VALUE CREATION, PERFORMANCE EVALUATION AND

MANAGERIAL DECISIONS ON SG&A EXPENDITURE

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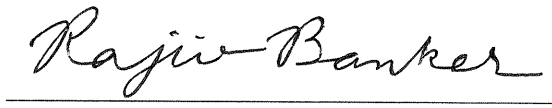

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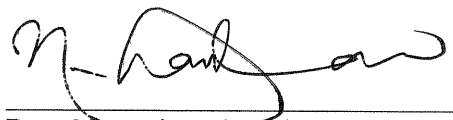

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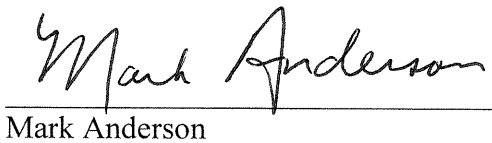

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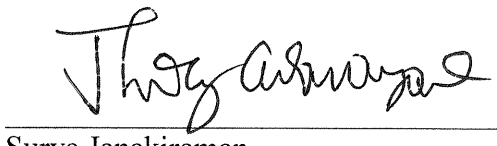

Surya Janakiraman

This dissertation is dedicated to

my parents, Xiaohua Huang and Shoufen Ge

and my brother, Bing Ge

VALUE CREATION, PERFORMANCE EVALUATION AND MANAGERIAL DECISIONS ON SG&A EXPENDITURE

by

RONG HUANG, M.A.

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The existing managerial accounting literature has investigated how firms *incentivize* and *reward* managers based on financial and non-financial measures of outcomes to motivate managers to take desired actions, such as expending resources on activities that enhance shareholder value. An alternative approach to induce managers' right action is to *alleviate the penalty* for input resource expenditure that increases shareholder value. In this study, I focus on the expenditure on selling, general and administrative (SG&A) activities, excluding R&D and advertising. I investigate whether the capital market and the executive labor market recognizes the long-term value generated by SG&A expenditure, how firms design incentive contracts to alleviate the penalty on value-enhancing SG&A expenditure and whether the incentives effectively lead to desired managerial actions.

In the first part of my dissertation, I hypothesize and find that SG&A expenditure generates future economic benefits although it is required to be expensed as a period cost. Analyzing contemporaneous stock returns, I infer that investors do not view all of SG&A expenditure as

an expense in the current period, but rather seem to recognize some of the asset value implicit in SG&A. I also document that no excess returns can be earned on SG&A portfolio in subsequent periods. My analysis of executive compensation indicates that the changes in bonus and equity compensation are negatively associated with the change in SG&A expenditure, while the negative association decreases when current SG&A expenditure has a relatively greater impact on future profitability. Overall, the evidence is consistent with the efficiency of the capital market and the executive labor market in recognizing the asset value created by SG&A expenditure despite its expensing for financial reporting purposes.

In the second part of this dissertation, I examine how incentives affect managers' expenditure decisions and whether firms make equity grant decisions considering managerial behavior. I hypothesize and find that new grants of equity incentives lead to an increase in SG&A expenditure in companies where SG&A creates a high future value. I also find that firms with high level of SG&A spending grant more new equity incentives when SG&A creates more future value. The evidence is consistent both with managers making rational investment decisions in response to new grants of equity incentives and with firms making efficient grant decisions based on managers' expected behavior.

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CHAPTER 1

INTRODUCTION

1.1 Overview

The last two decades have witnessed considerable interest in designing performance evaluation systems that align managers' interests with shareholder value. Performance evaluation systems can be based on measures of either the behavior of managers or the outcomes of those behaviors (Thompson 1967, Ouchi 1979). Examples of behavior-based performance measures are expenditures on input resources such as labor, materials and information, on various desirable and undesirable activities. Examples of outcome-based performance measures include financial variables such as accounting earnings and stock returns, and non-financial variables such as customer satisfaction and market share. Many empirical studies in the managerial accounting literature have investigated the role of outcome-based performance measures, including both financial and non-financial measures of outcomes (Lambert and Larcker 1987, Sloan 1993, Banker et al. 2000). Their focus has been on how firms *incentivize* managers using outcome-based measures and how firms *reward* managers for achieving higher outcomes. Very few accounting studies have examined how firms use behavior-based performance measures such as input expenditure on specific activities to induce managers to focus on value-enhancing actions.

Activities on which managers expend more or less input resources signal whether their behavior is consistent with building long-term shareholder value. A common assumption in managerial accounting is that higher expenditure on any activity should be

penalized in managerial compensation to induce efficient cost control behavior. However, to better understand the optimal choice of activities, we must differentiate between expenditure on long-term and short-term value-creating activities. Expenditure on long-term value-creating activities such as R&D, advertising, product development, brand building or customer service should not be penalized in managers' rewards as much as expenditure on other short-term activities. If performance is evaluated based on accounting earnings, all expenses are penalized equally. However, an efficient contract should *alleviate the penalty* for input resource expenditure that enhances long-term shareholder value to induce the managers to select the right action. To examine this issue, I focus on selling, general and administrative (SG&A) costs, a category of expenditure that contains many value-enhancing activities and is a large component of total expenses. I seek to provide additional evidence on performance evaluation practices in U.S. corporations by investigating the relationship between executive compensation and value-enhancing expenditure contained in SG&A.

