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journal homepage: [www.elsevier.com/locate/jpube](http://www.elsevier.com/locate/jpube)The response of deferred executive compensation to changes in tax rates<sup>☆</sup>Aspen Gorry<sup>a</sup>, Kevin A. Hassett<sup>b</sup>, R. Glenn Hubbard<sup>c</sup>, Aparna Mathur<sup>b,1</sup><sup>a</sup> Department of Economics and Finance, Utah State University, 3565 Old Main Hill, Logan, UT 84322, United States<sup>b</sup> American Enterprise Institute, 1150 17th St, NW, Washington D.C., 20036, United States<sup>c</sup> Columbia Business School, Columbia University, 3022 Broadway, Uris Hall 101 New York, NY 10027 and the National Bureau of Economic Research, United States

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## ABSTRACT

Given the increasing use of stock options in executive compensation, we examine how taxes influence the choice of compensation and document that income deferral is an important margin of adjustment in response to tax rate changes. To account for this option in the empirical analysis, we explore deferral by estimating how executives' choice of compensation between current and deferred income depends on changes in tax policy. Our empirical results suggest a significant impact of taxes on the composition of executive compensation.

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## 1. Introduction

Since 1980, there have been significant changes in the form of executive compensation. Not only has there been dramatic growth in total compensation, but [Bebchuk and Grinstein \(2005\)](#) and [Frydman and Saks \(2010\)](#) document that stock options and other forms of incentive pay now represent a larger share of the overall pay package. Indeed, during our sample period (1992–2005) total income of executives more than doubled while deferred income, which we define as the sum of the value of options and restricted stock grants awarded, more than tripled. The growth of equity-based compensation enables executives to substitute away from cash compensation which is immediately taxable and defer taxation on their income in high tax years.

This paper uses data from Execucomp to study how the use of deferred income as a form of executive compensation is influenced by tax policy between 1992 and 2005. While studying deferral behavior among executives does not offer a representative analysis of the entire population, given the interest in executive compensation and due to

the fact that high-income earners represent a large share of earnings, studying how those earners respond to changes in tax policy has implications for both total government revenue and the efficiency of the tax system. The use of options and stock grants in compensation creates a means through which executives can choose to defer taxation on their current compensation.<sup>2</sup>

Deferring income can generate important tax benefits to individuals for at least four reasons. First, when workers face uncertainty about future tax rates (because tax rates vary over time), having a stock of deferred income creates an option value. Second, with graduated income tax brackets, deferring income can help workers avoid taxes by pushing income forward into periods in which they earn less. Third, when capital gains are taxed differently than labor income, the returns on deferred income (such as options) could also be taxed at a lower rate. Finally, even with equal tax treatment, deferral allows individuals to earn returns on the pre-tax value of their savings. Each of these mechanisms implies that executives have a greater incentive to defer income when they face higher tax rates. Moreover, the tax treatment of stock options

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<sup>2</sup> Such means of deferral are not available to typical workers. In particular, executives have access to forms of deferred compensation such as stock options that are not offered to typical workers who only have limited access to tax deferred savings accounts such as the IRA and 401(k). For possible welfare effects of these accounts on welfare of non-executives, see [Imrohoroglu et al. \(1998\)](#), [Kitao \(2010\)](#), and [Ho \(2014\)](#) for a discussion. Of course, one must be cautious in broadly interpreting our results. [Goolsbee et al. \(1999\)](#) summarize the evidence of the existence of a high-income Laffer curve.

can create additional tax incentives through the corporate tax rate. In particular, deferred compensation delays when the firm can claim a deduction and potentially allows the firm to generate a larger deduction due to the million dollar limit on deductibility of non-incentive based pay. Hall and Liebman (2000) summarize tax and accounting rules regarding different forms of executive compensation and the total payoff to the firm and the executive of cash compensation as opposed to deferred income.

Changes in tax rates can influence both the choice of executive compensation and the timing of exercise of vested options. Changing the timing of exercising options allows executives to shift their income either forward or back in order to reduce tax payments when there are anticipated changes in tax policy. This paper, however, focuses exclusively on the question of how taxes affect the initial choice of compensation between cash (salary and bonus) and deferred income because timing decisions have been extensively studied by Feldstein (1995) for the 1986 tax reform and Goolsbee (2000a,b) for the 1993 tax changes. Moreover, the exercise of options is often a mechanical decision; for example, Huddart and Liang (2006) and Fu and Ligon (2010) find that managers exercise a substantial portion of their options as soon as they vest.<sup>3</sup>

A challenge in estimating the response of deferred income to changes in taxes is that the tax rate that the executive faces is endogenous, depending on the executive's current year income. To address this potential endogeneity bias, we follow Goolsbee (2000a) by using the permanent income tax rate, defined as the executive's personal tax rate based on average income over all the years in our sample, as an instrument. Our empirical results suggest that deferral of income is highly elastic with respect to the tax price.

