percent in the year of adoption while productivity growth following adoption is similar to that of other firms. (Kruse 1993) Regarding employee stock ownership, it has been established that an important source of executive stock ownership was the exercise of previously granted stock options. (Hall and Liebman 1998). To the extent that broader groups of employees exercise stock options and hold onto them, employee ownership research may be directly relevant to broad-based plans. Moreover, it is possible that the attachment to the firm engendered by ongoing employee stock ownership may be similar to that engendered by long-term holdings of stock options, although this remains to be explained and proven. If either of these observations is plausible, then employee ownership research may be relevant. Briefly, evidence indicates that the stock prices of firms with more than 5% employee ownership in 1991 had higher stock price growth than otherwise-similar firms over the 1980s. (Blasi, Conte, and Kruse 1996). And an index of public firms with more than 10% employee ownership has generally beat stock market indexes since it began in 1992. (American Capital Strategies 1998). And companies with 20% or more employee ownership in 1983 had similar productivity and average Tobin's q to non-employee ownership firms, but statistically better return on assets and total shareholder return. Several hypothetical portfolios of these employee ownership firms outperformed market-wide portfolios and a portfolio made up of a control group of their peers from January 1984 to July 1996 on an equal-weighted and a capital weighted basis and when they were adjusted for risk. (Blair, Kruse, and Blasi 2000: 274-277) A detailed review and meta-analysis of all systematic statistical studies of ESOPs (Employee Stock Ownership Plans) are split between neutral and favorable findings. Employee ownership firms appear to perform as well as non-employee ownership firms in most studies. They rarely perform worse. But we have identified a disproportionate of positive and significant estimates by a variety of researchers. The average estimated productivity difference between ESOP and non-ESOP firms is 6%, and the average estimated productivity increase in the year of ESOP adoption is 4%, while average productivity growth following adoption is similar between ESOP and non-ESOP firms. (Kruse and Blasi 1997)

Thus, while these studies involve no wide-ranging systematic assessment of the performance of broad-based stock option plans, they arrive at several suggestions:

1. Stock option plans are by definition dilution devices;
2. Broad-based stock option plans would have a substantial impact on company earnings if the companies were required to charge the current value of their stock option grants as an expense;

3. The companies with such plans have less favorable performance in a study with a small sample but favorable performance in a management opinion study but companies apparently hope for evidence of productivity improvements;
4. The companies with such plans are faster growing firms than companies without the plans;
5. There is a significant research challenge in disentangling the effects of these plans from the effects of other HRM practices.; and
6. Companies with broad-based stock option plans can be expected to have at least comparable performance to those without such plans, and perhaps better productivity and total shareholder return to the extent that broad-based plans reflect profit sharing or employee ownership dynamics.

Using a systematic analysis of evidence, we will attempt to assess if these observations can be confirmed or not.

Past Research on the Performance Effects of Senior Management Stock Options

It is an outstanding issue whether one can expect the same performance impacts from stock option plans for non-management employees as one expects from stock option plans for senior management. In the following section, we assess research on this question. We also assess the sizes of the samples on which these studies were conducted in order to provide an overall context for research on broad-based stock option plans. It makes sense to review the research on senior management stock options and firm performance in order to set a baseline for expectations. The main conclusions on the performance impacts of senior management stock options come from two large studies, Jensen and Murphy (1990) and Hall and Liebman (1998). The first study initially found that there was not much of a performance effect before the 1990s but the second study found very different results after 1990. Obviously, during this period stock option compensation packages for senior executives spread rapidly and the stock market soared. Briefly, the results of the new Hall and Liebman study show that the sensitivity of firm performance to CEO stock options has dramatically increased in the last decade. These studies provide a useful context for an examination of the evidence on broad-based stock options. In addition, the nature and size of the datasets on which these studies is based provides a useful metric to evaluate the broad-based stock option dataset.

The percentage of CEOs receiving stock option awards grew from 30% in 1980 to nearly 70% in 1994 and the percentage of CEOs holding any stock options increased from 57% to about 87% over the same period. (Hall and Liebman 1998) A Standard & Poors Compustat study of executive compensation at the 365 largest companies in the U.S. in 1998 found that long-term compensation, namely stock options, made up 80% of the average CEO pay package, up from 72% in 1997. (Reingold 1997) In the earlier study, Jensen and Murphy (1990) reported that: "Our estimates of the pay-performance relation (including pay, options, stockholdings, and dismissal) for CEOs indicate that CEO wealth changes \$3.25 for every \$1,000. change in shareholder wealth." (p. 225). To arrive at this estimate, they examined 2,213 CEOs serving in 1,295 corporations listed in the Executive

Compensation Surveys of Forbes from 1974 to 1986 with a total of 10,400 CEO years of data to understand the relationship between total CEO pay (excluding stock options) and a \$1,000. change in firm value. The study included data on salary, bonus, actual direct management stock ownership, and other benefits and excluded comprehensive stock option data. Then using a much smaller sample of 154 CEOs in 73 Fortune 500 manufacturing firms from 1969-1983, the researchers studied the value of all stock options granted in different years at different exercise prices and exercise dates and computed total stock option wealth at the end of every year using the Black-Scholes valuation formula. With this computation, they came to an estimate of how stock options fitted into this larger picture of executive compensation. Because data on actual exercise prices were not available, it was assumed that options were always exercised at the highest price observed during the year. They found that the value of CEO stock options increases an average of 14.5 cents for each \$1,000. increase in shareholder value and subsequently included this estimate as a component of their overall conclusion. They found that the incentives generated by options were much larger relative to the incentives generated by annual changes in cash compensation (3.3 cents per \$1,000. from the larger sample), but stock option incentives were still small relative to the incentives generated by direct stock ownership, which were \$2.50 per \$1,000. in shareholder wealth. Overall, the earlier 1990 Jensen and Murphy study concluded that CEO wealth was too insensitive to stock returns to provide proper incentives. They believed that "political forces operating both in the public sector and inside organizations limit large payoffs for exceptional performance." (Jensen and Murphy 1990: 262)

The picture was to change radically by 1998 with a new study of this issue. In 1998, Hall and Liebman reexamined the issue using a much larger and more recent fifteen year panel dataset in the largest publicly-traded companies. This dataset contained detailed information on CEO holdings of stock and stock options for 478 companies in 1980-1994 from proxies and 10-K filings. The distinguishing feature of this study is that it computed the value of the total options held by the CEOs for the current and all previous years using the Black-Scholes formula. And for each year they recalculated the value of all options based on share price information for that year. They focus on the median because mean changes were very misleading as a result of an observed very heavy influence by outliers. They discovered, as noted, that a quite large increase in CEO stock-based compensation occurred between 1980 and 1994. Between 1980 and 1994 the direct compensation (salary, bonus, and the value of annual stock option grants) of CEOs increased by 136% at the median and 209% at the mean in real terms. They found that most of this increase was in the form of stock options which increased the relationship between CEO pay and firm performance. The median elasticity of CEO compensation with respect to firm market value more than tripled from 1.2 to 3.9 between 1980 and 1994, with the 1994 elasticity being 30 times larger than previously reported elasticities. They observed that Jensen and Murphy's estimates rely on earlier data that predated the explosion in stock option issuance and that they believe that companies subsequently followed the Jensen and Murphy prescription to more closely tie stock compensation to firm performance. They did not question the Jensen and Murphy conclusions for the time period that those researchers used. In fact, they replicated it for that earlier time period.

Nevertheless, Hall and Liebman articulated a subtly different perspective from Jensen and Murphy by questioning whether the entire concept of high sharing rates (i.e. incentives) for CEOs per \$1,000. in shareholder value really made inherent sense. Put simply, they argue that a \$1,000. sharing rate (in this sense, a stock-based incentive) for CEO compensation per \$1,000. in shareholder value is neither a practical nor an efficient idea. In other words, their point is: why give a CEO \$1000. for increasing shareholder value \$1,000? Why have a one to one sharing rate between companies and executives? They observe that changes in CEO wealth (the numerator) can appear rather small when taken as a fraction of the firm value of a Fortune 500 company. (the denominator) They argue that a one-to-one relationship between CEO pay and firm value may be reasonable for a small firm but that it is not reasonable for a large publicly-traded firm. Initially, they make this point regarding executive stock ownership by arguing that a CEO would not have enough money to buy a significant stock ownership stake in a large Fortune 500 company. Then, they extend this notion to stock option incentives which they say would create too much risk for CEO compensation if a 1 to 1 sharing rate were used. And they posit that when the reality of CEO risk aversion is combined with high risk sharing rates, this would cause CEOs to avoid some high-risk (but positive net present value) investment projects in their companies that really would have been optimal for diversified shareholders. So they argue that high sharing rates may actually distort incentives. Small sharing rates in large companies are therefore the result of the infeasibility (the financing constraint that prevents CEOs from actually owning a large portion of the stock) and nonoptimality (the risk aversion constraint) of having CEO wealth vary one for one with firm value. They suggest that smaller sharing rates than one to one will often yield dollar changes in CEO wealth that are sufficient to produce value-maximizing behavior by the CEO. The actual sharing rates which Hall and Liebman discovered were still larger than the earlier Jensen and Murphy estimates. They came to the following conclusions:

- The connection between direct compensation (salary + bonus + stock option grants) and firm performance was 0.27 implying that a 10% increase in firm performance will increase salary and bonus and stock option grants by 2.7%. Most of the effect came from stock options and then bonuses.
- When they held constant all other aspects of total CEO compensation, a 10% increase in firm value increases the value of the median CEO's stock and stock options by about \$1.25 million which is 53 times larger than the elasticity for salary and bonus! To control for outliers, they found that at a 10th percentile firm stock price performance, the median CEO in the sample loses \$ 435,000. in the value of stock option holdings and stock holdings and these amounts are more than offset by direct pay. Then, these losses contrast with net gains of \$3. million for a median performance and \$8.6 million gain for a 90th percentile performance.
- The separate roles of stock and stock options holdings were estimated by the researchers assuming that direct pay is held constant. The assumption was that the firm's stock price increases from a median performance (a 5.9% increase in stock value) to a 70th percentile performance (a 20.5% increase in stock value). Assuming no stock ownership holdings, just stock option revaluations, moving firm performance from the 50th to the 70th percentile increases CEO stock option

wealth by a substantial \$1.5 million at the mean (37.8%) and by \$0.85 million at the median (33.2%) and by \$3. million at the 90th percentile (81.6%) assuming no stock holdings. When CEO holdings of stock are included, moving firm performance from the 50th to the 70th percentile increases CEO stock option revaluations + stock holding wealth by a substantial \$9.6 million at the mean (70.8%) and by \$ 1.8 million at the median (57.6%) and by \$13.24 million at the 90th percentile (149.5%). This implies that a ten percent point increase in firm value increases CEO wealth by about \$1.25 million, which is 53 times larger than their estimated \$23,400. increase in salary and bonus for the same change in firm value.

- When the authors re-estimated the Jensen and Murphy statistic of dollar changes in CEO wealth for a \$1000. increase in firm performance for 1994, they find that it has doubled by 1994 with a \$5.29 increase in CEO wealth from only stock and stock options with a \$1000. increase in firm value at the median and \$25. increase at the mean. And this figure substantially underestimates the increase adjusted for size.
- Using robust regressions, they regressed total compensation defined as total CEO wealth change on the firm's contemporaneous return for that fiscal year to get an annual percent return for all 15 years in the sample. The coefficient is 0.043 and highly significant implying that a one percentage point increase in the firm's return increases the CEO's wealth by \$43,000. This estimate was much less than the last year in the sample, 1994. By interacting returns with each year, they show that the pay to performance relationship has changed over time becoming almost 9 times larger in 1994 than 1980. In 1994, it is 0.124 implying a \$124,000. increase in CEO wealth for a 1% increase in firm value.
- They conclude that the dramatic rise in CEO compensation has been driven by increases in annual stock option grants which have produced a large buildup in total CEO holdings of stock options. While the holdings of direct stock relative to firm value have remained constant or fallen since the early 1980s, the dollar value of this stock has risen sharply due to the stellar performance of the stock market. The median value of stock holdings for CEOs rose from \$1.2 million in 1980 to \$4.4 million in 1994 in 1994 dollars. Since CEO holdings of firm stock are often the result of exercising stock options, some of the increased sensitivity that shows up as due to stock holdings actually originated in stock option grants. The CEO wealth change for a dramatic change in firm performance (moving the firm from the 10th to the 90th percentile in stock value performance) increased by a factor of almost seven from \$1.4 million to more than \$9. million and the median wealth change for CEOs for a modest improvement in firm performance (moving the firm from the 50th to the 70th percentile in stock value performance) increased from \$281,000. to \$1.8 million. The authors conclude that no matter which measure is used, there has been a dramatic increase in responsiveness of CEO pay to firm performance during the last 15 years, largely as a result of stock options.

Some observers whom we consulted would argue that the retrospective Hall and Liebman study should not be used to justify the size of many executive stock option packages nor do the studies necessarily prove definitively that it was these executives who were mainly

responsible for company success. Some critics argue that more modest executive rewards would also be consistent with having a connection between executive pay and firm performance. These observers believe that sharing of these rewards with the rest of the employees might actually end up compensating a wider range of responsible actors. of these observations. These are important issues and this is an important debate. While we are sympathetic to this point of view, a detailed discussion of these debates further are beyond the scope of the present article. Whatever one's view on these issues, the Hall and Liebman research definitely provides useful evidence on how widespread executive stock options reflects firm performance.

Executive stock option studies have also reached a number of secondary conclusions which may be relevant to our study. Miller and Scholes have reported that stock option plans may be an attractive part of compensation packages because of tax benefits. (1981) Because of the very favorable accounting treatment of broad-based stock option plans, this suggests that the role these tax incentives play merit closer scrutiny. In an earlier era, tax law changes were in large part responsible for the postwar growth of stock options. Agrawal and Mandelker (1987) found that firms undertaking variance-increasing (decreasing) investments have management compensation contracts with a larger (smaller) common stock and option component. This was consistent with the views of other scholars (Defusco, Johnson, and Zorn 1990) and more recent studies (Guay 1999). This suggests that executive options may encourage entrepreneurial behavior. A number of studies find positive stock market reaction to the announcement of executive compensation plans tied to performance, especially stock option plans consistent with the view that there may be lower agency costs in these companies. (Brickley, Bhagat, and Lease 1985; Larker 1983; Tehranian, Travlos, and Waagelein 1987) This emphasizes the reaction of outside shareholders to the potentially positive agency effects of such plans. But a recent study of 620 stock option awards to Fortune 500 CEOs from 1992-1994 finds that managers who become aware of impending improvements in corporate performance may influence the timing of their compensation committees to award them more stock options as a low-risk method of capitalizing on investors' expected reactions to news of the improvements. This scholar says that "because CEO option recipients benefit from the remarkable good timing of their rewards, their compensation appears to increase for reasons that have little to do with managerial skill, effort, or performance." (Yermack 1997: 451) Other studies show how executives manipulate corporate dividend policy by reducing dividends when stock options are added to their compensation packages. It is noted that dividends dilute the per-share value of stock. (Lambert, Lanen, and Larcker 1989; Fenn and Liang 1999) And scholars have found that management significantly increases the use of share repurchases -- which do not dilute the per-share value of the stock --- as stock options to compensate managers increase. (Jolls, 1998) There is a wealth of empirical evidence which documents a link between the higher debt ratio of the firm and a lower executive compensation-shareholder wealth relationship. (For a review, see John and John 1993)

All of these studies suggest that stock-compensation for executives has a significant relationship on how executives design the financial organization of the firm itself and they point to a level of executive decision-making and strategic choice and perhaps even

intention that may not involve employees in broad-based plans. The key findings are those of Hall and Liebman. They suggest that broad-based stock option plans should contribute to firm performance if they follow the lead, the expectations, and evidence of senior management plans in this decade. However, the key question is how will nonmanagerial employees affect the firm given that they are not executives who can engage in large-scale strategic decisions that may be value-adding.