1.2 Performance Evaluation and Incentive Contracting

Performance evaluation and incentive contracting are important areas in management accounting research. The separation of corporate managers from outside investors involves inherent incentive problems caused by asymmetric information. Agency theory explicitly incorporates incentive problems and provides mechanisms for controlling incentive problems. There are two streams of agency theory: positivist agency theory and principal-agent theory (Jensen 1983, Eisenhardt 1989). The former focuses on identifying special cases where the firm (principal) and the manager (agent) have conflicting goals and then describing the control mechanism to mitigate the conflicts (Jensen and Meckling 1976). The

latter focuses on determining the optimal contract between the principal and the agent based on behavior or outcome-related performance measures (Harris and Raviv 1979, Holmstrom 1979).

Most of the agency literature addresses two types of incentive problems referred to as moral hazard and adverse selection problems. Moral hazard arises because the agent's actions are not observable by the principal. Adverse selection arises because the agent has private information about his innate ability. The principal designs incentive contracts either to induce desired managerial actions or to screen out agents with inferior ability in order to maximize shareholder value (Holmstrom 1979, Darrough and Melumad 1995). Since the agent's action and/or ability are unobservable, contracts have to be written on performance measures that are observable to the principal. In a single-action principal-agent model, the relative weights placed on different performance measures are determined by the sensitivity-to-noise ratio (Banker and Datar 1989). In a multi-action framework, however, the relative weights are determined by the sensitivity and noise characteristics as well as the congruence of the performance measure with shareholder value (Feltham and Xie 1994).

Empirical work on performance evaluation and incentive contracting has generally confirmed these predictions from the basic agency theory. Existing literature shows that the cash compensation weights placed on accounting-based outcome performance measures such as earnings and market-based outcome performance measures such as stock prices are correlated with the noise, persistence, and value-relevance of performance measures (Lambert and Larcker 1987, Sloan 1993, Natarajan 1996, Bushman, Engel and Smith 2006).

1.3 Managerial Myopic Behavior and Outcome Measures

Recent studies on performance evaluation and incentive contracting have specifically focused on how to induce managerial actions that generate long-term rather than short-term value. Contracting on short-term financial outcome performance such as earnings may induce short-term action that is detrimental to long-term value consequence. In the absence of any long-term incentives, managers may behave myopically to increase firms' short-term earnings while sacrificing long-term value. Several theoretical papers argue that short-term reputational concerns may drive managers to deviate from optimal investment policies and focus on short-run actions (Narayanan 1985a, 1985b; Stein 1989). Managerial myopia may also arise from factors such as short-term trading by institutional investors, short-term focus of security analysts and very little information about long-run projects being impounded into security prices (Holden and Lundstrum 2005). Empirical studies have also examined the consequence of contracting on short-term financial outcome. For example, in firms where compensation heavily relies on current earnings, CEOs have a tendency to cut R&D expenditure to increase earnings (Bushee 1998). This problem is particularly severe when CEOs approach retirement or when firms face a small earnings decline or a small loss (Dechow and Sloan 1991, Baber, Fairfield and Haggard 1991). The overall evidence suggests that contracting on short-term oriented performance measures based on financial outcomes may induce managers to select short-term myopic actions that are detrimental to long-term value creation and sustenance.

To mitigate such myopic behavior of managers, firms use forward-looking outcome performance measures. Theoretical studies show that forward-looking performance measures serve to match the future investment return with the current investment expenditure

(Dutta and Reichelstein 2002, Dikolli 2001). Therefore contracting on forward-looking performance measures can mitigate adverse long-term effects of managers' focus on short-term performance. One example of commonly used forward-looking performance measures is stock price. Stock price reflects all available information to capital market participants and projects future financial outcomes resulting from management's current and past decisions. Stock price is forward-looking because it contains future information that is not captured by current earnings.

Empirical work has examined the role of stock price as a forward-looking performance measure (Lambert and Larcker 1987, Sloan 1993, Core, Guay and Verrecchia 2003). Both cash and stock-based compensation are positively associated with stock price. This indicates that stock price is used as a forward-looking performance measure in executive compensation to induce managers' long-term actions. However, since stock price is a noisy and imperfect measure of managerial actions, it may contain other factors that are not subject to managers' control. Therefore it is important to use alternative forward-looking outcome performance measures to supplement stock price. These alternative measures include metrics associated with employee and customer satisfaction, product and service quality, and supply chain relationships. A commonly used framework that links forward-looking (leading) and current (lagging) performance is called the balanced scorecard. In the balanced scorecard framework, non-financial performance metrics such as customer relations, internal business processes, and learning and innovation are leading indicators of financial performance (Kaplan and Norton 1996). Empirical studies show that customer satisfaction measures are leading indicators and drivers of future financial performance,

customer purchase behavior, and current market value (Banker et al 2000, Behn 1999, Ittner and Larcker 1998).