Deferred income, in our paper, is defined as the sum of option awards and restricted stock grants. Since both executive compensation and the use of stock options grew rapidly during our sample period, we study deferred income as a share of total compensation. The estimated current-period coefficient on the tax price is  $-0.072$  in the baseline specification in which a full set of controls is included, though it is not statistically significantly different from zero. The lack of significance arises as we find that the two components of deferred compensation, stock options and stock grants, respond in opposite ways to tax changes. Because restricted stock grants face a different tax treatment than options, we study how taxation influences the share of options and stock grants separately. We find that the tax-price response of option shares is  $-0.403$ , and the response of the stock grants share is  $0.331$ . The incentive to defer income comes mainly from option awards rather than stock grants. This difference arises partly because restricted stock grants are not treated as incentive pay for tax purposes and so are subject to the million dollar rule on corporate deductibility. Moreover, restricted stock grants allow the executive to decide to be taxed immediately or when the stock vests, so it is unclear if taxation is actually deferred.

In analyzing the responsiveness of compensation to taxes, we also consider the effect of corporate tax rates as they can influence the total tax benefit of options, because compensation is deductible against corporate profits. When executives defer realizations of income, this deferral influences the firm's current corporate tax payments because deductions occur at the time of realizations of income. We find little evidence that the corporate tax rate influences deferral decisions. This finding could be explained by the fact that we separately control for the corporate deductibility of income. Once the corporate deductibility is accounted for, if there are no expected changes in future corporate tax rates, then corporate taxes should not influence the efficiency cost of changes in the personal tax rate as discussed in Appendix A.

We do, however, find evidence that the use of stock options is responsive to the million dollar restriction on executive salaries that was

enacted in 1993 (section 162(m) of the Internal Revenue Code). This rule limits the corporate deductibility of non-incentive-based compensation to one million dollars. Because options are classified as incentive pay and are therefore exempt from the rule, theory would predict that there is a tax advantage to taking all pay in excess of one million dollars in stock options. In line with the theory, we find that the share of income above one million dollars is a strong predictor of the use of deferred income with a coefficient of  $0.571$  in the deferred income specification and  $0.466$  when stock options are considered.<sup>4</sup>

Our work contrasts with previous papers that do not find a strong relationship between taxes and the form of executive compensation. Hall and Liebman (2000) study the period from 1980 to 1994 and conclude that taxes have only a modest impact on the use of options while changes in corporate governance such as the role of institutional investors and managerial incentives play a much larger role.<sup>5</sup> Similarly, Frydman and Molloy (2011) study how tax policy affects the level of executive compensation between 1946 and 2005, with special focus on the years from 1946 to 1972. In particular, they look at how changes in labor income taxes influence the use of salary and bonus, stock options, and bonuses after retirement. Using *ex ante* versus *ex post* comparisons over tax changes, they find little effect of taxes on the level of compensation.

Relative to previous studies, our paper focuses on a more recent period where options are a larger share of executive compensation and pay is subject to the million dollar rule. Indeed, stock options have only recently become a common form of compensation. Hall and Liebman (2000) find that the median CEO did not receive stock options until 1985. Moreover, previous work studied periods where the million dollar rule did not exist. For example, Hall and Liebman's sample ends in 1994, 1 year after Section 162(m) was enacted. This is important as we find that the combined tax benefit to the firm and individual from deferred compensation depends greatly on the corporate deductibility of the income. For instance, when all income is deductible, we find small gains of between three and 4 percent to deferral in line with the findings of Hall and Liebman (2000). However, when cash compensation is not deductible then the gain to deferral is in excess of 50 percent. This fact may explain why they find a limited impact of tax policy on compensation. We find that both individual tax rates and excess pay over one million dollars have a significant effect on the use of options. Additionally, previous studies do not attempt to control for the endogeneity of tax rates in order to provide causal estimates of the effect of taxes on form of compensation. Finally, we use firm-specific corporate tax rates that account for tax loss carryforwards, provide more variation across firms, and more accurately measure firm's marginal tax rate than simply relying on the statutory rate.

Our findings are also related to the body of research estimating the elasticity of taxable income (ETI). A large body of research has arisen to provide estimates of the elasticity of taxable income with respect to marginal tax rates since Feldstein (1999) showed that this elasticity is a sufficient statistic for the deadweight loss of taxation under certain conditions.<sup>6</sup> However, changes in the timing of taxable income are

<sup>4</sup> These coefficients imply that nearly half of compensation in excess of one million dollars is taken as stock options. Part of the remaining payments that could be paid as a bonus is also considered to be incentive pay and is therefore exempt from the million dollar rule.

<sup>5</sup> In particular, they find that the tax benefit variable that calculates the period tax benefit of options over cash compensation using statutory rates is significant, but only find significant results for the corporate statutory rate when regressing tax rates separately. They also estimate specifications taking into account tax loss carryforwards and find no effects of corporate taxes on the use of options. Using current statutory rates is problematic, as options are deducted in the year of exercise and firms' effective marginal tax rates are highly variable. To account for differences in firm marginal tax rates, we use firm-specific rates constructed by Graham (1996a).

<sup>6</sup> While the research estimating the ETI is too extensive to include a full review here, prominent estimates of ETI include Lindsey (1987), Feldstein (1995), Carroll (1998), Auten and Carroll (1999), Slemrod (1996), Goolsbee (2000a,b), Gruber and Saez (2002), Saez (2003), Giertz (2010), Auten et al. (2008), and Heim (2009) among others. For a review of this body of research, see Saez et al. (2012).

<sup>3</sup> Cadman et al. (2013) discuss determinants of option-vesting schedules.

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