Past Research on The Impact of Options on Compensation

The full meaning of broad-based stock options for companies and workers cannot be properly estimated in a vacuum without understanding the trends in the fixed compensation of CEOs and workers. Whether workers on average have won significant fixed pay increases relative to inflation since the eighties or whether they have had essentially flat fixed wages, will help establish the context for analyzing the performance effects of broad-based stock options. For example, in general, if workers have been generously compensated with inflation-adjusted fixed wages, then broad-based stock option plans throughout the economy would have to demonstrate positive effects on company performance if they are not to be deemed unnecessary excess compensation and an unnecessary dilution of shareholder value. But if workers have seen flat inflation-adjusted incomes, then broad-based stock options throughout the economy may be viewed as a supplement to flat fixed wages that corporations used to reward workers with stock-based pay . On this score, as long as the impact of broad-based stock options on firm performance is zero or not significantly negative, then one can view it as playing a neutral supplementary role to fixed wages. What does the literature indicate? Between 1982 and 1994, Hall and Liebman (1998) demonstrate that the mean real growth of CEO compensation (salary + bonus + the value of stock option grants) increased by 175% or about 8.8% per year. The median growth rates were 120% and 6.8%. The comparable mean real growth rates for all wage and salary workers based on the Employment Cost Index was almost flat during this period at 7.2% or about 0.6% per year from \$30,400. in 1982 to \$32,600. in 1994. For comparison, the very rich or the top 1.2 percent of the population had a 55.4% change over the same period or an annual rate of 3.7% per year. They calculate that most of the real increase in CEO compensation was due to stock options and stock ownership. (Hall and Liebman 1998: 665, Table III) Note that the Employment Cost Index numbers for workers do not include stock option income. (Lebow , Sheiner, Slifman, and Starr-McCluer 1998:3) Thus, this comparison indicates that in general stock options put CEOs in a very favorable income situation over this period, while the absence of stock options put the average worker in a very disadvantaged position. This is consistent with other data that indicate that those members of the U.S. population whose personal and family incomes went up in the U.S. in recent decades had greater capital incomes. Labor incomes are falling and capital incomes are rising. (Mishel, Bernstein, and Schmitt 1999: 62-71) In effect, the fixed wage and benefit system is collapsing. Those who prosper do so because they have an interest in capital.

What has happened to the workers who did receive stock options? A central controversy about broad-based stock options is whether companies trade off cash compensation with risky benefits, in other words, the companies engage in substitution. Are companies

reducing wages and giving employees stock options? Or are companies maintaining fixed wage packages and adding stock options? In effect, what is the role of broad-based stock options in the collapse of the fixed wage system? Is it extensive or irrelevant? While there is no systematic study of this issue some analyses suggest that options increase compensation. Hewitt Associates' 1997 study compared the cash compensation of 20 companies with broad-based stock option plans to a larger sample of 152 companies within their Variable Compensation Database and found that in the companies with the broad-based stock option plans, employees actually received more total cash compensation. (Hewitt 1997: 7). In 1998 the National Center for Employee Ownership computed the average value of the most recent stock options on the date of grant to nonmanagement employees for 96 companies with available data that are in the sample in our current study. The average value of most recent stock option grants was between \$37,000. and \$41,000. for professional and technical employees and \$12,500. for administrative employees. However, data for administrative and other employees put the average value of an option award in annual or periodic option programs at \$6-12,000. depending on the industry group. In this study, the average minimum salary at which employees received options was \$18,718 or \$18,000. at the median. The NCEO estimated that the broad-based stock options would result in employees garnering 12-20% of annual pay in the form of exercisable option spreads if the historical performance of the stock market, the typical frequency of grants, and the typical terms of grants were taken into account. (Weeden, Carberry, and Rodrick 1998: 9). But the real implications of this observation depends on whether the stock option grants are simply one-time or truly regular annual or periodic grants. If such programs are only spot events then the ongoing annual impact of a one time grant cannot be presumed to have a meaningful regular annual impact on compensation for a broader group of workers. The 1998 National Center for Employee Ownership Study reported that 81% of the companies actually provide ongoing awards to nonmanagers that are either annual or periodic but regular. And the frequencies are similar across different industry groups. (Weeden, Carberry, and Rodrick 1998: 9, 20.). Thus, the available evidence appears to suggest that broad-based stock option programs do serve as a supplement to wages and thereby do increase total compensation. Indeed, researchers at the U.S. Federal Reserve Board are entertaining a similar conclusion, albeit while making estimates for the effect of stock options on average compensation figures for the entire economy:

Stock option grants never appear in the Employment Cost Index. They do get captured in other measures of compensation, but not in an ideal fashion... (In both the NIPA (the Commerce Dept.'s National Income and Product Accounts data) and the CPH (DOL's Bureau of Labor Statistics Compensation Per Hour data) series, stock options are not counted as compensation until the exercise date. Thus, during a period of rapid increases in the issuance of stock options, all our remuneration measures will understate the true cost of labor.... We also offer, as an example, some extremely rough calculations of the possible effect on the ECI of stock option grants... Had stock option grants been included in the ECI they might have added about a quarter of a percentage point to annual ECI growth between 1994 and 1998. A similar calculation would be made to estimate the effects on nonfarm compensation per hour of including stock option exercises rather than grants.... Inclusion of stock option exercises would have boosted growth of nonfarm compensation per hour about 3/4 percentage point per year from 1994 to 1998 -- roughly half a percentage point more than compensation growth that includes stock option grants. These calculations assume that stock option grants granted by the largest nonfinancial firms are representative of the entire publicly traded sector.... All told, the effect on aggregate compensation measures of including stock option grants -- and especially, the value

of stock option exercises -- is highly uncertain, but our calculations suggest that in recent years stock options have been a not-insignificant part of actual overall compensation growth. (3, 5, 17-19)

Thus, the available evidence suggests that broad-based stock options play a not-insignificant role in supplementing a flat fixed wage system by broadening the compensation schemes of workers to include a greater reliance on capital incomes. However, the existing evidence sheds very little light on the compensation history of the companies that provide broad-based stock options compared to the companies that do not provide them. Our study will look at the compensation history of the companies that use broad-based stock options and we will provide one additional evaluation of whether the Federal Reserve Board's suspicion that stock option supplement rather than replace compensation might be accurate.

Past Research on How Non-Executive Employees Exercise Stock Options

Finally, researchers have looked at how employees in broad-based plans actually go about exercising their options. While it may not be readily apparent, exercising behaviors are a relevant factor in the stock option-firm performance relationship. Let's examine how this happens. One study of 60,000 employees at 7 companies over ten years found that 90% of employees receiving options sold the stock immediately after they exercised the options. In short, stock options appear to function as cash profit-sharing plans and less as stable employee ownership formats. Indeed, two-thirds of the exercise activity of lower-level employees occurred within six months of the options being vested and "in-the-money", suggesting that lower-level employees may have been more anxious to sell and get the compensation than capitalizing on the optimum value of the options would provide. Indeed, the evidence shows that the employees exercised the options years before they expire and hence sacrifice on the order of a quarter of the option's expected value! In contrast, senior executives were half as likely to exercise their options within six months. (Huddart and Lang, 1996) A subsequent study (Heath, Huddart, and Lang 1999) demonstrated that a variety of psychological factors affect exercise behavior. They especially emphasize reference points based on maximum stock price that was achieved in the previous year. They conclude that this behavior -- which is well-developed in the literature in belief-based models of investor behavior -- has the capability of cutting short the performance influence of options.

Our results have practical implications for firms, compensation planners, and employees. Over the last few years, stock options have become a pervasive form of compensation: a majority of U.S. companies issue stock options to employees, and many grant options to more than half of all employees. From the firm's perspective, exercise behavior affects the costs and benefits of this for compensation, because it affects how long options are held. In particular, options only have an incentive effect as long as they are outstanding. If employees systematically exercise options before expiration, then incentive endure for shorter periods of time than might be suggested by the life of the option. Similarly, if employees exercise options in response to particular price paths, then firms will find that options-based incentives are reduced at times when the market has rewarded the firm's

performance... Employees sacrifice significant economic value when they exercise in response to economically irrelevant factors. (p. 625)

THIS STUDY

The Data Analyzed for This Report

(See the main article, “Broadly Granted Stock Options Improve Corporate Performance,” at www.nceo.org for a PDF of the tables)

This study uses the most extensive dataset yet available on broad-based stock-option plans in U.S. companies to conduct our analysis. This unique dataset was developed by the National Center for Employee Ownership. (See Weeden, Carberry, and Rodrick 1998: vii and 4-7 for more details and a copy of the survey). A list was constructed of 1360 companies that might have broad-based stock option programs. NCEO defined a broad-based stock option program as those where a majority of full-time employed persons at the company actually receive options over a reasonable period of time. The list included companies that nine major national compensation consulting organizations suspected might have such programs and 385 companies that had made public announcements in the media about the implementation of such programs. These 1360 companies were the population that was sampled. A survey was mailed to each of these companies in early 1998 and 141 responses were received, yielding a response rate of 10.4%. Of these, 105 were confirmed to have broad-based stock option plans that actually made stock option grants to a majority of their full-time employees and had sufficient information to be included in our study. Ninety one percent of the companies in the sample were public; 28% were manufacturers of electronic and measurement equipment, 23.3% were from other manufacturing sectors, 22.5% were providers of business/other services, 10% were communication and transportation companies, 9.3% were finance/real estate companies, and 6.2% belonged to the retail sector. The National Center for Employee Ownership published the book *Current Practices in Stock Option Plan Design* in 1998 to report on the characteristics of the broad-based stock option plans of these 105 companies. (Weeden, Carberry, and Rodrick 1998). At that time, our group of researchers at Rutgers University requested permission to use the database in order to do an analysis that would focus exclusively on the performance effects of these plans. The research group at Rutgers was not compensated for their work on this project by either the NCEO or the compensation consulting organizations that assisted the NCEO with the original survey. The agreement was that Rutgers University team would work independently in arriving at and publishing our results and make them available in a final report to the organizations that facilitated the initial survey.

The core idea of this research is to compare the performance of corporations with broad-based stock options to corporations without broad-based stock options. All data on company performance was taken from Standard and Poors Compustat datafile of public information on public corporations which is available at Rutgers University. No performance data was supplied in the surveys or by management independent of Compustat. The surveys were only used to assess the presence of broad-based stock

option plans in the companies and the percent of non-management employees in the broad-based stock option plans. In order to make this analysis as robust as possible, the researchers also identified an additional group of broad-based stock option companies that had publicly announced their plans but did not participate in the survey. This method expanded the number of broad-based stock option companies considered in the study. It also helps to address any claim that the companies that responded to the survey may have had a unique set of performance results because they chose to respond to the survey. The reasoning is that if the study finds consistent results in the analysis of performance using both groups of broad-based stock option companies, there is a higher probability that it may have actually discovered something useful. Following is a brief description of each group of stock option and non-stock option companies used in the analysis to which this report refers in Table 2 to Table 9. In this report and in these tables the terms stock option and non-stock option companies refer only to broad-based stock option plans. Obviously, most companies have non-broad based plans. The groups of companies with broad-based stock options used are:

(1) All Surveyed Stock Option Companies

These are the 105 corporations who responded to the survey and for whom detailed information is available on their stock option plans. Unlike corporate plans that only include a small number of top executives, the broad-based plans included in this survey actually distributed an average of 45% of recent stock option grants to non-management employees. (see Weeden, Carberry, and Rodrick: 1998 for detailed data.)

(2) Surveyed Stock Option Companies With > 50% Non-management Employees Participating

These are a subset of 73 corporations who responded to the survey whose broad-based stock option programs include more than 50% of their non-management employees (also referred to in the Tables as 50+% Coverage of Non-Management Employees or Cos. W > 50%).

(3) Surveyed Stock Option Companies With < 50% Non-management Employees Participating

These are a subset of 32 corporations who responded to the survey whose broad-based stock option programs include less than 50% of their non-management (also referred to in the Tables as < 50+% Coverage of Non-Management Employees or Cos. W < 50%).

(4) Unknown Coverage of Non-management

These are the 395 broad-based stock option companies that did not respond to the survey but have been publicly identified as having broad-based plans. Because they did not respond to the survey, we do not know the actual percentage of non-management employees in their stock option plans.

(5) All Stock Option Companies

These are the 490 corporations that we know from either responses to the survey (105) or publicly available information (395) have broad-based stock option plans (also referred to in the Tables as Stock Option Companies).

In the data analysis that follows, different groups of companies with broad-based stock option plans are compared to several groups of companies without broad-based stock option plans. The groups of companies without broad-based stock options are:

(1) All Non-Stock Option Companies

These are the 7165 U.S. public companies in Standard and Poors Compustat datafile of all public companies that we were unable to identify as having broad-based stock options. Firms that reported number of employees in either 1996 or 1997 were included. This group was constructed by taking all of the Standard and Poors Compustat datafile and removing both the 105 companies that responded to the survey and the 385 companies that we identified as having broad-based stock option plans. (also referred to in the Tables as Control Companies or Full or Full Set or All Compustat). Note: A special subset of this group is the Compustat 500 which is the 500 largest Compustat companies by market capitalization.

(2) All Paired Companies

This group of companies was formed in the following way. For each stock option company, the next smallest and the next largest public company without broad-based stock option plans in its industry group (two digit SIC code) was selected. Sometimes both members of a comparison pair (i.e. two companies) were not available. For example, there were times when the stock option company had no larger company in its industry group to which it could be compared. In such cases, only one company was chosen (i.e. the next smallest). The average performance of the two matched companies was then used as a control measure that could be compared to each stock option company's performance. (also referred to in the Tables as Control companies, Paired cos. or Paired or their peers or their paired peers)

The purpose of both comparison groups is to fine-tune the analysis. While one can compare the performance of stock option companies to all public non-stock option companies and this analysis does that, we are also persuaded by the argument that it makes sense to compare stock option companies to non-stock option companies that are as similar to them as can be established in sales and industry group. These are the paired companies. They are peers of the broad-based stock option companies except that they do not have broad-based stock options to our knowledge.

The performance measures used include Productivity, measured as $\ln(\text{output}/\text{employee})$, Total Shareholder Return, Tobin's q and Return on Assets. Productivity is calculated as the natural logarithm of total sales normalized by the number of employees. Total

shareholder return is calculated as (adjusted price + adjusted dividend)/ (adjusted price [t-1]). Adjustments are made for stock splits. The calculation for Tobin's q is: (market value + preferred stock + long term debt)/(capital stock + current assets - current liabilities). Return on assets is calculated as [(income-adjusted depreciation) x 100]/(capital + current assets-current liabilities). All calculations are adjusted for inflation. Labor costs are also examined in this study, however, only a limited number of the firms in our dataset reported such data. Table 1 provides definitions of these measures of performance. For the non-technical reader who wishes to have a detailed walk-through of many aspects of the study and the accompanying charts, the Appendix provides that level of detail.