Overall the existing managerial accounting research has mainly examined the reward systems based on outcomes of managerial actions. Their focus has been on how to reward managers for improving financial and non-financial outcomes to motivate managers to select long-term value-enhancing actions. However, very few studies have examined the role of rewards and penalties on reported input expenditure in motivating long-term value-enhancing activities.

1.4 Managerial Myopic Behavior and Input Resource Expenditure

Contracting on the resource expenditure choices of managers is an alternative way to induce long-term value-enhancing managerial actions. Expenditure on short-term activities such as sales promotion generates current profit. On the other hand, expenditure on long-term activities such as R&D, advertising, human resource management and information technology creates long-term value at the expense of short-term earnings (Lev and Sougiannis 1996). Contracting on current earnings while expensing both short-term and long-term expenditure implies that all the expenditure is penalized by the compensation contract. This may induce managers to under-invest in long-term activities and consequently reduce shareholder value. Similarly, contracting on current stock price while expensing all expenditure may also result in opportunistic reduction in long-term investment if current stock price fails to reflect all information about long-run managerial actions. To induce managerial actions that maximize shareholder value, it is important to alleviate the penalty for the expenditure that enhances shareholder value.

Very few studies have examined the relationship between executive compensation and value-enhancing expenditure such as R&D and advertising. The main finding is that executive cash compensation is shielded from R&D and advertising expenditure, especially when the CEO approaches retirement and when the firm faces a small earnings decline or a small loss (Duru et al 2002, Cheng 2004). The maintained assumption is that all of the R&D and advertising expenditure generates long-term value for a firm. However, the income statement expenses a broad class of expenditure that creates both short-term value and long-term value for a firm. It is important to differentiate between short-term and long-term value-enhancing activities and design appropriate contracts to induce desired managerial actions.

In my study, I focus on selling, general and administrative (SG&A) expenditure, excluding R&D and advertising expenditure. Prior research on the value of intangible assets has mainly focused on research and development (R&D) expenditure for the few industries where R&D expenditure is material. However, long-term economic benefits of SG&A expenditure have not been examined although SG&A expenditure is more commonly reported than R&D across all industries and its magnitude is usually larger. In my sample covering 121,455 firm-year observations from 1970 to 2004, SG&A for the median firm is 27% of total assets, while R&D is only 3% of total assets. Some studies have also examined the role of advertising expenditure in creating an intangible asset. A large component of SG&A is selling expenditure other than advertising that includes sales promotion, customer development and distribution channel management. Since the expenditure on SG&A is material and since it supports various value-enhancing activities, it is important to investigate its role in executive compensation.

SG&A expenditure supports both short-term activities and long-term activities, and constitutes a substantial component of the total expenses for most companies. SG&A ranges from an average of 17% of total expenses for construction industries to 50% of total expenses for music service industries. Selling expenditure includes costs of marketing, selling and distributing products and services. General and administrative expenditure includes costs of managing and developing the business. SG&A comprises expenditure to support several different activities. Sales commissions and promotional costs increase short-term profits and these benefits may expire in current period. Brand development, information technology and employee training costs may create long-lived intangible assets that generate future value. Although SG&A costs support various long-term activities that may create future value for a firm, GAAP requires SG&A to be expensed immediately as a period cost[1]. The above evidence suggests a potential mismatch between the value-generating process and the accounting treatment of SG&A.

1.5 Overview of Dissertation

In my dissertation, I empirically document that SG&A expenditure, on average, has a six-year positive impact on current and future operating income before SG&A. The long-

[1] "Recognition of expenses and losses is intended when an entity's economic benefits are used up in delivering or producing goods, rendering services, or other activities that constitute its ongoing major or central operations….Selling and administrative salaries, are recognized during the period in which cash is spent or liabilities are incurred for goods and services that are used up either simultaneously with acquisition or soon after." (Statement of Financial Accounting Concepts No. 5, "Recognition and Measurement in Financial Statements of Business Enterprises", page 31.)

term value generated by SG&A varies across firms and industries based on their operating environment and competitive strategy. I construct a firm-specific measure that characterizes the long-term value created by SG&A. I show that in industries where demand uncertainty and growth opportunity are high (e.g., wholesale, service and high-tech industries), the long-term value created by SG&A is high. In mature industries where cost efficiency is important (e.g., industries engaged in transportation and mass production of raw materials), the long-term value created by SG&A is low. Further analysis indicates that the SG&A long-term value measure varies with investment in tangible assets, number of employees, size, and industry competition. This validates the estimates of long-term value created by SG&A. It also confirms that the long-term value created by SG&A activities varies across firms and industries due to differences in their operating environments.

Next I examine whether investors understand the long-term value created by SG&A expenditure. Since GAAP requires SG&A expenditure be expensed immediately and investors may fixate on reported earnings numbers, it is likely that investors may not fully understand the long-term value created by SG&A contemporaneously. I find the contemporaneous stock market reaction to SG&A expenditure information is not the same as it is to other current period expense items. Investors seem to differentiate SG&A expenditure from the other components in the extent of the value change corresponding to the change in these items reported in the income statement. The evidence is consistent with the notion that the long-term value of SG&A expenditure are value-relevant to investors. The evidence also indicates that investors fully recognize the value-relevance of SG&A information reported in financial statements. I find that no excess returns can be earned on SG&A portfolios in subsequent periods.