The Analytical Methods Used

The performance of broad-based stock option companies is assessed using multiple regression techniques. Influencing both the magnitude of the coefficients and the regression fit will be any extreme values found in the dataset. In order to eliminate the influence of outliers the researchers run the regressions using both robust regression (assigning lower weights to extreme values) and quantile regressions (minimizing the sum of absolute residuals rather than of squared residuals). We also run OLS regressions with the upper and lower 1% values trimmed and the untrimmed dataset. The results did not vary significantly among these techniques and the reported results use robust regression. A specification of the regression models used is available from the authors. For the purposes of this report, we will focus on discussing the statistically significant results. Statistical tables reporting these results are contained in Tables 2- 9. Appendix I contains a detailed guide to making sense of the tables for the non-technical reader. The study is a combination of a cross-sectional study – which looks at portrait of the broad-based stock option versus the non-broad-based stock option companies in 1997 – and a before and after study – which compares the performance of stock option companies to non-stock option companies before broad-based plans were introduced in 1985-1987 and after they were introduced in 1995-1997. The results of the cross-sectional study are reported in Tables 2-5 and 9. The results of the before and after study are reported in Tables 6-8.

How Do the Broad-Based Stock Option Companies Compare to the Non-Stock Option Companies Before the Introduction of Broad-Based Stock Option Plans?

It is important to understand the baseline performance of the broad-based stock option companies compared to the non-broad based stock option companies in Compustat in general and their peers. For example, if it is discovered that broad-based stock option companies had 10% greater productivity than non- broad-based stock option companies before the introduction of these plans and 10% greater productivity after the introduction of these plans, it would be clear that the increase after the introduction of broad-based stock options is probably not associated with the introduction of these plans but might be explained by the fact that more productive companies adopt broad-based stock option plans. Some of the data in Tables 6-8 answer this question because these tables focus on the performance of stock option and non-stock option companies in the 1985-1987

period. The researchers choose this period because it is a period before public corporations began to report the introduction of broad-based stock option programs and data on this period represents a fair picture of what these companies were like before the introduction of the programs. These results for 1985-1987 are based on smaller samples than the main results of this study because they were limited to companies that had made data fully available to Compustat in the periods under question. In the interests of drawing fair comparisons, the following comparisons hold constant company size by employment, capital intensity, and industry group.

Looking at Table 6, in 1985-1987, all broad-based stock option companies had significantly higher productivity levels of 9.3% and, looking at Table 7, they had significantly higher annual productivity growth of 2.2% per year in than all non broad-based stock option companies. If one adjusts for the performance of the control companies, all broad-based stock option companies had significantly higher productivity levels of 9.8% and significantly higher annual productivity growth of 1.8% per year than all non-stock option companies. All stock option companies had significantly higher productivity levels of 5.4% and significantly higher annual productivity growth of 1.8% per year in than their peers (their industry group pairs.) In general, all broad-based stock option companies did not have significantly different levels or growth rates of total shareholder return in 1985-1987 than all non-broad-based stock option companies and their peers, except that they had 4.1% higher total shareholder return levels than all non-broad-based stock option companies. This number is 3.6% if one adjusts for the performance of the control companies.

Using the Tobin's q measure of market value in 1985-1987, broad-based stock option companies had significantly higher levels of Tobin's q of .31 and significantly higher annual growth rates in Tobin's q of 7.5% than all non-broad-based stock option companies in the 1985-1987 period. . If one adjusts for the performance of the control companies, broad-based stock option companies had Tobin's q levels of .35 and Tobin's q growth rates of 8.9% more than non-broad-based stock option companies.

In general, broad-based stock option companies did not have significantly different levels or annual growth rates in return on assets than non-broad-based option companies or their peers in the 1985-1987 period, except that they did have a 58.3% higher growth rate in return on assets compared to non-broad-based stock option companies in the 1985-1987 period. This figure is 61.7% greater if one adjusts for the performance of the control companies.

The compensation levels of all stock option companies in the 1985-1987 period were 7.8% higher than all non-stock option companies although the annual growth rate was no different. If one adjusts for the performance of the control companies, the compensation level in 1985-1987 was actually 8% higher.

In conclusion, the companies that implemented broad-based stock option programs in the nineties tended to be those companies that were already more productive, more valuable in terms of Tobin's q, and higher paying in the mid-eighties, although they were not

higher return on asset companies on average. While we did not measure if these were faster growing companies in the mid-eighties, these results certainly do suggest that they were more successful companies in the mid-eighties. This is an important point. Companies that later implemented broad-based plans had already been fairly successful. Now, the key question that remains is how they performed after they introduced the broad-based stock option plans. Was the continuation of this past success merely maintained at previous levels or was it expanded?

The Results: What Is the Financial Performance of Public Companies with Broad-Based Stock Options Compared to Public Companies Without Announced Broad-Based Stock Option Plans?

We will discuss only the statistically significant results on productivity, total shareholder return, Tobin's Q, and return on assets separately. Thus, all numbers given in this section can be assumed to be statistically significant at least at the 90% level of probability. (The level of statistical confidence behind each statement can be assessed by examining the Tables. The only exception to this is when we discuss nominal total shareholder returns that may be of interest to investors.) This discussion will summarize all the data contained in Tables 2 to 9. This evaluation of the performance of broad-based stock option companies compared to non-stock option companies examines their performance in three time periods:

1. The performance levels in 1997, which is the last year for which data is available
2. The average annual percentage change in performance from 1992-1997
3. The change in performance from the period 1985-1987 -- before the programs were introduced -- to the 1995-1997 period after the programs were introduced

(Note: 84% of the survey sample did not adopt their broad-based stock option plan until after 1987).

Broad-based stock option companies will be compared to all non-broad-based stock option public companies and to their industry group peers (pairs). Table 2 provides some simple descriptive statistics on the different company groups. The tests of statistical significance in this table determine if the various groups of broad-based stock option companies are significantly different from all non-broad-based stock option companies. In 1997, all broad-based stock option companies were significantly larger in sales (\$3.5 billion versus \$1.1 billion) and employment (14,451 workers versus 5,654 workers) than non-broad-based stock option. The logarithm (Ln in the Table) of sales, employees, and capital intensity allows a more useful percentage comparison of the two groups of companies. The average sales of all broad-based stock option companies was 169.8% higher than the non-broad-based stock option companies. (i.e. $6.23 - 4.532$ or 169.8%) The average employment of the broad-based stock option companies was 146.6% greater than the non-broad-based stock option companies. The average capital intensity of the broad-based stock option companies was 14.4% higher than the non-broad-based stock option companies. All broad-based stock option companies had significantly more sales

(\$784. Million more or 36.1% more) than their peers and were more capital intensive with 12.2% greater total assets per employee. But they had similar employment to their peers. Table 2 also demonstrates that the broad-based stock option companies were highly concentrated in manufacturing and services and communications reflecting the general concentration of public companies in those industries. But broad-based stock option companies were less concentrated in mining/construction, whole trade, retail trade, and finance and real estate than most public companies, although significance tests were not performed on these differences.

The Productivity Evidence

The productivity evidence is particularly important in this analysis because the productivity measure is one over which individual employees and groups of employees may have some influence as a result of active components such as work practices, their effort, their motivation, their self-and mutual monitoring, their creative ideas and (or) passive components such as their acceptance of and participation in downsizings, reorganizations, restructurings, new technologies, and so forth. In brief, the productivity findings are that stock option companies demonstrated statistically significant higher productivity levels and annual growth rates than non-stock option companies in Compustat in general and among their peers. Now, let's consider the data in more detail. Those findings that are reported are statistically significant differences unless otherwise noted. Initially, the 1997 levels for broad-based stock option versus non-broad-based stock option companies are examined as noted in Table 3, Simple Performance Comparisons without holding constant employment, capital intensity, and industry group differences. At the end of the period in which they had broad-based stock option plans, that is 1997, the last year for which data is available, broad-based stock option companies had 31% more productivity than broad-based non-stock option companies. (and 37% more than their paired peers). Surveyed broad-based stock option companies had 16% greater productivity than all non-broad-based stock option companies. And surveyed stock option companies with more than 50% non-management employees receiving grants had 20% more productivity than non-broad-based stock option companies (and 21% more than their paired peers).

Regarding the average annual change in productivity from 1992-1997, broad-based stock option companies had 1% greater average annual productivity than non-broad-based stock option companies. (and 2% more than their paired peers). Surveyed broad-based stock option companies had 1% greater average annual productivity than non-broad-based stock option companies. And surveyed broad-based stock option companies with more than 50% non-management employees receiving grants had 1% greater average annual productivity than non-broad-based stock option companies (but the same annual productivity growth as their paired peers). While these appear to be positive results, it is entirely possible that differences in company size, capital intensity, and industry group actually have a greater role in accounting for the better performance of the broad-based stock option companies, although this is less likely because the previous comparison also compared the broad-based stock option companies to their peers with similar results.

Nevertheless, in order to be more careful about these analyses Table 5 does a more rigorous test.

Table 5 looks more closely at productivity again in 1997 but performs a more rigorous statistical test by holding constant company size according to total employment, capital intensity, and industry group. This analysis allows a comparison of the productivity effects of like broad-based stock option versus like non broad-based stock option companies. The results are very consistent with those that have already been discussed from Table 3. Broad-based stock option companies had 27.7% more productivity than non-broad-based stock option companies and 30.6% more than their paired peers. The first figure is 27.5% if one adjusts for the performance of the control companies. Surveyed broad-based stock option companies with more than 50% non-management employees receiving grants had 22.0% more productivity than non-broad-based stock option companies (and 21.3% more than their paired peers). . The first figure is 21.7% if one adjusts for the performance of the control companies. Surveyed broad-based stock option companies with less than 50% non-management employees receiving grants had similar productivity to all non-broad-based stock option companies and their paired peers. And the 385 corporations who the press had publicly identified as having broad-based stock option plans -- but were not surveyed and whose percent of non-management employees receiving grants was unknown -- had 30.1% greater productivity than non-broad-based stock option companies (34.4% more than their paired peers). The first figure is 27.8% if one adjusts for the performance of the control companies.

This appears to constitute very strong and consistent evidence that stock option companies have higher productivity than non-stock option companies in 1997 after the broad-based plans were introduced. But, remember, it was also noted earlier that stock option companies were already productivity leaders in 1985-1987 before 87% of them introduced broad-based stock option plans. Is the evidence of greater productivity in 1997 simply carrying forward that superiority from the 1985-1987 period or did these companies really improve their productivity after the introduction of the broad-based plans? Certainly, there is a strong clue that the productivity edge is not simply a carry forward because the broad-based stock option companies had 9.3% greater productivity than all non-stock option companies in 1985-1987 (and 5.4% than their paired peers), whereas by 1997, as we see above, the findings of their productivity edge over the non-broad-based stock option companies is consistently in the 20-30% range. Nevertheless, a rigorous test of this clue is to actually compare the performance of broad-based stock option companies to non-broad-based stock option companies before and after they implemented their plans and also look at the within-company changes on a before and after basis.

Tables 6 and 7 examine the change in productivity levels and annual growth rates from the period 1985-1987 -- before the programs were introduced -- to the 1995-1997 period after the programs were introduced. Obviously, this analysis relies on a much smaller sample because the researchers were limited to analyzing firms that had no missing data in Compustat in all years of both periods. Both Tables continue to hold size of company by employment, capital intensity, and industry group constant. Broad-based stock

option companies had 29.4% greater productivity levels in 1995-1997 than non-broad-based stock option companies and the productivity level change for broad-based stock option companies was 14.8% between the two periods. If one adjusts for the performance of the control companies, the broad-based stock option companies still had 24.6% higher productivity levels than the non-broad-based stock option companies. Broad-based stock option companies had 22.2% higher productivity levels than their control companies in 1995-1997 and the productivity level change for the control companies was 16.8% between the two periods. The stock option companies consistently maintained their earlier edge over their peers and over general market companies and expanded this edge significantly between the two periods.

The story was not generally reflected in the results for annual growth in productivity. (Table 7) Broad-based stock option companies had similar annual productivity growth in 1995-1997 than non-broad-based stock option companies and the productivity growth change for all stock option not dissimilar. Broad-based stock option companies had 1.7% higher productivity growth rates than their control companies in 1995-1997 but the productivity annual rate change was not dissimilar between the two periods.

Thus, the leadership appears to be in productivity levels rather than annual productivity growth rates. In order to further check this conclusion, it made sense to go one step further. The above before and after study for broad-based stock option companies assumes that their year of adoption of the broad-based plan was before 1997 (and after 1987) and that their post-adoption period was 1995-1997. Now, the study focused only at those broad-based stock option companies that filled out the survey where we actually know the exact data on which the plan was adopted. These were compared to all non-broad-based stock option companies for which data was available over the entire period and all paired peers. This is called the "within-company change following adoption" study and is shown at the bottom of Tables 7 and 8 in lines 8-10. The result is that broad-based stock option companies had 6.3% higher productivity levels pre-adoption than non-broad-based stock option companies and they had 14% higher productivity levels post adoption than non-broad-based stock option companies. The difference of 7.7% is statistically significant. Broad-based stock option companies had 2.29% higher annual productivity growth rates before adoption but their post-adoption growth rates were 2.3% lower and the -5.2% difference was statistically significant. These findings now suggest that broad-based stock option companies did increase their productivity levels although not their rates after adoption. Note that the sample sizes are very small with this comparison.

In conclusion, these findings establish that companies with broad-based stock options had significantly higher productivity levels than non-broad-based stock option companies and their peers whether one compares their situations in 1997 or considers 1992-1997 average annual changes or considers an analysis based on measuring productivity before broad-based stock options were implemented in 1985-1987 and after they were implemented in 1995-1997. But the annual rates of productivity growth were no different post-adoption for broad-based stock option companies, while they were significantly reduced for a

small sample broad-based stock option companies whose actual data of adoption was known.

How should the productivity evidence be interpreted? It is important not to view the productivity evidence in a simplistic fashion as suggesting that workers just worked harder once their companies announced stock options. Productivity increases could be a result of a the active involvement of workers in increasing effort, working smarter, working in redesigned or reengineered work structures, participating in various productivity-increasing employee involvement or team approaches that enhance self-and mutual monitoring.. Or they could be the result of company changes that increased productivity because employees offered or agreed to live with specific creative ideas that originated with the management or the employees. In addition, productivity increases could be the result of passive components such as workers' acceptance of downsizings, reorganizations, restructurings, new technologies, and other major changes in firm organization that might increase sales per worker by increasing sales with a constant or decreasing base of workers or by decreasing workers and holding sales fairly constant or by increasing sales and workers but doing this with a smaller proportion of workers to sales than in the past. Moreover, a variety of all the above-mentioned components could account for the productivity increases. Or different components could account for productivity increases in different companies. Obviously, it was not possible to measure the possible answers to this question. This perspective does not underplay the importance of the productivity evidence, but it should serve as a warning against facile formulas to explain it.

The Total Shareholder Return Evidence

The total shareholder return evidence is particularly important in assessing the performance of broad-based stock option plans because of persistent concerns by institutional and other shareholders that these plans may not be paying for themselves over time. In brief, when all the findings are taken together, the total shareholder return findings are that over the 1992-1997 period broad-based stock option companies perform as well as non-stock option companies in Compustat in general and among their peers and sometimes exceed the total shareholder returns of these comparison groups. Those findings that are reported are statistically significant differences unless otherwise noted. The analysis will illustrate how different readers could use these data to paint very positive or very negative pictures of the findings depending on the specific time period that they examine. We shall make the case for what we consider to be the empirically correct conclusion based on all the available evidence by methodically going through six different ways of approaching this evidence that was available in this study.

Now, let us consider the data in more detail. Note that as we move through the discussion certain issues regarding the methodology will become very relevant. We will examine the results in several time periods using several methods: (1) total shareholder return in the single year 1997, the last one for which we have data; (2) the average annual change in total shareholder return from 1992-1997; (3) total shareholder return before broad-based stock options were implemented in 1985-1987 and after they were implemented in 1995-

1997; (4) total shareholder returns in each individual year from 1992-1997; (5) a comparison of the total shareholder returns of all broad-based stock option companies to all non-broad-based stock option companies controlling for industry group, size, and capital intensity in all years from 1992-1997, and, finally (6) cumulative total shareholder return from 1992-1997.

First, let's examine the 1997 levels for broad-based stock option versus non-broad-based stock option companies as noted in Table 3, Simple Performance Comparisons without holding constant employment, capital intensity, and industry group differences. At the end of the period in which they had broad-based stock option plans, that is 1997, the last year for which data is available, broad-based stock option companies had 5.39% higher total shareholder return than non-broad-based stock option companies. (but -7.18% lower than their paired peers). Surveyed broad-based stock option companies had 2.79% higher total shareholder return than non-broad-based stock option companies. The total shareholder return of surveyed broad-based stock option companies with more than 50% non-management employees receiving grants was not significantly different than non-broad-based stock option or their paired peers.

Table 5 looks more closely at total shareholder return in the year 1997 but performs a more rigorous statistical test by controlling for company size according to total employment, capital intensity, and industry group. This analysis allows us to compare the total shareholder return effects of like broad-based stock option versus like non-broad-based stock option companies. The results are very consistent with those that have already been discussed. Broad-based stock option companies had -3.44% worse total shareholder returns than non-broad-based stock option companies and -6.43% worse returns than their paired peers. The figure for broad-based stock option companies is -6.77% if one adjusts for the performance of the control companies. Surveyed broad-based stock option companies with more than 50% non-management employees receiving grants had -11.92% worse total shareholder returns in 1997 than all non-broad-based stock option companies but similar returns to their paired peers. The figure for surveyed broad-based stock option companies with more than 50% non-management employees receiving grants is -15.27% if one adjusts for the performance of the control companies. Surveyed broad-based stock option companies with less than 50% non-management employees receiving grants had similar total shareholder returns to all non-broad-based stock option companies and their paired peers. And the 385 corporations that the press had publicly identified as having broad-based stock option plans and were not surveyed -- referred to here as unknown coverage of non-management (i.e. whose percent of non-management employees receiving grants was unknown) -- had similar total shareholder returns to all non-stock option companies but -7.56% worse returns their paired peers.

These data for 1997 initially appear to constitute negative to mixed evidence about the impact of broad-based stock option plans on total shareholder returns in the single year 1997 after the broad-based plans were introduced. However, the analysis does stop here. Several more levels of analysis are necessary before arriving at a firm conclusion. The year 1997 is just a single year and perhaps it was a bad year for stock option companies. Additionally, these data are based on robust regressions that adjust for outliers, namely,

companies with very high and very low total shareholder returns. This is a standard approach in careful statistical analysis. In this case, however, these data do not reflect the actual experience of investor shareholders during these years. Because investors and shareholders are specifically interested in achieving outlier returns, this may not be the best way to approach this question. Later, in the analysis, the available Compustat data on all the companies in this analysis will be re-analyzed without excluding outliers.

Second, in order to evaluate whether the results for 1997 make sense, let's look at more years and examine the average annual change in total shareholder return from 1992-1997. These figures are shown at the bottom of Table 3. It initially appears from these data that broad-based stock option companies had -2.0% worse average annual total shareholder return change than all non-broad-based stock option companies. (and -6.16% worse than their paired peers). Surveyed broad-based stock option companies did not have different shareholder returns from all non-broad-based stock option companies. Surveyed broad-based stock option companies with more than 50% non-management employees receiving options were not dissimilar from all non-broad-based stock option companies. However, they had -9.80% worse average annual change in total shareholder return respectively from their paired peers. These data continue to be based on robust regressions that adjust for outliers – companies with very high and very low total shareholder returns – and therefore still do not reflect the actual experience of investor shareholders during these years. They may or may not reflect the actual experience of investors in these companies and the actual impact of broad-based stock option plans.

Third, we will now examine total shareholder return before and after the introduction of the broad-based stock option plans. Tables 6 and 7 examine the change in total shareholder return levels and total shareholder return annual growth rates from the period 1985-1987 -- before the programs were introduced -- to the 1995-1997 period after the programs were introduced. Obviously, this analysis relies on a much smaller sample because we were limited to analyzing firms that had no missing data in Compustat in all years of both periods. Moreover, in both Tables 6 and 7, we continue to control for the size of the company by employment, capital intensity, and industry group. The results of this analysis indicate that between the periods 1985-1987 to 1995-1997 broad-based stock option companies did not significantly differ from non-broad-based stock option companies in their total shareholder return change. And broad-based stock option companies did not differ significantly from their paired peers in their total shareholder return change from one period to the next. The story was similar for annual growth in total shareholder return. The broad-based stock option companies and the non-broad-based stock option companies did not significantly differ in how their total shareholder return levels and annual growth changed between the two periods.

In order to further check this conclusion, we went one step further. For the purpose of the previous analysis, the before and after study for all stock option companies assumes that the year of adoption of the broad-based stock option plans was after 1985-87 and that the post-adoption period for these broad-based plans was 1995-1997. This assumption made sense because we know that 87% of the surveyed broad-based stock option companies introduced their plans after 1985-1987 and we can reasonably assume that this was true

for all broad-based stock option companies. For the next analysis, we looked only at those broad-based stock option companies that filled out the survey where we actually know the exact date on which the plan was adopted. These were compared to all non-broad-based stock option companies for which data was available over the entire period and all paired peers. The result is that there is no significant difference in total shareholder return pre-adoption and post-adoption. These findings now suggest that broad-based stock option companies, which implemented plans that should have been dilutive, did not appear to have any statistically significant dilution to shareholders post-adoption when the 1995-1997 period is considered as the post-adoption period. For this last analysis, the sample sizes are extremely small with 12-15 companies. However, both of these analyses are still based on robust regressions that adjust for outliers and they employ smaller samples because of the necessity of having data for both periods. The analysis now moves to an examination of all the total shareholder return data that is publicly-available in Compustat without adjusting for outliers.

Fourth, we now examine actual total shareholder returns for the individual years 1992-1997 in order to begin resolve the question definitively. These observations do not adjust for outliers and are based on actual total shareholder return data from Compustat. Table 4 applies two different methods. In the top of the table, we use all available Compustat data to compute the returns for all companies that reported data in any individual year. In the bottom of Table 4, we use all available Compustat data for all companies that reported data in every year over the entire 1992-1997 period. Asterisks in the table indicate where the broad-based stock option companies differ significantly from the non-broad-based stock option companies. Let's consider the results of the two parts of the table separately.

When one examines total shareholder returns for 1992-1997 based on all companies that report in any individual year (the top part of the table), the data indicates that the total shareholder returns of different groups of broad-based stock option companies -- all broad-based stock option companies, those with more than 50% non-management coverage, and those with less than 50% of non-management coverage -- always and in every year was not significantly different from or significantly surpassed the total shareholder return of all non-(broad-based) stock option companies. Broad-based stock option companies statistically significantly surpassed the average returns of non-broad-based stock option companies in 1994 by 10.0% (column 3) to -4.5% (column 1) and in 1995 by 51.4% (column 3) to 31.8% (column 1) And broad-based stock option companies with more than 50% non-management coverage statistically significantly surpassed the average returns of non-broad-based stock option companies in 1995 by 72.9% (column 3) to 31.8%. (column 1) When closely examining the table, it is obvious that the average and median returns for both broad-based stock option and non-broad-based stock option companies fluctuated considerably during the period depending on the year examined. Moreover, both the broad-based stock option company groups and the non-broad-based stock option group had individual good and bad years.

When one examines total shareholder returns for 1992-1997 based on all companies that report in every year over the 1992-1997 period (bottom part of the table), the data indicates that the total shareholder returns of different groups of broad-based stock option

companies -- all broad-based stock option companies, those with more than 50% non-management coverage, and those with less than 50% of non-management coverage – always and in every year was not significantly different from or surpassed the total shareholder return of all non-(broad-based) stock option companies. All broad-based stock option companies statistically significantly surpassed the average returns of all non-stock option companies in 1994 by 10.9% (column 3) to –1.7% (column 1) and in 1995 by 45.7% (column 3) to 33.4%. (column 1) And all broad-based stock option companies with more than 50% non-management coverage statistically significantly surpassed the average returns of all non broad-based stock option companies in 1995 by 67.2% (column 4) to 33.4%. (column 1) However, when closely examining the table, it is obvious that the average and median returns for both broad-based stock option and non-broad-based stock option companies fluctuated considerably during the period depending on the year examined. Moreover, both the stock option company groups and the non-stock option group had individual good and bad years.

Fifth, while the previous analysis has the advantage of using actual stock market data for all years, but it also has the disadvantage of comparing apples and oranges, namely, we may be comparing broad-based stock option companies that are not in the Compustat 500 to the Compustat 500 and we may be comparing broad-based stock option companies to non- broad-based stock option companies that have different capital intensity, industry groups and sizes. Table 9 adds a further analysis that involves a tighter comparison of the returns of broad-based stock option versus non- broad-based stock option companies. All broad-based stock option companies are compared to all non-broad-based stock option companies controlling for firm size, industry, and capital intensity using regressions. This table is organized differently than the previous Table 4. The numbers in the table indicate the average percent that the broad-based stock option group overperforms or underperforms the non-stock option group with these controls applied. An asterisk indicates if these returns are statistically significantly different from those of the non-stock option companies at the 99% level of confidence. The results indicate that the previous analysis (whose results we just reviewed in Table 4) holds up to this more rigorous test. For all years, every group of broad-based stock option companies for which the analysis was performed -- all broad-based stock option firms, those with > 50% nonmanagement coverage, those with < 50% nonmanagement coverage, and all non-surveyed broad-based companies – did not have returns that differed statistically from companies of similar sizes, industry group or capital intensity in any year, except that all broad-based stock option companies had 13.3% significantly higher returns in 1995 and all broad-based stock option companies with more than 50% coverage had significantly higher returns of 18.2% in 1994 and 31.4% in 1995.

Sixth, the previous analysis has convinced us that it makes more sense to look at cumulative average total shareholder returns for the entire 1992-1997 period rather than to examine individual years or to tally who beat whom in those years. Cumulative total shareholder returns have the twin advantage of summarizing the results of the comparison between broad-based stock option and non-broad based stock option companies in one number AND avoiding an over-emphasis on up or down years. Indeed, the key question for shareholders, managers, and for employees is: What kind of total shareholder return

performance was the granting of stock options to a broad group of employees associated with in the years after they were granted? This question realistically assumes that an individual year or two would be an unreasonable period to examine in order to assess the answer to this question. Thus, we took all broad-based stock option companies and all non-broad-based stock option companies for share price data was available in Compustat for every year in the 1992-1997 period and we computed each company's cumulative percentage gains during that period. Then, we averaged these cumulative returns. The resultant number gives equal weight to every individual firm. It tells both employees and outside shareholders whether the average cumulative average gains for broad-based stock option companies did better than, worse than, or the same as typical market averages. The market averages used for comparison purposes in this analysis are All Non-Broad-Based Stock Option Companies (in Compustat) [column 1] and the Compustat 500 [column 2]. The number indicates the average effect of an individual investing \$1,000. in a company on January 1, 1992 by December 31, 1997. For example, a cumulative total average shareholder return of 193.1% over the period means that the \$1000. Investor in 1992 would have \$1000. + \$1931. or \$2.931. at the end of the period in 1997. The results appear on the second-to-last line "Avg. individual company cumulative return" in Table 4. Over the 1992-1997 period All Compustat non-stock option firms had average individual company cumulative returns of 193.1% (81.8% at the median) while the Compustat 500 had returns of 275.0% (151.7% at the median). All broad-based stock option companies had average individual company cumulative returns of 303.2% (163.9% at the median) over the period. This return was statistically significantly greater than the return for all non- broad-based stock option companies. Broad-based stock option companies with more than 50% of non-management actually receiving grants had average individual company cumulative returns of 232.6% (108.9% at the median). And broad-based stock option companies with less than 50% of non-management actually receiving grants had average individual company cumulative returns of 318.9% (128% at the median). On a 1992-1997 cumulative basis using this measure, the average individual company cumulative return and the median individual company cumulative return of the broad-based stock option companies surpassed that of the non-broad based stock option firms. Finally, the last line in Table 4 shows the average yearly return in every year from 1992-1997. This indicates the average annual percent appreciation for every individual year that would deliver the cumulative return when compounded. The average yearly return for all groups of broad-based stock option companies was greater than that of all non-broad based stock option companies and this difference was statistically significant for all broad-based stock option companies (column 3). The median yearly return for all three groups of broad-based stock option companies surpassed the median return for all non- broad-based stock option companies. However, we do see that the average and median returns of broad-based stock option companies with more than and less than 50% coverage did not always beat the Compustat 500.

In conclusion, the total shareholder return data clearly show over the 1992-1997 period broad-based stock option companies perform as well as non-stock option companies in Compustat in general and among their peers and sometimes exceed the total shareholder returns of these comparison groups or comparable companies based on industry group, size, and capital intensity. Moreover, the analysis illustrates that – for this dataset at

least – one could draw different conclusions depending on whether one uses a comprehensive versus a limited scope analysis of the results. This last observation suggests that there is considerable room for manipulation of the analysis if an observer focuses on single perspectives on the data.

How should the total shareholder return evidence be interpreted? When companies implement broad-based stock option programs, they are taking an action that should – all other things being equal – dilute total shareholder returns. We see clearly that the drop that would have been expected in total shareholder return in these companies apparently did not take place over the long run, namely, the 1992-1997 period. Total shareholder return for the stock option companies was not statistically significantly different from that of the non-stock option companies in most years and for the period as a whole, against the expectation that dilution should have taken place, we interpret this as relatively positive news for shareholders. And the actual cumulative total shareholder returns of every broad-based stock option company group clearly beat the main broad market average for all non- broad-based stock option companies. So far, it would appear that the positive performance of the broad-based stock option companies – especially in the productivity area – may have counterbalanced the dilution that these plans would have been expected to cause. Thus, we have a case where a negative result was expected, i.e. dilution, and a neutral to positive result is discovered, i.e. no statistically significant difference between stock option and non-stock option companies and nominal better returns. We think this should be interpreted as good news. Nevertheless, some qualifications are in order. With this study we cannot look into the "black box" of each company and understand precisely what accounted for the productivity increases and changes in total shareholder return. Moreover, obviously, there will be some broad-based stock option companies who had dilution and we have not explored why that was the case. Furthermore, we have not explained the details of how performance effects in the area of productivity might actually translate into the elimination of the dilutive effect of broad-based stock options. But as a general assessment, it does appear that broad-based stock option plans were not dilutive to shareholders over the 1992-1997 period and may have resulted in nominal superior returns depending on the market average to which an individual company investment was compared.