In addition to the capital market, I investigate whether the executive labor market recognizes the long-term value created by SG&A expenditure. There are two types of agency problems associated with managerial investment decisions: 1) managers may invest in projects that obfuscate a firm's current performance and consequently extract higher wages, and, 2) managers may cut discretionary expenditure to increase current performance. If the executive labor market recognizes SG&A expenditure as an investment in intangible asset, we would expect that compensation contracts do not induce opportunistic reductions in SG&A to boost short-term earnings. On the contrary, compensation contracts would motivate higher investment in SG&A to increase the firm's long-term value. Consistent with this prediction, I find that the change in both bonus and equity compensation are less negatively associated with the change in SG&A expenditure when current SG&A expenditure has a greater impact on future profitability.

To examine whether long-term incentives effectively motivate managers to increase investment in SG&A, I investigate how managers' investment behavior changes after receiving new grant of equity incentives. I find that in companies where substantial benefits created by SG&A are realized in the future, managers increase the amount of SG&A spending following new grant of equity incentives. However in companies where future benefits created by SG&A are relatively low, managers do not increase the amount of SG&A spending after receiving new grant of equity incentives. Thus, the evidence indicates that whether managers increase SG&A spending in response to new equity grants depends on whether SG&A creates substantial future value.

Next I investigate whether firms make new grant decisions considering how managers make their decisions to invest in SG&A. I find that in companies where SG&A

spending is high, new equity grants are made when SG&A creates substantial future value. The operating environment of those companies enables the SG&A spending to create high potentials in terms of increasing future profitability, and, therefore, more equity grants are necessary to motivate further investment in SG&A to realize the potential opportunities.

In my initial analysis, I assume that SG&A expenditures and equity grant decisions are made sequentially. However, it is possible that they are determined simultaneously. To consider this possibility, I also estimate the relation between long-term incentives and SG&A expenditures using a simultaneous equation model. I find as before that the increase in SG&A spending and new grant of equity incentives are positively associated with each other only when SG&A creates high future value. This is consistent with the notion that firms and their executives recognize that long-term incentives create long-term value for a firm when SG&A activities create considerable future opportunities. Overall the results are consistent with the notion that firms recognize the future value generated by SG&A and develop performance measures and action plans to maximize shareholder value.

My dissertation contributes to the literature in several ways. First, in contrast to prior studies that have focused on rewarding managers for higher financial outcomes and non-financial value drivers, I emphasize input resource expenditure and examine whether the penalty for incurring the expense is alleviated for long-term value-enhancing activities. I hypothesize and show that expenditure on activities that create long-term value is not penalized by executive compensation contracts as much as short-term oriented expenditure is. Second, I empirically document that SG&A expenditure creates long-term value that varies systematically across firms and industries. Despite the fact that SG&A expenditure has long-term impact on firm value, financial analysts and regulators often treat SG&A as a

current period expense when comparing the ratio of SG&A to sales across firms and years (Abarbanell and Bushee 1997; Lev and Thiagarajan 1993). Third, I extend the literature on valuation and incentive contracting of intangible assets. Prior studies have only investigated intangible assets created by R&D and advertising expenditure. However, none of the studies have examined the intangible assets created by SG&A expenditure. The amount of SG&A expenditure is much more substantial than R&D and advertising. The intangible assets created by SG&A expenditure have a greater impact on both capital and executive labor market. My analysis shows that both capital and executive labor market recognize the long-term value created by SG&A expenditure and differentiate the asset and expense components of SG&A. Fourth, I extend the understanding of how incentives influence managers' behavior by showing that the impact is contextual. Prior studies have examined how performance improves subsequent to the adoption of the performance-based compensation contract (Larcker 1983; Banker, Lee, Potter and Srinivasan 2000). I show that the extent to which managers react to long-term incentives depends on the future value they can create in their operating context. Fifth, I contribute to the literature on determinants of new grants of equity incentives (Smith and Watts 1992; Yermack 1995; Core and Guay 1999) by documenting that firms grant more new equity incentives when they perceive the contribution of SG&A expenditure to future value to be relatively high.

1.6 Organization of Dissertation

The remainder of this dissertation is structured as follows. Chapter 2 presents a review of related literature. First I review two streams of literature in agency theory: positivist agency theory and principal-agent theory. I discuss behavior-based and outcome-

based principal-agent theory in detail. I then present a review of literature on measuring and contracting on outcome-based non-financial performance measures such as customer satisfaction measure. Next I discuss the literature on value creation of intangible assets such as R&D and advertising. I then review studies on performance evaluation and incentive contracting on these value-creating expenditures. Finally I discuss existing work on managerial expenditure decisions and actions.

Chapter 3 develops the research hypotheses. I first develop hypotheses on value creation by SG&A expenditure. Next I discuss hypotheses on the capital market implications of SG&A expenditure. I examine whether the capital market participants understand the value implications of SG&A expenditure. I also develop hypotheses on executive compensation implications of SG&A expenditure. I investigate whether compensation committees recognize the future value created by SG&A expenditure. I then present hypotheses on managerial decisions on SG&A expenditure and firms' equity grant decisions in this chapter. I examine whether the association between equity incentives and new investments in SG&A depends on the future value creation ability of SG&A expenditure.

Chapter 4 describes the research design and sample selection procedures. I first present the empirical model on value-creation of SG&A expenditure by relating current earnings with current and past SG&A expenditure. I then describe the model and portfolio analysis relating contemporaneous and future stock returns to SG&A information. Next I discuss the model on executive compensation and SG&A expenditure. In the final section of this chapter, I present models relating equity incentives and managerial decisions on SG&A expenditure. I first describe the model on whether new equity incentives lead to change in

SG&A expenditure. I then present the model on whether firms consider managerial decisions on SG&A expenditure when making equity grants.

Chapter 5 presents a discussion of empirical results and additional analysis to assess the robustness of results. I first discuss results on value creation by SG&A expenditure. I show the association between earnings and current and past SG&A expenditure. I also discuss the construction and validation of SG&A future value creation measure. Next I present empirical results on the capital market implications of SG&A expenditure. I demonstrate the relation between SG&A expenditure and contemporaneous and subsequent stock returns. In the next section of this chapter, I show the results on executive compensation implications of SG&A expenditure. I discuss the results of both cash compensation and total compensation contracts. In the final section of this chapter, I present results on the association between equity incentives and managerial decisions on SG&A expenditure. I show how the association depends on the future value creation of SG&A expenditure. I then extend the analysis and show the results on R&D and advertising, and SG&A expenditure. Finally I show additional results using a simultaneous model to account for the joint determination of managers' expenditure decisions and firms' equity grant decisions.

Chapter 6 concludes the dissertation. I first summarize the results of the dissertation. Next I discuss its contribution to the research literature. I then point out the limitations of this study. Finally I discuss the implications for future research.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Agency problems occur when the firm (principal) and the manager (agent) have different goals and risk preferences (Jensen and Meckling 1976, Ross 1973). Agency theory is concerned with resolving the conflicting goals and enabling risk sharing between the principal and the agent. There are two streams of agency theory: positivist agency theory and principal-agent theory (Jensen 1983, Eisenhardt 1989). Positivist agency theory identifies special cases under which the principal and the agent are likely to have conflict. It also describes the governance mechanisms to mitigate the conflict and limit the agent's self-maximizing behavior. For example, Jensen and Meckling (1976) examine how ownership structure helps align managers' interests with shareholder value. They show that increasing the ownership of the managers reduces managers' appropriation of corporate resources. Fama (1980) discusses the role of efficient capital and labor markets as information mechanisms to control managers' self-serving behavior. Fama and Jensen (1983) investigate the role of the board of directors as an information mechanism to monitor managerial opportunistic behavior.

Principal agent theory focuses on a general theory of the principal-agent relationship. Unlike the positivist agency theory that identifies various contracting alternatives, the principal agent theory examines which contract is optimal under various levels of outcome uncertainty, risk aversion and information asymmetry (Eisenhardt 1989). Principal agent

theory specifies two types of agency problems: moral hazard and adverse selection. Moral hazard problem occurs when the agent is effort-averse, and the principal cannot observe the agent's effort level. Adverse selection problem occurs when the agent misrepresents his ability and the principal cannot verify the agent's ability. To mitigate the above two problems, the principal can either invest in information systems to discover the agent's behavior or contract on the outcomes of the agent's behavior. The former is called behavior-based contract and the latter is called outcome-based contract.

In the following section, I discuss behavior-based and outcome-based principal-agent theory. I then review the existing managerial accounting literature on measuring and contracting on outcome-based performance measures such as customer satisfaction measure. Next I review the literature on value creation by input expenditure such as R&D and advertising as a signal of managerial behavior. I then discuss existing studies on evaluation and incentive contracting on outcome-based performance and behavior-based R&D and advertising expenditure. Finally I discuss existing work on managerial expenditure decisions on R&D and advertising.

2.2 Behavior-Based and Outcome-Based Principal-Agent Theory

Agency theory models the contract relationship between a principal who delegates work to an agent who performs the work. The contract can be based on either the behavior of the agent or the outcomes of the behavior (Thompson 1967, Ouchi 1979). The center of the principal-agent theory is the trade-off between the cost of measuring the behavior and the cost of measuring the outcomes while transferring risk to the agent. In the case of complete information, the principal has perfect knowledge of an agent's behavior. In this case, a

contract based on behavior is most efficient. An outcome-based contract would unnecessarily transfer risk to the agent. If the principal does not know exactly what the agent has done, a self-interested agent may or may not perform as agreed by the contract. In this case whether the behavior-based or the outcome-based performance measure should be used depends on the information characteristics of the given task.