The Tobin's Q Evidence

The Tobin's q evidence is particularly important in this analysis because the Tobin's Q number expresses a ratio of the market value of assets to the estimated replacement cost of assets and tells us whether a company is currently worth more than the replacement cost of its assets. It is a sign that investors believe there are good opportunities for the business. The market value of a company is more than the replacement cost of its assets when q is greater than 1. In brief, the Tobin's q findings are that the levels of Tobin's q of broad-based stock option companies in general tend to be higher than the Tobin's q levels of the non-broad-based stock option companies although there is some mixed evidence and this is not the case regarding annual growth rates in Tobin's q. Now, let us consider the data in more detail. Those findings that are reported are statistically significant differences unless otherwise noted. Initially, we will examine the 1997 levels for stock

option versus non-stock option companies as noted in Table 3, Simple Performance Comparisons without holding constant employment, capital intensity, and industry group differences. At the end of the period in which they had broad-based stock option plans, that is 1997, the last year for which data is available, broad-based stock option companies had higher mean Tobin's q levels (their score is 3.67) than non-broad-based option companies (their score was 2.44) of 1.23. They were more valuable companies. Compared to their peers, all stock option companies had higher mean Tobin's q of 0.51. All surveyed broad-based stock option companies had higher mean Tobin's q of 0.77 (their score was 3.21) than all non-stock option companies (whose score was 2.44). Moreover, surveyed stock option companies with more than 50% non-management employees receiving grants had higher mean Tobin's q of 0.91 (their score was 3.35) than all non-broad-based stock option companies (whose score was 2.44). But surveyed stock option companies with more than 50% non-management employees receiving grants had mean Tobin's q that was not significantly different than their paired peers.

Regarding the average annual change in Tobin's q from 1992-1997, broad-based stock option companies had 0.9 greater average annual change in Tobin's q than all non-broad-based stock option companies. However, the average annual change in Tobin's q for broad-based stock option companies was -1.78 less than their paired peers. And surveyed broad-based stock option companies with more than 50% non-management employees receiving grants had -2.28 less average annual change in Tobin's q than their paired peers without broad-based plans.

Table 5 looks more closely at Tobin's q but performs a more rigorous statistical test by holding constant company size according to total employment, capital intensity, and industry group. This analysis allows us to compare the Tobin's q effects of like broad-based stock option versus like non-broad-based -stock option companies. Broad-based stock option companies had 0.61 higher Tobin's q than all non-broad-based stock option companies and 0.62 more than their paired peers. The first figure is 0.60 if one adjusts for the performance of the control companies. Surveyed broad-based stock option companies with more than 50% non-management employees receiving grants had 0.53 higher Tobin's q than non-broad-based stock option companies but similar Tobin's q their paired peers). . The first figure is 0.52 if one adjusts for the performance of the control companies. Surveyed broad-based stock option companies with less than 50% non-management employees receiving grants had similar Tobin's q to non-broad-based stock option companies and their paired peers. And the 385 corporations who the press had publicly identified as having broad-based stock option plans -- but were not surveyed and whose percent of non-management employees receiving grants was unknown -- had 0.68 higher Tobin's q than all non-stock option companies (and .824 more than their paired peers). . The first figure is 0.67 if one adjusts for the performance of the control companies. This suggests that stock option companies were indeed more valuable companies in 1997. The key question is whether this increase in value happened after the introduction of broad-based stock options.

Tables 6 and 7 examine the change in Tobin's levels and annual growth rates from the period 1985-1987 -- before the programs were introduced -- to the 1995-1997 period after

the programs were introduced. Obviously, this analysis relies on a much smaller sample because we were limited to analyzing firms that had no missing data in Compustat in all years of both periods. Both Tables continue to hold size of company by employment, capital intensity, and industry group constant. Table 6 shows that in 1985-1987 companies that were later broad-based stock option companies had an average Tobin's q that was 0.312 significantly higher than companies that were later non-broad-based stock option companies in 1985-1987 (and .269 higher than their paired peers in 1985-1987). This suggests that the companies that later adopted broad-based stock options were already more valuable companies. Nevertheless, by 1995-1997, broad-based stock option companies still had higher Tobin's q levels than non-broad-based stock option companies. The change in Tobin's q over the period was 0.216 higher for broad-based stock option companies over the change for non-broad-based stock option companies. This indicates that the stock option companies maintained their edge in Tobin's q and improved upon it. Although a caveat is that the difference in the 1985-1987 to 1995-1997 change was not significant when broad-based stock option companies were compared to their paired peers.

The story was quite different for Tobin's q growth. Broad-based stock option companies did have 0.075 higher Tobin's q annual growth in 1985-1987 than non-broad-based stock option companies. However, compared to their paired peers the broad-based stock option companies had lower Tobin's q growth in the 1985-1987 period. But there was no difference in the change in Tobin's q growth of broad-based stock option companies between the 1985-1987 period and the 1995-1997 period. However, compared to their paired peers all stock option companies did have a -1.189 worse Tobin's q growth by 1995-1997.

In order to further check this conclusion, we went one step further. The above before and after study for all broad-based stock option companies assumes that their year of adoption was before 1997 and that their post-adoption period was 1995-1997. Now, we looked only at those broad-based stock option companies that filled out the survey where we actually know the exact data on which the plan was adopted. These were compared to all non-broad-based stock option companies for which data was available over the entire period and all paired peers. This is called the "within-company change following adoption" study (line 8) and is shown at the bottom of Tables 6 and 7. In this analysis, broad-based stock option companies do not significantly differ from non-broad based stock option companies or their paired peers in their Tobin's q levels between the 1985-1987 and the 1995-1997 periods. For Tobin's q growth, broad-based stock option companies do not significantly differ from non-broad based stock option companies in their Tobin's q levels between the 1985-1987 and the 1995-1997 periods. But they do have -1.35 less Tobin's q growth than their paired peers, although this is based on a very small sample.

In conclusion, these findings present a mixed to positive picture. Several of the pre/post analyses suggest that stock option companies did have higher Tobin's q before adoption of the broad-based plans. Thus, it appears as with the total shareholder return measure that the more valuable companies actually adopted broad-based plans. Moreover, five out

of the ten simple performance comparison measures of Tobin's q in 1997 find it is higher for the stock option companies compared to the non-stock option companies (Table 4) and five out of six measures of Tobin's q with controls find it is also higher for the stock option companies compared to the non-stock option companies (Table 5). Six out of the eight pre/post comparisons of Tobin's q levels and annual growth find that the measure for stock option companies is either not significantly different from that of non-stock option companies or greater. Indeed, the pre/post study with the largest sample (Table 6) indicates that the 1985-1987 to the 1995-1997 period difference in Tobin's q levels is 0.216 higher. But this effect does not hold true when the Tobin's q growth of stock option companies are compared to their paired peers. (Table 7, line 7 and line 10)

In conclusion, , the Tobin's q findings are that the levels of Tobin's q of broad-based stock option companies in general tend to be higher than the Tobin's q levels of the non-broad-based stock option companies although there is some mixed evidence and this is not the case regarding annual growth rates in Tobin's q.

The Return on Assets Evidence

The method for computing return on assets is shown in Table 1. In brief, the evidence shows that the levels of return on assets of broad-based stock option companies may be significantly higher than that of the non-broad-based stock option companies although there is inconclusive evidence regarding annual growth rates in return on assets. Now, let us consider the data in more detail. In this discussion, the results that are reported are reported are statistically significant differences. Initially, we will examine the 1997 levels for stock option versus non-stock option companies as noted in Table 3, Simple Performance Comparisons without holding constant employment, capital intensity, and industry group differences. At the end of the period in which they had broad-based stock option plans, that is 1997, the last year for which data is available, broad-based stock option companies had higher mean return on asset levels (their score is 16.5%) than all non-, broad-based stock option companies (their score was 10.02%) of 6.48%. But surveyed , broad-based stock option companies had lower mean return on asset levels (their score was 8.08%) than all non-stock option companies (whose score was 10.02%) of 1.94%. Broad-based stock option companies and surveyed stock option companies with more than 50% non-management employees receiving grants had mean return on asset levels that was not significantly different than their paired peers.

Regarding the average annual change in return on assets from 1992-1997, broad-based stock option companies had +0.98 greater average annual change in return on assets than non- broad-based stock option companies. However, the average annual change in return on assets for broad-based stock option companies was not different than their paired peers. Moreover, surveyed broad-based stock option companies and surveyed broad-based stock option companies with more than 50% non-management employees receiving grants did not have average annual changes in return on assets significantly different than non-broad-based stock option companies. And broad-based stock option companies with more than 50% non-management employees receiving grants did not have average annual changes in return on assets significantly different than their paired peers. These findings are mixed. Most of the observations suggest that the return on

assets performance of stock option companies is not significantly different than that of non-stock option companies, although all stock option companies do consistently have better performance than all non-stock option companies. But this is not true for the paired peers.

Table 5 looks more closely at return on assets but performs a more rigorous statistical test by holding constant company size according to total employment, capital intensity, and industry group. This analysis allows us to compare the return on asset level effects of like stock option versus like non-stock option companies. Broad-based stock option companies did not have significantly different return on assets than non-broad-based stock option companies or their paired peers. Surveyed broad-based stock option companies with more than 50% non-management employees receiving grants had significantly lower return on asset levels than non-broad-based stock option companies of -6.6% (and -6.2% lower compared their paired peers). The first figure is -8.07% if one adjusts for the performance of the control companies, However, these negative findings are at low levels of statistical significance. (There is a 95% level of confidence in the first figure and only a 50% level of confidence in the second figure.) Surveyed stock option companies with less than 50% non-management employees receiving grants had similar return on asset levels to all non-stock option companies and their paired peers. And the 385 corporations who the press had publicly identified as having broad-based stock option plans -- but were not surveyed and whose percent of non-management employees receiving grants was unknown -- had 2.49% higher return on asset levels than all non-stock option companies (but levels not dissimilar from their paired peers). The first figure is 1.02% if one adjusts for the performance of the control companies but it is only significant at a 95% level of confidence. On balance, this analysis also suggests that the performance of the stock option companies is not significantly different than that of the non-stock option companies. Five of the eight results follow this pattern while one is positive. The two negative results and the one positive result are at lower levels of statistical significance. The key question is whether there is any systematic evidence that an increase in the level or annual growth rates in return on assets happened after the introduction of broad-based stock options.

Tables 6 and 7 examine the change in return on asset levels and annual growth rates from the period 1985-1987 -- before the programs were introduced -- to the 1995-1997 period after the programs were introduced. Obviously, this analysis relies on a much smaller sample because we were limited to analyzing firms that had no missing data in Compustat in all years of both periods. Both Tables continue to hold size of company by employment, capital intensity, and industry group constant. Table 6 shows that in 1985-1987 broad-based stock option companies had an average return on asset levels that were not significantly different than non-broad-based stock option companies or their paired peers. Nevertheless, by 1995-1997, broad-based stock option companies did have 2.5% higher return on asset levels than non-broad-based stock option companies and 2.048% higher return on asset levels than their paired peers. This suggests that while the broad-based stock option companies did not have an edge in return on assets in 1985-1987 but that they significantly improved upon this situation by 1995-1997.

The story was different for return on asset growth. Broad-based stock option companies did have 0.583% higher return on asset annual growth in 1985-1987 than non-broad-based stock option companies (but their growth was not different than that of their paired peers). But there was no difference in the change in return on asset growth of broad-based stock option companies between the 1985-1987 period and the 1995-1997 period when they are compared to non- broad-based stock option companies and to their peers.

In order to further check this conclusion, we went one step further. The above before and after study for broad-based stock option companies assumes that their year of adoption was between 1988 and 1994 and that their post-adoption period was 1995-1997. Now, we looked only at those broad-based stock option companies that filled out the survey where we actually know the exact data on which the plan was adopted. These were compared to non-broad-based stock option companies for which data was available over the entire period and all paired peers. This is called the "within-company change following adoption" study and is shown at the bottom of Tables 6 and 7. In this analysis, broad-based stock option companies have similar return on asset levels and annual growth to non-broad-based stock option companies in post-adoption and any pre-adoption/post-adoption period difference in not statistically significant.

These findings present a mixed to positive picture. Several of the simple performance comparisons and the performance comparisons with controls in do suggest that broad-based stock option companies did have higher return on assets in 1997. This is borne out in two pre/post comparisons when broad-based stock option companies are compared to all non-broad-based stock option companies and to their paired peers. This first comparison is based on 13,022 observations for 166 companies (Table 6) and the second comparison is based on 774 observations for 129 companies. Both certainly do provide some support for the argument that there is a return on assets effect.

In conclusion, the available evidence suggests that the levels of return on assets of broad-based stock option companies may be significantly higher than that of the non broad-based -stock option companies although there is inconclusive evidence regarding annual growth rates in return on assets and some mixed evidence of this effect remains.

The Compensation Evidence

Data was available on the total compensation expenses of the companies from the Compustat database. For each company in the study a logarithm called labor costs per employee was developed using these data. This allowed a comparison of the compensation levels and growth of the broad-based stock option companies to all the non-broad based stock option companies in Compustat and to the paired peers. In brief, this analysis found that broad-based stock option companies did not substitute stock options for fixed wage cuts and that they continued to maintain a compensation edge in fixed pay that they had before the introduction of broad-based stock options. However, broad-based stock option companies, did not continue to raise fixed wages beyond the raises of comparable non-broad-based stock option companies. Let's look at the findings in more detail in Table 8. The compensation levels of the broad-based stock option

companies were 7.8% higher than all non-broad based stock option companies in Compustat in the 1985-1987 period before these firms are assumed to have adopted broad-based stock options. (column 2) This means that the broad-based stock option companies were firms that compensated their employees more than other companies controlling for employment size, capital intensity, and industry group before the introduction of the plans. By 1995-1997, the compensation levels for the broad-based stock option companies were still 7.7% higher than all non-broad based stock option companies in Compustat. However, the difference in both compensation levels and annual growth between the 1985-1987 and the 1995-1997 periods for both groups of firms was not statistically significant. These results indicate that the broad-based stock option companies paid their employees close to 8% more than other firms before they instituted broad-based stock options, and that they maintained their compensation edge after instituting broad-based stock options, although they did not significantly increase their levels or growth after the introduction of broad-based stock option plans relative to non-broad based stock option companies. The broad-based stock option companies were not like little high-tech startups that paid employees poor wages and gave them stock options instead. Also, there is no evidence that the broad-based stock option companies cut fixed wages and substituted stock options for them. This is evidence that the broad-based stock option companies had the same fixed wage increases over the 1985-1987 to the 1995-1997 period as non-broad-based stock option companies, and they continued to maintain their relative advantage of higher compensation. But the broad-based stock option companies did not expand their compensation edge either in terms of levels or growth. Thus, a trajectory of further fixed wage increases beyond their earlier edge remained flat after the introduction of broad-based stock option plans, although it was no flatter than non-broad based stock option companies in general.

What are the implications of these findings for the debate between the U.S. Federal Reserve Board and the U.S. Department of Labor regarding the role broad-based stock options might be playing in wage inflation? Remember that the Employment Cost Index of the DOL does not include stock option pay and both Federal Reserve researchers and officials have suggested that the broad use of stock options may represent unmeasured and hidden wage inflation. (see Lebow, Sheiner, Slifman, and Starr-McCluer 1998 on the research position and Uchitelle 1999 on the DOL/Federal Reserve discussion and debate on this question). While our data have distinct limitations, they certainly lend some support to the position that broad-based stock option payments during the period studied may have significantly contributed to unmeasured and hidden wage inflation. The reason is that this study found no systematic evidence of any kind that companies that adopted broad-based stock option plans reduced their fixed compensation in any significant way. There was no wage substitution according to this evidence. This suggests that stock option payments were on top of fixed wages for a set of companies that the evidence establishes as already being compensation leaders. Indeed, this story is consistent a number of reports of a tight and tightening labor market where broad-based stock options are playing a role in attracting and retaining employees. Some reports suggest that some employers are frantic and that the crisis especially in technology companies is reaching crisis proportions. (Richtel 1999)

Conclusion

The results of this study suggest that there is no systematic evidence publicly-traded corporations with broad-based stock option plans had worse performance than the larger group of publicly-traded corporations that did not adopt the plans or industry group pairs regarding productivity, total shareholder return, Tobin's q, or return on assets. Indeed, there is some evidence that the broad-based companies may have performed better. There is unambiguous evidence that broad-based stock option companies had achieved statistically significantly higher productivity levels and annual growth rates compared to non-broad-based stock option companies in Compustat in general and among their peers. This is clearly demonstrated by evidence comparing the broad-based companies to the non-broad-based firms before they instituted the plans and after they instituted the plans. The total shareholder return findings are that over the 1992-1997 period broad-based stock option companies perform as well as non-stock option companies in Compustat in general and among their peers and sometimes exceed the total shareholder returns of these comparison groups. The actual average and median cumulative total shareholder returns for all groups of broad-based stock option companies from 1992-1997 exceed those of all non-broad-based stock option companies in Compustat. The average cumulative total shareholder returns of all broad-based stock option companies in the study statistically significantly exceed those of all non-broad-based Compustat companies. And the actual average and median cumulative total shareholder returns for all broad-based stock option companies in the study as a group also exceed those of the Compustat 500 from 1992-1997. For another measure of market value, Tobin's q, the levels of Tobin's q of broad-based stock option companies in general tend to be higher than the Tobin's q levels of the non-broad-based stock option companies although there is some mixed evidence and this is not the case regarding annual growth rates in Tobin's q. And the available evidence suggests that the levels of return on assets of broad-based stock option companies may be significantly higher than that of the non broad-based - stock option companies although there is inconclusive evidence regarding annual growth rates in return on assets and some mixed evidence of this effect remains.

Our interpretation of these findings is that, the performance of the firms using broad-based stock options appears to equal or exceed the dilution that these plans initially would have caused. As noted, we are not analyzing data on the specific expectations articulated by each of the firms in our samples adopting broad-based stock options. And certainly, the U.S. Federal Reserve study quoted above suggests that the managers of the companies in their sample did not universally expect improved economic performance. And obviously, dilution may have occurred in certain individual cases. But the systematic analysis of broad-based stock option companies yields little evidence of dilution to shareholders over this period and much evidence of opportunities for shareholders. This then raises the question of how evidence of no consistent statistically significant positive effect on total shareholder return should be interpreted. Our view is that on balance this is acceptable news for outside shareholders. It indicates that the performance of the firms after the introduction of the broad-based stock options essentially paid for the stock options. If these firms installed broad-based stock options in order to attract and retain

workers in a tight labor market in order to secure their expectations of continued returns to shareholders, then the broad-based stock options can be viewed as a success.

Regarding the compensation levels and growth of broad-based stock option firms, this analysis found that broad-based stock option companies did not substitute stock options for fixed wage cuts and that they continued to maintain a compensation edge in fixed pay that they had before the introduction of broad-based stock options. However, broad-based stock option companies, did not continue to increase wages beyond their earlier edge. This can be viewed as evidence that firms which were high compensation firms before the introduction of broad-based stock options may have used the program to restructure their compensation systems and align them with shareholder value by perhaps abandoning further increases in their fixed wage compensation edge and providing these further increases in the form of broad-based stock options. While our data have distinct limitations, they certainly lend some support to the position that broad-based stock option payments during the period studied may have significantly contributed to unmeasured and hidden wage inflation. The reason is that this study found no systematic evidence of any kind that companies that adopted broad-based stock option plans reduced their fixed compensation in any significant way. There was no wage substitution according to this evidence. This suggests that stock option payments were on top of fixed wages for a set of companies that the evidence establishes as already being compensation leaders. Indeed, this story is consistent a number of reports of a tight and tightening labor market where broad-based stock options are playing a role in attracting and retaining employees. Some reports suggest that some employers are frantic and that the crisis especially in technology companies is reaching crisis proportions. (Richtel 1999) We would caution against simplistic interpretations of our positive productivity findings.

While the productivity evidence is particularly important in this analysis because the productivity measure is one over which individual employees and groups of employees may have some direct influence or some indirect involvement, it is quite important not to view the productivity evidence as merely suggesting that workers just worked harder once their companies announced broad-based stock options. Productivity increases certainly could be a result of the active involvement of workers in increasing effort, working smarter, working in redesigned or reengineered work structures, participating in various productivity-increasing employee involvement or team approaches that enhance self-and mutual monitoring, and offering their creative ideas that lift worker output. However, productivity increases could just as likely be the result of more passive components such as workers' acceptance of downsizings, reorganizations, restructurings, new technologies, and other major changes in firm organization that might have the impact of increasing sales while holding headcount constant or decreasing headcount while holding sales constant or increasing sales. It is possible that variety of these components could account for the productivity increases. Or different sets of components could account for productivity increases in different companies. The story for individual companies may be contingent on various environmental or industry group influences such as imports and exports. Obviously, we were not able to measure the possible answers to this question. It remains a black box to us. That may be a useful focus of follow-up research. This cautious perspective is not to underplay the importance of the

productivity evidence, but it should serve as a warning against facile formulas to explain it.

The surveyed broad-based stock option companies indicated that the top three objectives for the broad-based stock option plan among their companies was to retain key employees, align employee interests with shareholders, and create an employee ownership culture. Only 3%, 4%, and 12% respectively of the companies reported that these three objectives were not met. Rewarding individual performance was the fourth objective with all four being chosen as top objectives by 60% of the firms. (Weeden, Carberry, and Rodrick 1998) This report has not assessed whether all of these objectives were met for the companies that adopted broad-based stock option plans. Based on our evidence, it does appear that the companies in general did succeed in aligning the interests of employees with those of shareholders. Attaining statistically significantly better corporate performance than non-broad-based stock option companies or their industry group peers was not a stated objective of these plans. This study finds some evidence that may have happened.

Further research is needed to understand the details of how a performance effect after the introduction of broad-based stock options may translates into an elimination of their dilutive effect. We need to understand whether certain ways of structuring broad-based stock option programs or combinations of stock option programs with other human resource management practices such as participation programs or teams affects the impact of such programs on corporate performance. We also need to better understand why firms adopt this form of compensation and to learn more about the both employee and company characteristics. We have not explored the impact of these effects on union versus nonunion workforces. We have not presented data on the dollar value of stock options for various classes of employees and the impact of the stock option endowment on their fixed compensation, namely, what proportion of fixed wages does it represent. In the future, we plan to use this dataset to explore these various issues.

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Appendix: Interpretation of the Tables for the Non-Technical Reader

(See the main article, “Broadly Granted Stock Options Improve Corporate Performance,” at www.nceo.org for a PDF of the tables)

This appendix was prepared at the request of non-technical readers who desired a more user-friendly guide to the statistical charts. Unfortunately, some knowledge of statistics is still necessary as we focus only on making the table structure and content clear. In order to avoid presenting a large number of tables we have constructed a few complex tables with different sections. This appendix walks the reader step by step through the tables. We are intentionally repetitive in the interest of attempting to walk the reader through the tables slowly and deliberately and allowing a reader to focus only on one particular table.

Table 2. Descriptive Statistics, 1997 levels.

This table presents descriptive statistics on the different samples of companies used in the study in 1997. This year was chosen because it is the last year for which data were available in this study. This table shows simple comparisons of broad-based stock option companies to all non-broad-based stock option companies and to pairs of companies in their own industry group that also do not have broad-based stock options. Basically, if we want to compare broad-based stock option companies it makes sense to compare them to all companies in general without such stock options and to similar companies in their industry groups without such stock options. This is what this table achieves. One can view these two different types of comparisons as two different ways of checking our findings using alternative methods. If the results of both types of comparisons parallel each other, then the finding has more validity.

First, let’s discuss the meaning of the different company categories in the tables and the meaning of the variables that we are measuring. There are 6 different company categories in this table.

1. The 7165 "All non-[broad-based]stock option companies" are all companies for which data was available in this year in Standard & Poors Compustat database of public company information excluding those companies that the National Center for Employee Ownership identified as sponsoring some form of broad-based stock option plans.
2. The 490 "All [broad-based] stock option companies" include the 105 companies with broad-based stock options that responded to the survey and 385 additional

- companies that did not respond to the survey but which the NCEO identified as having broad-based stock option plans based on public information.
3. The 105 "All surveyed [broad-based] stock option companies" are the 105 companies that responded to the NCEO survey.
 4. The data for "All paired companies" in column 5 represent the average differences between the 490 stock option companies and their next largest and next smallest industry group competitors.
 5. The 73 "Paired cos. With >50%" are the 73 pairings of all 73 stock option companies with more than 50% of their employees covered by stock options with their next largest and next smallest industry group competitors.

Here is what the numbers in the table mean. The numbers outside of parentheses are means or averages. The numbers in parentheses are standard errors. The tests of statistical significance in this table compares different categories of stock option companies, i.e. columns 2,3, 4, to all non-SO companies:

- Sales in this table are in millions of dollars.
- Employees are in thousands.
- Capital intensity is in thousands of dollars of capital assets per employee (or millions in capital assets divided by thousands of employees).
- The Ln of Sales, employees, and capital intensity refers to the logarithm of sales, employees, and capital intensity. This is a transformation of those numbers that allows us to easily compare the sales, employee, and capital intensity averages between the different groups of companies. The Ln numbers are not practically meaningful, however the differences between them indicate percentage differences between the categories of companies. Finally, industry shows two-digit SIC code industry groups.

Second, let's discuss the meaning of the data presented. The left-hand side of the table compares different categories of broad-based stock option companies to all non-SO[broad-based stock option] companies and the right-hand side of the table compares broad-based stock option companies to similar pairs of companies in their own industry group that are the next larger and smaller company than them.

Regarding the left-hand side of the table (columns 1-4) comparing various categories of broad-based stock option to non-broad-based stock option companies, the numbers shown are simple averages except those in parentheses which are standard errors. For example, using the logarithms to subtract the differences between the averages for the different categories of companies, these data show that the broad-based stock option companies have average sales that are 169.8% greater than all non broad-based SO companies (that is $6.23 - 4.532$), and average employment that is 146.6% larger (that is $.869 - (-.589)$), and capital intensity that is 14.4% greater (that is $3.769 - 3.625$). The tests for significance in this table, test whether there are significant differences between the different categories of broad-based stock option companies and the "All non-[broad-based] stock option companies category.

Regarding the right-hand side of the table (columns 5-6) marked "Paired differences 1997" this part of the table describes the differences between the broad-based stock option companies and their non-broad-based pairs when, for example, the average sales of the broad-based stock option companies is subtracted from the average sales of the pairs. For each of the 490 companies with broad-based stock options a pair of similar companies without broad-based stock options in each company's industry group was chosen which included the next largest and the next smallest company. In some cases only one comparison company was available such as when there was no company larger in that industry group than the stock option company. The data in this part of the table is arrived at in the following way. Let's look at column 5 and compare all broad-based stock option companies to their non-broad-based stock option pairs using their sales as an example. For each broad-based stock option company, the average sales of its non-stock option pair is subtracted from its sales and all of these differences are themselves averaged. The result indicates that the broad-based stock option companies have on average \$784.19 million sales greater than their non broad-based stock option pairs. The test of significance in this part of the table test whether the differences are significantly different from zero. We see that this difference in sales is indeed statistically significant. Now, let's look at column 6 and compare all broad-based stock option companies with more than 50% of employees covered to their non- broad-based pairs regarding sales. We see that there are no significant differences.

Note that all datasets contain extreme values some of which may be inaccuracies or mistakes. For these summary statistics, we are using all the data available on all the companies. We are not trimming the data for wild values or adjusting for outliers in any way at this point. That will be done in further analyses below. Asterisks in this chart alongside a statistic indicate that the finding is statistically significant at various levels of probability. One asterisk ($p < .10$) indicates a 90% probability, two asterisks ($P < .05$) indicates a 95% probability, and three asterisks ($p < .01$) indicates a 99% level of probability.

Table 3. Simple performance comparisons.

This table presents simple performance comparisons on the different samples of companies used in the study . This table looks at two time frames of performance:

1. Levels of certain performance measures in 1997. For the levels in 1997 this is a cross-sectional look, a one time portrait.
2. The annual change over the 1992-1997 period. Here we are using the average annual change in each year over this period.

The different company categories are the same as Table 2 although the sample sizes differ because of missing data. The chart allows us to examine whether the differences between the broad-based stock option companies and the non-broad-based stock option companies are statistically significant. Let's discuss in the meaning of the variables that we are measuring and how to read this chart. Here is the meaning of the numbers not in parentheses which are means:

- The productivity means are not practically meaningful in and of themselves because they are based on logarithms. Only the differences between the productivity numbers have practical meaning. As noted in the previous table, the differences in the numbers of the logarithms here convey percentage differences between the categories of companies that are being compared. Thus, on the left-hand side of the table, we see that in 1997 broad-based stock option cos. have a productivity measure of 5.38 and all non-broad-based stock option companies have a productivity measure of 5.07. By subtracting 5.07 from 5.38 we see that the broad-based stock option companies had 31% higher productivity in 1997.
- The ROA numbers are actual percents of ROA.
- The Tobin's Q number expresses a ratio of the market value of assets to the estimated replacement cost of assets. It tells us whether a company is currently worth more than the replacement cost of its assets and it is a sign that investors believe there are good opportunities for the business. The market value of a company is more than the replacement cost of its assets when q is greater than 1.
- TSR mean Total Shareholder Return and this is an actual percent.
- Ln sales and employment are logarithms of sales and employment.
- The numbers in parentheses are standard errors.

Now let's discuss the results for each time frame and each side of the chart separately. Again, we compare broad-based stock option companies to non-broad-based stock option companies in Compustat and then to industry group pairs without broad-based stock options. One can view these two different types of comparisons as two different ways of comparing broad-based stock option to non-broad-based stock option companies in order to achieve the ability to check our findings using alternative methods. If the results of both types of comparisons parallel each other, then the finding has more validity.

Regarding the levels of certain performance measures in 1997 and their average annual change over the 1992-1997 period, the table shows the following. The left-hand side of the table compares all non-broad-based stock option companies to different categories of broad-based stock option companies. The significant differences indicate whether the different categories of broad-based stock option companies are different significantly from these non-broad-based stock option companies. For example, we see that in 1997 broad-based stock option cos. have a productivity level measure of 5.38 and all non-broad-based stock option companies have a productivity measure of 5.07 in 1997. By subtracting 5.07 from 5.38 we see that the broad-based stock option companies had 31% higher productivity in 1997. And we see that this was a statistically significant difference. We see that in 1997 the Return on Assets of broad-based stock option companies was 6.48% greater than the non-broad-based stock option companies (16.5% - 10.02%). And we see that this was a statistically significant difference. We see that in 1997 the Tobin's q of broad-based stock option companies was 1.237 greater than the non-broad-based stock option companies (3.67 - 2.44). And we see that this was a statistically significant difference. We see that in 1997 the TSR of broad-based stock option companies was 5.39% greater than the non-broad-based stock option companies (12.11-6.72). And we see that this was a statistically significant difference. The right-hand side of the table

compares broad-based stock option companies to their non- broad-based industry group pairs. As in the previous table, the results show the mean of the differences of the broad-based stock option minus the non broad-based stock option company values. For example, (on line 1) we see that regarding productivity broad-based stock option companies had a mean 37% (0.37) greater productivity than their non-broad-based stock option industry group pairs and that this was a statistically significant difference. We see that the broad-based stock option companies with more than 50% employee coverage in the stock option plans had 21% greater productivity than their non-broad-based stock option industry group pairs.