Ouchi (1979) discusses the linkage between the information characteristics and control strategies. He argues that if the task can be programmed, then the contract should be based on behaviors since they can be easily measured. As task programmability decreases, behaviors are used less as the basis of performance evaluation because they are less clearly specified. On the other hand, if the goals can be clearly stated, then the contract should be based on outcomes since the outcomes can be readily measured. If both behaviors and outcomes can be measured, then either can be used.

Eisenhardt (1989) reviews the behavior-based and outcome-based principal agent literature. Behavior-based (outcome-based) contracts are positively (negatively) related to investment in information systems, outcome uncertainty, the risk aversion of the agent, and the length of the agent relationship while negatively (positively) related to the goal congruence between the principal and the agent and outcome measurability (Harris and Raviv 1979, Demski 1980, Perrow 1986, Anderson 1985, Lambert 1983).

2.3 Value-Drivers

Agency theory indicates that the goal of performance evaluation and control system is to align the interests of the shareholders with those of the managers. The control system should emphasize managerial actions that increase shareholder value. Consistent with this

purpose, value-based management (VBM) literature focus on the identification and measurement of value drivers.

Ittner and Larcker (2001) provide a comprehensive review on VBM approach. According to Ittner and Larcker (2001), the VBM approach involves the following steps: (1) defining and implementing strategies that provide value creation potential; (2) implementing information systems that focus on value creation and value drivers; (3) aligning management processes with value creation; and (4) designing performance systems and incentive compensation plans that reflect value creation. They define identification of value drivers as the process to identify specific actions or factors that cause costs to arise or revenues to change.

The balance scorecard concept provides an integrated system that identifies and measures value drivers along multiple dimensions (Kaplan and Norton 1996). It synchronizes together financial performance, customer relations, internal business processes and learning innovation. Kaplan and Norton (1996) contend that the non-financial value drivers, such as customer relations, internal business processes and learning and innovation, are leading indicators of financial outcomes such as earnings and stock prices.

Empirical studies in managerial accounting literature confirm that non-financial performance measures are leading indicators of future financial performance. For example, Banker, Potter, and Srinivasan (2000) find that customer satisfaction measures are positively associated with future financial performance in the hotel industry. Behn and Riley (1999) report similar findings in a study covering the airline industry. Ittner and Larcker (1998) find that customer satisfactions measures are leading indicators of customer purchase behavior, accounting performance, and current market value. They also find that the association

between customer satisfaction measures and future accounting performance is nonlinear, with diminishing performance benefits at high satisfaction levels. Consistent with these findings, Foster and Gupta (1997) show positive, negative, or insignificant relations between customer satisfaction measures and future financial performance depending on the questions included in the measures or the model specification.

Overall, the existing managerial accounting literature finds that non-financial value drivers such customer satisfaction measures are leading indicators of future financial performance. However, most studies mainly examine the measurement and reward system based on outcomes of managerial actions. The emphasis is on how to reward managers for improving non-financial value drivers to motivate managerial value-enhancing actions. Very few studies have investigated the alleviation of penalization on input expenditure that creates intangible assets.

2.4 Value Creation of Intangible Assets

There is extensive research in economics and related area on value creation and value-relevance of intangible assets. Most of the studies focus on the intangible assets created by research and expenditure (R&D). Dukes (1976) studies investors' perceptions of R&D and demonstrates that investors adjust reported earnings for R&D expense. Ben-Zion (1978) shows that the difference between a firm's market and book values varies cross-sectionally with R&D and advertising expenditure. In a similar vein, Hirschey and Weygandt (1985) find that Tobin's Q value (the ratio of market value to replacement cost of assets) varies cross-sectionally with R&D to sales ratio.

The accounting literature examines how to adjust GAAP earnings and book values for R&D capitalization and whether these adjustments are value-relevant to investors. Lev and Sougiannis (1996) show that current operating income before R&D expense is positively impacted by R&D expenditure in the prior four to seven years in R&D intensive industries. They estimate the firm-specific R&D capital and adjust the reported earnings and book values based on these estimates. They find that financial statements adjusted for R&D capitalization and amortization are more highly associated with stock prices than financial statements based on expensing current R&D. This indicates that adjustment for R&D capitalization is value-relevant to investors.

Other studies examine whether the stock market fully values the intangible assets created by R&D expenditure. Hirschey and Weygandt (1985), Woolridge (1988) and Chan, Martin and Kensinger (1990) find that R&D expenditure has a positive impact on the market value of a firm, but investors do not seem to fully recognize the value-relevance of R&D expenditure when they are expensed immediately. Chan, Lakonishok and Sougiannis (2001) show that companies with high R&D to market value earn large excess returns in the subsequent years. They argue that the stock market is too pessimistic about R&D-intensive firms. Similarly, Lev and Sougiannis (1996) document a significant intertemporal association between firms' R&D capital and future stock returns. Eberhart, Mexwell and Siddique (2004) examine the association between future stock returns and large R&D increase. They find that positive abnormal returns are earned on firms with large R&D increase. They conclude that the market underreacts to large increases in R&D expenditure. These results either suggest that the market systematically misprice R&D-intensive stocks, or R&D is an extra risk factor. Either way, they provide the economic rationale for capitalizing

and amortizing R&D expenditure rather than immediately expensing it as required by SFAS No. 2.

Some studies on R&D expenditure also recognize that advertising expenditure for sales promotion and product development may create an additional intangible asset. However since relatively few R&D intensive firms separately report advertising expenditure, the evidence on the value relevance of advertising expenditure is at best limited. Lev and Sougiannis (1996) show that previous period advertising expenditure has a positive impact on current operating income. Chan, Lakonishok and Sougiannis (2001) find that firms with large advertising spending earn large abnormal returns in subsequent periods. Hirschey and Weygandt (1985), Woolridge (1988) and Chan, Martin and Kensinger (1990) show that advertising expenditure has a positive impact on the market value of a firm.

The above evidence suggests that R&D and advertising expenditure create long-lived intangible assets for a firm, although they are mandated to be expensed immediately. This mismatch between value-relevance and accounting treatment of R&D and advertising expenditure potentially causes the stock market to misprice R&D and advertising-intensive stocks. A natural question to ask is whether compensation committees understand the value-creating process of intangible assets and consequently design appropriate incentive contracts to induce those value-enhancing actions.

2.5 Performance Evaluation and Incentives

Empirical work on performance evaluation has investigated compensation weights placed on various components of earnings. Prior studies show that executive compensation contracts place different weights on various components of earnings because the different

components provide differential information about managerial actions. Clinch and Magliolo (1993) show that earnings components relate differently to CEO performance and the components are weighted differently in CEO compensation. Natarajan (1996) argues that shareholders use components of earnings in contracting when these components provide information over and above earnings itself. Dechow, Huson and Sloan (1994) show that executive cash compensation is adjusted for restructuring charges to enable CEOs value-enhancing restructuring actions. Kern and Leauby (1997) find that executive compensation is shielded from the income-decreasing effects related to mandatory changes in accounting principles. Gaver and Gaver (1998) show that CEO cash compensation is shielded from losses.

Duru, Iyengar and Thevaranjan (2002) investigate whether CEO compensation is shielded from income-decreasing effect of strategic expenditure such as R&D and advertising. They find that firms shield CEO cash compensation from R&D and advertising expenditure to induce CEOs' value-enhancing actions. Cheng (2004) examines whether compensation committees seek to prevent opportunistic reductions in R&D expenditure under two scenarios: (1) when the CEO approaches retirement, and (2) when the firm faces a small earnings decline or a small loss. He finds that change in R&D spending is positively associated with change in value of CEO option grants in the above two scenarios, but no significant association otherwise. This suggests that compensation committees design incentive contracts to mitigate potential opportunistic reductions in R&D expenditure.

One way to mitigate opportunistic reduction in R&D expenditure is to grant stock options and restricted stocks. Tying CEO compensation to stock options and restricted stocks help align CEOs' interests with shareholder value in the long run. A number of prior

studies have examined the determinants of the grant of new equity incentives. Smith and Watts (1992) find that the level of CEO stock-based compensation is positively associated with growth opportunities and firm size. Baber, Janakiraman and Kang (1996) provide evidence that total CEO compensation is positively related to firm performance. Yermack (1995), Matsunaga (1995), and Dechow, Hutton and Sloan (1996) find that firms grant more stock options when they have lower free cash flow and higher net operating loss carry-forwards. This is because firms with cash constraints are more likely to use stock options and restricted stocks to pay compensation. Furthermore, when future corporate tax rates are expected to be higher, firms will benefit more from future tax deduction through deferred compensation. Dechow, Hutton and Sloan (1996) also find that firms that are constrained with respect to earnings tend to grant more stock options. Core and Guay (1999) examine the influence of existing level of equity incentives on the decision to provide new equity incentives. They find that firms use equity grants to rebalance a CEO's equity portfolio equity incentives.

Collectively, the evidence in performance evaluation and incentive contracting literature shows that firms use both cash and stock-based compensation to induce managerial value-enhancing expenditure decisions. Cash compensation is shielded from the expense incurred by R&D and advertising expenditure. New grants of stock options and restricted stocks are used to induce managerial actions that increase shareholder value. A related question is whether these compensation schemes effectively lead to desired managerial expenditure decisions.

2.6 Managerial Expenditure Decisions

Prior studies provide mixed results on whether compensation schemes trigger the desired expenditure decisions. Larcker (1983) finds that firms adopting long-term performance plans exhibit a significant growth in capital expenditure compared to non-adopting firms. Eng and Margaret (2001) examine whether the adoption of long-term performance plans affects R&D spending. They find that the adoption of performance plans is not associated with subsequent R&D expenditure. Bens, Nagar and Wong (2002) find that managers shift resources away from R&D and capital expenditures towards stock repurchases to mitigate the EPS dilution effect when they exercise their stock options. Bizjak, Brickley and Coles (1993) show that firms with high information asymmetries between managers and shareholders place more emphasis on long-term contracts than on short-term contracts. However, they do not provide any evidence that this emphasis leads to desirable investment choices by managers. Dechow and Sloan (1991) find that equity incentives mitigate opportunistic reduction in R&D spending by departing CEOs. Cheng (2004) finds that compensation committees seek to prevent opportunistic reductions in R&D expenditures by adjusting option grants and this adjustment successfully mitigates R&D reductions when the firm faces horizon and managerial myopia problems. Holthausen, Larcker and Sloan (1995) show that future innovation is positively tied to the proportion of long-term compensation. But their measure of future innovation (number of patents granted) is an output measure of investment behavior that is influenced by a number of factors outside the control of managers. Overall, prior studies provide mixed evidence on whether long-term incentives lead to desirable investment behavior.