The right-hand side of the table compares the performance of broad-based stock option companies and broad-based stock option companies with >50% coverage by reporting the difference between the mean of the performances of all paired values, that is, subtracting the broad-based stock option company performance from that of the non- broad-based stock option companies in their own industry group. Again, significance tests here determine if this difference is significantly greater than zero. For example, we see that productivity levels (remember they are in logarithms so the reported difference is a percentage difference) for broad-based stock option companies are 37% greater than non broad-based stock option company industry group pairs in 1997. And the productivity levels for broad-based stock option companies with more than 50% coverage in their plans is 21% greater 37% than all non-broad-based stock option company industry group pairs in 1997. Both differences are statistically significant.

Regarding the annual change over the 1992-1997 period, the table shows average annual change in the measures. Thus, for example, the average annual change in productivity over the 1992-1997 period is 4% per year for broad-based stock option companies, for all surveyed broad-based stock option companies, and for surveyed broad-based stock option companies with more than 50% employees participating, but 3% per year for all non-broad-based stock option companies. For all three categories of broad-based stock option companies, these differences are statistically significant in reference to the non-broad-based stock option companies.

The right-hand side of the table compares the performance of broad-based stock option companies and broad-based stock option companies with >50% coverage by reporting the difference between the mean of the performances of all paired values, that is, subtracting the broad-based stock option company performance from that of the non- broad-based stock option companies in their own industry group (the paired companies). For average annual changes from 1992-1997, for example, we see that the average annual productivity for broad-based stock option companies is 2% per year greater than non-broad-based stock option company industry group pairs over the 1992-1997 period. This is a statistically significant difference. And the average annual productivity for broad-based stock option companies with more than 50% coverage in their plans is 3% per year greater but the difference is not statistically significant. Note that all datasets contain extreme values some of which may be inaccuracies or mistakes. For the simple performance comparisons in this table, we are using robust regressions which takes account for wild values and adjusts for outliers.

Asterisks in this chart alongside a statistic indicate that the finding is statistically significant at various levels of probability. One asterisk ($p < .10$) indicates a 90% probability, two asterisks ($P < .05$) indicates a 95% probability, and three asterisks ($p < .01$) indicates a 99% level of probability.

Table 4: Total Shareholder Returns, 1992-1997 .

This table focuses on one key performance measure, total shareholder return, in order to evaluate a critical measure for shareholders and other groups in evaluating broad-based stock option programs. Instead of looking only at 1997, it presents a picture of total shareholder return for various categories of stock option companies in our sample, for each individual year from 1992-1997 AND for the cumulative total shareholder return from 1992-1997. Various categories of broad-based stock option companies are compared to All Compustat (all public companies without broad-based stock options) and Compustat 500 (the five hundred largest companies in Compustat by market value, a close approximation to the S&P 500). (Note: we did not exclude broad-based stock option companies from the computation of the Compustat 500 in order to try to approximate an equally-weighted S&P 500 as a market standard.)

The numbers in this table are actual percents of total shareholder returns. Both means and medians are given. The median is the total shareholder return above which 50% of the companies in the category achieve and below which the other 50% of the companies in the category obtain. Tests of significance are used in this table and in all cases they test whether the broad-based stock option company groups are significantly different statistically from the "All Non[broad-based] Stock Option Companies" group. In the top of the chart the data are computed for any and all companies reporting data in any individual year ("All cos. Reporting in a given year") in order to make maximum use of the Compustat data. In the middle of the chart, ("Cos. Reporting in every year") the data are more restricted by computing average returns for all companies in every year but only for companies REPORTING IN EVERY YEAR. The bottom part of the chart computes the average equally-weighted individual company cumulative return from 1992-1997 for all companies that reported data for all years. Below this we have computed the average individual company yearly return.

As noted, the market averages used for comparison purposes in this analysis are All Non-Broad-Based Stock Option Companies (in Compustat) [column 1] and the Compustat 500 [column 2]. The number indicates the average effect of an individual investing \$1,000. in a company on January 1, 1992 by December 31, 1997. For example, a cumulative total average shareholder return of 193.1% over the period means that the \$1000 invested in 1992 would have become \$1000 + \$1931 or \$2,931 at the end of the period in 1997. The results appear on the second-to-last line "Avg. individual company cumulative return" in Table 4. Over the 1992-1997 period All Compustat non-stock option firms had average individual company cumulative returns of 193.1% (81.8% at the median) while the Compustat 500 had returns of 275.0% (151.7% at the median). All broad-based stock option companies had average individual company cumulative returns of 303.2% (163.9% at the median) over the period. This return was statistically significantly greater than the return for all non- broad-based stock option companies. Broad-based stock

option companies with more than 50% of non-management actually receiving grants had average individual company cumulative returns of 232.6% (108.9% at the median). And broad-based stock option companies with less than 50% of non-management actually receiving grants had average individual company cumulative returns of 318.9% (128% at the median). On a 1992-1997 cumulative basis using this measure, the average individual company cumulative return and the median individual company cumulative return of the broad-based stock option companies surpassed that of the non-broad based stock option firms. Finally, the last line in Table 4 shows the average yearly return in every year from 1992-1997. This indicates the average annual percent appreciation for every individual year that would deliver the cumulative return when compounded. The average yearly return for all groups of broad-based stock option companies was greater than that of all non-broad based stock option companies and this difference was statistically significant for all broad-based stock option companies (column 3). The median yearly return for all three groups of broad-based stock option companies surpassed the median return for all non- broad-based stock option companies. However, we do see that the average and median returns of broad-based stock option companies with more than and less than 50% coverage did not always beat the Compustat 500.

Table 5. Stock Option Plans and 1997 Performance Levels.

This table presents the results of regressions to see if we can predict the various company performance measures based on our knowledge of broad-based stock option programs in different groups of companies. While the structure of the table is fairly complicated, paragraph 2 below will show that its results can be readily interpreted. Throughout this table, we are holding constant total employment, net assets (in essence, capital intensity), and industry group so that we compare like broad-based stock option companies to like non-broad-based stock option companies. This table uses robust regressions that take account of outliers. Across the top of the table are the various performance measures that we are trying to predict. These measures have already been described. Each box has two columns. The "full set" column provides the results for comparing broad-based stock option companies to non- broad-based stock option Compustat companies. The "paired" column provides the results for comparing broad-based stock option companies to their industry group pairs that do not have broad-based stock options. One can view these two different types of comparisons as two different ways of comparing broad-based stock option to non- broad-based stock option companies in order to achieve the ability to check our findings using alternative methods. If the results of both types of comparisons parallel each other, then the finding has more validity. In the left-hand column we see the various categories of companies. In the top portion, broad-based stock option company here mean all companies with broad-based stock options whether they participated in the survey or not (i.e. 490 companies). Paired companies means all non- broad-based stock option company pairs. As noted in the text of the report, we use this computation to adjust the results of the broad-based stock option companies. Ln(total employment), Ln(net assets), and 2-digit industry dummies refers to variables we are holding constant in the analysis. In the bottom portion of the table in the left-hand column, we have divided the broad-based stock option companies into several additional groupings, namely, those with 50%+ coverage of employees based on their reports in the survey,

those with <50% coverage of employees based on their reports in the survey, and those with unknown coverage of non-management employees (these are the 395 companies that did not participate in the survey but were publicly identified as having broad-based stock option programs.) The numbers in parentheses in this table are t tests.

Here is how to read the results of this table. Let us consider the comparison of broad-based stock option companies to all of Compustat (all other public companies) and to their industry group pairs without broad-based stock options separately.

Regarding the comparison of broad-based stock option companies to Compustat, in column (1), the performance level for productivity of the average stock option company was 27.7% greater [line 1 column (1)] than the average non-broad-based stock option company controlling for employment size, capital intensity, and industry group. This is a statistically significant difference. Looking down at the results for companies with 50%+ coverage we find that the 1997 productivity performance level was 22% greater (also significant) [line 7 column (1)]. For companies with unknown coverage of non-managers but announced broad-based plans, the productivity levels were 30.1% greater (also significant).[line 9, column (1)]

Regarding the comparison of broad-based stock option companies to their industry group pairs without broad-based stock options, in column 2, the performance level for productivity of the average stock option company was 30.6% greater [line 1 column (1)] than the average non-stock option company controlling for employment size, capital intensity, and industry group. This is a statistically significant difference. Looking down at the results for companies with 50%+ coverage we find that the 1997 productivity performance level was 21.3% greater (also significant) [line 7 column (2)]. For companies with unknown coverage of non-managers but announced broad-based plans, the productivity levels were 34.4% greater (also significant).[line 9, column (1)].

Asterisks in this chart alongside a statistic indicate that the finding is statistically significant at various levels of probability. One asterisk ($p < .10$) indicates a 90% probability, two asterisks ($p < .05$) indicates a 95% probability, and three asterisks ($p < .01$) indicates a 99% level of probability.

Table 6. Stock Options Plans and Pre-post Changes in Performance Levels.

This table presents the results of regressions to estimate the change in the performance levels of broad-based stock option plan companies from before they instituted the plan to after they instituted the plan. We also estimate the differences from non-broad-based stock option companies over the time periods and determine if the difference is significant. Additionally, we compare the broad-based stock option companies to both the full set of Compustat non-broad-based stock option companies (Full, column 1) and to their industry group pairs without broad-based stock options. (Paired, column 2). One can view these two different types of comparisons as two different ways of comparing broad-based stock option to non-broad-based stock option companies in order to achieve the

ability to check our findings using alternative methods. If the results of both types of comparisons parallel each other, then the finding has more validity. While the structure of the table is fairly complicated, the next paragraph will show that its results can be readily interpreted. Let's be clear about how the table is constructed. The performance measures are the same ones that we have been using. The numbers in parentheses are t scores. We will discuss the top part and the bottom part of the table separately.

Regarding the top part of the table, we believe that we can safely assume that companies with broad-based stock option plans did not have their plans in the 1985-1987 period based on a review of public announcements of such plans. Indeed, the survey indicated that over 80% of the surveyed companies instituted their plans after 1987. We then designate this as the BEFORE period. We designate the 1995-1997 period as the AFTER period. Thus, the top part of the table looks at broad-based stock option companies without knowing exactly when they adopted their plans. The body of this table is similar to Table 5. However, in the left-hand side of this table, we are comparing the performance in the BEFORE and AFTER periods for all stock option companies (line 1 and 2), for all paired companies (that is non-broad-based stock option company pairs), (Line 3 and 4) and then we are evaluating whether the change from the 1985-87 TO the 1995-97 period was a statistically significant change (i.e. whether the difference between the change for the broad-based stock option versus the non-broad-based stock option companies was also statistically significant, see Line 7, Difference).

For example, for productivity, column 1 tells the story when we compare broad-based stock option companies to Compustat non-broad-based stock option companies while holding employment size, capital intensity, and industry group constant. Column 2 tells the story when we compare the broad-based stock option companies to their industry pairs without broad-based stock options. Productivity which is still expressed as a logarithm. We see in lines 1 and 2 of column 1, that broad-based stock option companies had 9.3% significantly higher productivity than non-broad-based stock option companies in Compustat while holding employment size, capital intensity, and industry group constant in the 1985-1987 period (that is BEFORE they are assumed to have had broad-based stock option plans!) This difference is statistically significant. Broad-based stock option companies had 29.4% higher productivity than non-broad-based stock option companies in Compustat while holding employment size, capital intensity, and industry group constant in the later 1995-1997 period (that is AFTER they had broad-based stock option plans!) Thus, the broad-based stock option companies were companies with significantly higher productivity levels even before they implemented broad-based stock option plans and after they implemented these plans, they both maintained their relative productivity level edge (that is they were still at least 9.3% higher) and they beat it by developing 20.1% higher productivity (that is, a + 20.1% additional productivity level in the 1995-1997 period. (line 5). We see in line 7 that the difference in the productivity level changes over the period 1985-87 to 1995-97 between the broad-based stock option and the non-broad-based stock option companies is very significant, indicating 14.8% higher productivity levels for the broad-based stock option companies. Below line 7 we indicate the size of the sample that we used. Because we were limited to using companies that had data in both time periods, the number of broad-based stock option companies

represented was only 165 and the number of non-broad-based stock option companies represented was 1980. However, in total, this conclusion is based on 12,870 individual company observations (that is $1980 + 165 = 2145 \times 6$ years of data or 12,870 company years of data).

When we compare broad-based stock option companies to their industry group pairs without broad-based stock options (column 2), again, we find out that the broad-based stock option companies had 5.4% higher productivity levels in 1985-1987 (line 1) and 22.2% higher productivity levels in the 1995-1997-period. (line 2) Over the 85-87 period, the broad-based stock option companies have a statistically significant 16.8% productivity level difference from the paired non-stock option companies. (line 7) Again, because of the need to focus the analysis only on companies that had data in both periods, the number of broad-based stock option companies used for this analysis is only 128, the number of paired companies represented is 128 and the total number of observations is 768 (or 128×6 years).

Regarding the bottom part of the table, this analysis looks at broad-based stock option companies for whom we had a lot more information but unfortunately a much smaller sample. These are companies for whom we knew the exact date of their adoption of the broad-based plan (and thus no assumptions were necessary) AND who filled out our survey AND who had Compustat data in both periods. Obviously, these requirements reduced the sample from 105 (the number who filled out the survey) to 16 in the case of the full set comparisons to Compustat and 13 in the case of the paired comparisons. Despite these small samples, these observations are somewhat useful to examine to see if they support or contradict the above analysis. First, comparing broad-based stock option companies to Compustat non-broad-based stock option companies, looking at column 1, line 8, we see that the broad-based stock option firms had 6.3% significantly higher productivity levels pre-adoption, 14% significantly higher productivity levels post-adoption (line 9), and that the difference in their pre-adoption/post-adoption productivity level change was indeed significantly different from that of the non-broad-based stock option companies at 7.7% (line 10). Thus, the analysis of the sample above is supported. Second, comparing broad-based stock option companies to their industry group pairs without broad-based stock options, looking at column 2m line 8, we do not see significantly different productivity levels pre-adoption or post-adoption (lines 8 and 9), but we do see a significant difference of 9.1% greater productivity levels from the non-broad-based stock option companies. This provides some limited support for the above analysis, although the sample, at 13 companies, is very small.

Asterisks in this chart alongside a statistic indicate that the finding is statistically significant at various levels of probability. One asterisk ($p < .10$) indicates a 90% probability, two asterisks ($p < .05$) indicates a 95% probability, and three asterisks ($p < .01$) indicates a 99% level of probability.

Table 7. Stock Options Plans and Pre-post Annual Growth in Performance

This table is structured in exactly the same way as Table 6 except that the performance measures deal with the annual growth in performance over the periods used and the differences in annual growth rates between the stock option and the non-stock option companies instead of performance levels at the end of the periods.

Table 8. Compensation Levels and Growth

This table compares the compensation levels and the annual growth rates in compensation for broad-based stock option versus non-broad-based stock option companies in order to assess the compensation policies of those companies and determine if there are any statistically significant differences between them. The compensation data were available in Compustat. We would caution the reader that Compustat compensation data are missing for many. This is a distinct limitation of this analysis. Thus, the samples are much smaller in this analysis than the samples that can be observed in Tables 2 and 3. Some scholars believe that public companies are not accurate in their assessments of their compensation as reported to Compustat. Despite these limitations, we thought it would be important to at least analyze the publicly information that is available. Compensation is computed as the logarithm of labor costs per employee. We will walk through each of the four columns of the table separately. Finally, it is important to note that the term "compensation" obviously does not include stock option compensation. It is a measure of fixed wages and benefits plus bonuses included in W-2 earnings. Stock option compensation is also not included in the U.S. Department of Labor's Employment Cost Index as of 2000.

Column 1 compares the compensation levels in 1997 of the broad-based stock option versus the non-broad-based stock option companies for which data is available. We see that the broad-based stock option companies had 20.1% higher compensation per employee holding constant the size of the company by number of employees, capital intensity, and industry group. Comparing the 1985-1987 to the 1995-1997 period, we find that the compensation levels of the broad-based stock option companies was 7.8% higher than the paired or control companies without broad-based stock options. This would suggest that the companies offering broad-based stock options were higher paying companies in 1997 as they had been in 1985-1987. (But remember these levels DO NOT include stock option payments so they are not factored into this "higher payment".)

Column 2 takes a smaller number of companies for which complete data for each company was available for both the 1985-1987 and the 1995-1997 periods on compensation levels. We see that compensation levels for the stock option companies were 7.8% greater than the non-stock option companies in 1985-1987 holding constant the size of the company by number of employees, capital intensity, and industry group AND that the compensation levels continued to be 7.7% greater than the non-stock option companies in 1995-1997 period holding constant the size of the company by number of employees, capital intensity, and industry group. Both differences are statistically

significant. This would suggest that the companies offering broad-based stock option programs were higher paying companies BEFORE they instituted the broad-based stock option programs and that they remained higher paying companies after they instituted the broad-based stock option programs. It would appear from these data that the broad-based stock option companies did not decrease their fixed compensation relative to non-broad-based stock option companies over the 1985-87 to the 1995-97 periods. Their fixed compensation proportion remained the same. It was higher before broad-based stock option plans and it was higher after. This suggests the broad-based stock option companies had the same wage increases over this period that the non-broad-based stock option companies had, but that they also maintained their relative advantage from the earlier period. In maintaining their relative advantage, it would appear that they did not use broad-based stock option pay to substitute for non-stock option compensation. On the other hand, these "more generous" companies in 1985-1987 DID NOT extend their relative advantage in pay over the period, which indicates that they may have decided to substitute broad-based stock option payment opportunities for not current fixed wages but future wage increases.

Column 3 looks at the annual growth in compensation levels and shows that there were no significant differences between the annual growth of the broad-based stock option versus the non- broad-based stock option companies in the 1985-1987 period, in the 1995-1997 period or over the periods. This shows that the broad-based stock option companies for which data is available did not increase their compensation growth levels relative to other companies of similar employment size, capital intensity, and industry group after implementing broad-based stock options, although they continued to maintain their earlier leadership in compensation levels.

Asterisks in this chart alongside a statistic indicate that the finding is statistically significant at various levels of probability. One asterisk ($p < .10$) indicates a 90% probability, two asterisks ($p < .05$) indicates a 95% probability, and three asterisks ($p < .01$) indicates a 99% level of probability.

Table 9. The Total Shareholder Returns of Stock Option Samples, 1992-1997.

Note: This table uses OLS regressions and non-trimmed dataset, that is, outliers are not excluded so that all the available data in the study are analyzed.

This table focuses on one key performance measure, total shareholder return, in order to evaluate a critical measure for shareholders in evaluating broad-based stock option programs. Instead of looking only at 1997, it presents a picture of total shareholder return for various categories of stock option companies in our sample, for each individual year. As distinct from Table 4 above, this table performs a set of further statistical analyses on the data on that table and answers the 2 questions: 1. In each year, how do the total shareholder return of various categories of broad-based stock option companies differ from non-broad-based stock option companies if we hold firm size, industry group, and capital intensity constant? ; and 2. Are these differences statistically significant? Each

positive or negative number expresses whether and the extent to which the returns for broad-based the stock option companies were greater or less than comparable companies for that year and the presence of asterisks indicates statistical significance. For example, in 1992, line 1, column 1, we see that All [p broad-based] Stock Option Companies had 5% greater return than non-broad-based stock option companies of similar firm size, industry and capital intensity but that this difference was not statistically significant, i.e. it was not different from zero. But in 1995, the 13.3% better return was statistically significant.

In general, this table demonstrates three conclusions:

1. In most years for most categories of broad-based stock option companies their total shareholder return was not statistically different from non-broad-based stock option companies of similar firm size, industry and capital intensity (i.e. note that there are few asterisks);
2. The returns of the broad-based stock option companies tend to be positive although these nominal differences are not statistically significant;
3. Where the returns of the broad-based stock option companies are statistically different from zero, in 1995 for All [broad-based broad-based] Stock Option Companies a return of +13.3%, in 1994 a return of +18.2% for Stock Option Companies with >50% coverage , and in 1994 a returns of +31.4% for Stock Option Companies with >50%, they always are significantly positive.

The overall conclusion is that we observe no significant statistical evidence of either better or worse shareholder returns over the period. Our interpretation is that the expected dilution from broad-based stock option plans appeared not to have taken place.

Even when this distinction appears to be clear in the words chosen by different studies, an examination of the entire study may reveal that a claim that x% of employees receive stock options really means that x% of employees simply received the right to get stock options.

More study is needed on the annualized values of stock option grants in broad-based plans over longer periods in order to more precisely pinpoint the effect on fixed wages. In its small study of 20 large public companies with broad-based plans, Hewitt Associates found that the annualized values of options granted (using a slightly modified Black-Scholes formula) ranged from 4.8% to 7.5% at the mean and 2.1% to 2.6% a the median for employees making between \$30,000 and \$60,000. Annual periodic grants ranged from \$1134 to \$1196 for these pay ranges, one-time grants were \$1220. Performance related grants were higher at \$1194-3939 at the median and \$4159-\$8010 at the mean (Hewitt Associates 1997: 17-18).

Repricing is when the exercise price of the options that are outstanding is adjusted downward because the employee options have gone "underwater" due to the market price falling below the previously set exercise price. High technology companies and employers in a tight labor market fear losing vitally needed employees for whom options

are an important part of compensation especially if they are constantly being actively courted by the company's competitors. But institutional shareholders believe that repricing replaces the notion of options as an incentive with the notion that they are an entitlement and it is different to treat employee optionees different than outside shareholders. But proponents of repricing argue that companies will lose their ability to retain employees, that this will decrease morale, and that outside shareholder will eventually suffer from this. (Weeden, Carberry, and Rodrick 1998: 165)

This is because they 'measure the value of an option by its intrinsic value—that is, the difference between the market price on the grant date and the exercise price. When firms grant options with a fixed exercise price equal to or greater than the market price at the grant date, the intrinsic value of the option, and thus the recorded expense is zero. (See Lebow, Sheiner, Slifman, and McCluer, 1999: 4-5). This approach was allowed by the accounting profession's Board in its Opinion 25 in 1972. The Financial Accounting Standards Board Statement 123 in 1995 suggested that companies abandon the "intrinsic value method" and account for the added value stock options would be expected to have at the time they are granted. This was only a suggestion and the suggested approach remains optional. After heated debates about whether to mandate a more stringent method of measuring the cost of stock options, the FASB decided not to change its views in 1998.

As a compromise, since 1997, the Financial Accounting Standard Board Statement Number 123 required that companies now report, in an appendix to the financial statements in their annual reports, the pro forma effect on net income and earnings per share had the firm been required to take an accounting charge for the fair market value of all stock options on the date of grant.

Information on past studies is taken from the studies and from Weeden, Carberry, and Rodrick 1999.

Note that the Rutgers researchers' definition of a broad-based plan is slightly more restrictive than that of the NCEO. In this survey, a broad-based plan actually grants options to more than 50% of non-management employees rather than to more than 50% of all full-time employees. These 32 companies still meet the NCEO definition of more than 50% of full-time employees actually receiving stock options and thus can also be considered broad-based in terms of their definition. Tables with these results can be provided by contacting the authors. When we say "If one adjusts for the performance of the control companies" we are taking the performance comparison of the broad-based stock option versus the non-broad-based stock option companies and subtracting out of the performance of the non-stock option company peers in order to make the comparison to the entire market of non-stock option companies a fairer comparison. The reader will note that, in general, these corrections do not change the results.

The productivity numbers in Tables 3 are expressed in logarithms. In order to arrive at the percentages discussed in the text above, it is necessary to subtract the productivity measure of the broad-based stock option companies from the productivity measures of

the non-broad-based stock option companies. Thus, in Table 3 $5.38 - 5.07 = .31$ or a 31% difference.

The total shareholder return numbers in Table 3 are actual percent returns. When the total shareholder returns of all broad-based stock option companies are compared to all non-broad-based stock option companies in this particular table, the numbers mentioned in the table were computed by subtracting the total shareholder return of the non-broad-based stock option companies from the broad-based stock option companies in order to arrive at the difference. Thus, 5.39% (the percent that the total shareholder return of broad-based stock option companies exceeds all non-broad-based stock option companies) is 12.11% (the total shareholder return of broad-based stock option companies)[in column 2] minus 6.72% (the total shareholder return of non-broad-based stock option companies)[in column 1]. This adjustment is not necessary for the Paired data part of the table because it has already been made. A reader familiar with actual market returns during the nineties will find these returns to be quite small. The reason is that all total shareholder return data for Table 3, 5, 6, and 7 are based on robust regressions that assigns lower weights to extreme values. One can certainly make the criticism that all shareholders are concerned about is extreme values and returns. Thus, later in this discussion, in Tables 4 and 9 we will report total shareholder return data using all the actual stock price information provided by Compustat.

For levels of total shareholder return the sample size is 147 companies when we compare broad-based stock option companies with available data in all years to all of Compustat. For annual growth of total shareholder return the sample size is 144 companies when we compare broad-based stock option companies with available data in all years to all of Compustat. When total shareholder return levels are compared between broad-based stock option companies and their non-broad-based stock option pair, 106 paired companies are represented. When total shareholder return annual growth is compared between broad-based stock option companies and their non-broad-based stock option pair, 95 paired companies are represented.

A closer examination of the top part of Table 4 illustrates this point. Comparing the average and median total shareholder returns of broad-based stock option companies versus all Compustat non-broad-based stock option companies and the Compustat 500 (a proxy for the S&P 500) in the individual years from 1992-1997 results in different groups doing better in different years. For the entire period, we have comparisons in 18 years for the three different groups of broad-based stock option companies. The following patterns and findings emerge: a. In general, the median returns for different groups of broad-based stock option companies exceeded the median returns of All Compustat non-broad-based stock option companies twice as often as the average returns of different groups of broad-based stock option companies exceeded the average returns of All Compustat non-stock broad-based option companies; b. The average and the median returns for different groups of broad-based stock option companies both exceeded the average and median returns of Compustat 500 companies in roughly half the years; c. When the track record of returns of all the three groups of broad-based stock option companies are compared to the All Compustat non-broad-based stock option group in 18 observations over 6 years,

the average returns of the broad-based stock option companies does worse in 12 observations and better in 6 observations for average performance but better in 12 observations and worse in 6 observations for median performance. The years 1994 and 1995 were very good years for broad-based stock option company returns relative to the entire market and 1997 (the year on which Tables 2, 3, and 5 are based) was a particularly bad year; d. When the track record of the returns of all the three groups of broad-based stock option companies are compared to the Compustat 500 group in 18 observations over 6 years, the average return of the broad-based stock option companies does worse in 8 observations and better in 10 observations for average performance but better in 8 observations and worse in 10 observations for median performance. The years 1994 and 1995 were very good years for broad-based stock option company returns relative to the Compustat 500 and 1997 (the year on which Tables 2,3, and 5 are based) was a particularly bad year; e. When we specifically examine the track record of all broad-based stock option companies their average performance is better than All Compustat in 2 years and worse than it in 4 years while their median performance is better than All Compustat in 5 years and worse than it in 1 year. Their average return is better than the Compustat 500 in 4 years and worse than it in 2 years. And their median return is better than the Compustat 500 in 4 years and worse than it in 2 years; f. When we specifically examine the track record of broad-based stock option companies that actually make grants to more than 50% of non-management employees in their broad-based plans their average performance is better than All Compustat in 2 years and worse than it in 4 years while their median performance is better than All Compustat in 2 years and worse than it in 4 years. Their average return is better than the Compustat 500 in 3 years and worse than it in 3 years. And their median return is better than the Compustat 500 in 4 years and worse than it in 2 years; g. When we specifically examine the track record of broad-based stock option companies that actually make grants to less than 50% of non-management employees in their broad-based plans their average performance is better than All Compustat in 2 years and worse than it in 4 years while their median performance is better than All Compustat in 4 years and worse than it in 2 years. Their average return is better than the Compustat 500 in 2 years and worse than it in 4 years. And their median return is better than the Compustat 500 in 2 years and worse than it in 4 years; h. These findings suggest that employees would have found that their stock options were worth more or less than a comparable opportunity in the broad stock market depending on the timing of their exercising of their options; i. These findings suggest that non-employee shareholders would have found that their stock holdings in these companies were worth more or less than a comparable opportunity in the broad stock market depending on the timing of their exercising of their sell decisions.

We could have designed a market capitalization weighted index of the cumulative total shareholder returns. But this would demonstrate only how a hypothetical mutual fund portfolio of broad-based stock option companies would perform against a hypothetical mutual fund portfolio of non-broad based stock option companies. We do not believe that that is the information that individual managers, employees, and company shareholders want to know.

Nominal better returns are those for which there are no statistically significant differences investors just the same. Richard Brealey and Stewart C. Myers provide further information on Tobin's q in their book, *Principles of Corporate Finance* (McGraw Hill, 1988. P. 660). "The ratio is like a market-to-book ration, but there are several important differences. The numerator of q includes all the firm's debt and equity securities, not just its common stock. The denominator includes all assets, not just the firm's net worth. Also, these assets are not entered at original cost, as shown in the firm's books, but at what it would cost to replace them. Since inflation has driven many assets' replacement cost well above original cost, the Financial Accounting Standards Board (FASB) recommended procedures that would take into account the impact of inflation.... Tobin argued that firms have an incentive to invest when q is greater than 1 (i.e. when capital equipment is worth more than it costs to replace), and that they will stop investing only when q is less than 1 (i.e. when equipment is worth less than its replacement cost.) When q is less than 1, it may be cheaper to acquire assets through merger rather than buying new assets. At these times investors sometimes joke that the cheapest place for a firm to buy assets is Wall Street... We should expect q to be higher for firms with a strong competitive advantage. ... The companies with the highest values of q tend to be those that have had a very strong brand images or patent protection."

These compensation data are missing for many companies in Compustat. And some scholars consider these data to be inadequate. An examination of Table 8 indicates that the sample is significantly reduced when data on labor costs per employee is included.

When we refer to non-stock option companies or companies that do not have stock options, we mean companies whose stock option status is unknown. It is possible that some of these companies have broad-based stock option plans despite our comprehensive effort to identify all public firms that had announced such plans.

In other tables we will look at other individual years, particularly all individual years from 1992-1997 regarding total shareholder return, which will be a key picture of any dilutive impact of stock options during this period. For example, we will find in looking at Table s 2c1 and 2c2 that 1997 indeed is *not* the most important year to observe in understanding total shareholder return performance because it is generally an exceptional story compared to the other years.

In other words, in order to get the largest possible sample, we began with the 490 companies that we knew from public documents to have broad-based stock option plans. To be part of this particular analysis, these companies merely had to have data on their performance variables in the 1985-1987 and 1995-1997 period in the Compustat database. Since most of them did not fill out our survey we do not know exactly when they adopted their plans. Thus, we created the arbitrary – but we believe realistic – assumption that they adopted between 85-87 and 95-97.