A major factor contributing to the mixed results in the literature is the varying levels of myopic managerial behavior. A number of theoretical papers argue that short-term reputational concerns may force managers to deviate from optimal investment policies and focus on short-run actions (Narayanan 1985a, 1985b, Stein 1989). Managerial myopia may arise from factors such as short-term trading by institutional investors, short-term focus of security analysts and very little information about long-run projects being impounded into security prices (Holden and Lundstrum 2005). Empirical evidence shows that transient institutional trading based on current earnings increases the likelihood that managers cut R&D to increase earnings (Bushee 1998). The opportunistic reduction in R&D spending is more likely to happen when CEOs approach retirement (Dechow and Sloan 1991) and when the firm faces a small earnings decline or a small loss (Baber, Fairfield and Haggard 1991). The presence of managerial myopic behavior is consistent the mixed results on whether long-term incentives lead to desirable investment behavior.

CHAPTER 3

RESEARCH HYPOTHESES

3.1 Value Creation of SG&A Expenditure

Prior studies on value relevance of intangible assets show that current operating income before R&D expense is positively impacted by R&D expenditure in the past four to seven years in R&D intensive industries. Moreover, financial statements adjusted for R&D capitalization and amortization are more highly associated with security prices than financial statements based on expensing current R&D (Lev and Sougiannis 1996 and Chambers, Jennings and Thompson 1998). Although R&D expenditure has a positive impact on the market value of a firm, investors do not seem to fully recognize the value-relevance of R&D expenditure when they are expensed immediately (Hirschey and Weygandt 1985, Woolridge 1988 and Chan, Martin and Kensinger 1990). Firms with high R&D spending earn large abnormal returns in subsequent periods (Lev and Sougiannis 1996, Chan, Lakonishok and Sougiannis 2001). These studies provide the economic rationale for capitalizing and amortizing R&D expenditure rather than immediately expensing it as required by SFAS No. 2.

Some studies on R&D expenditure also recognize that advertising expenditure may create an additional intangible asset. Previous period advertising expenditure has a positive impact on current operating income (Lev and Sougiannis 1996). Firms with large advertising spending earn large abnormal returns in subsequent periods. (Chan, Lakonishok and Sougiannis 2001).

I explore whether SG&A expenditure, i.e., SG&A expenditure excluding R&D and advertising expenditure, creates long-term value for a firm by studying the intertemporal relationship between current earnings and past SG&A spending. SG&A comprises expenditure to support several different activities. It contains both variable costs that change proportionately with sales volume and fixed costs that do not change with sales volume (Anderson, Banker and Janakiraman 2003, Anderson, Banker, Huang and Janakiraman 2005). Selling expenses include sales commissions, delivery expenses and promotion materials that usually vary with the level of sales. General and administrative expenses include top management's salaries and the cost of supporting staff departments such as information systems and legal services that tend not to vary with the level of sales (Stickney, Brown and Wahlen 2004). Other marketing expenditure in addition to advertising included in SG&A may create intangible assets via product promotion, brand development and distribution channel management. Many items in general and administrative expenditure contained in SG&A are also shown to have long-run impact on a firm's future performance. For example, operating performance is positively associated with lagged IT spending (Brynjolfsson and Hitt 2000). Expenditure on employee training or customer satisfaction systems also creates intangible assets that may be associated with future financial performance (Cleland and Bruno 1996, Ittner and Larcker 1998).

If the various components of SG&A expenditure impact only the current income, there would be no intertemporal relationship between future income and current SG&A expenditure. Such expiration of SG&A expenditure in the current period would support the GAAP requirement of immediate expensing of SG&A expenditure. On the other hand, if a positive relation exists between future income and current SG&A expenditure, then SG&A

expenditure creates a long-lived asset that should be capitalized and amortized over its life-time. Such a situation would be consistent with the EVA literature where marketing expenditure is capitalized and amortized to adjust GAAP earnings to EVA. Therefore, I state my first hypothesis in the alternative form as follows:

H1: There is a positive intertemporal relationship between future income and current SG&A expenditure.

3.2 Capital Market Implications of SG&A Expenditure

Next I investigate whether investors price SG&A expenditure as a value-creating asset. GAAP requires immediate expensing of SG&A in the income statement. Therefore if investors fixate on earnings (Sloan 1996), they would not price SG&A differently from the remaining part of earnings. In other words, they would view SG&A as an expense and give the same pricing coefficients to earnings before SG&A and the negative of SG&A (i.e. investors penalize positive SG&A surprise as much as they penalize negative earnings surprise). However if investors conjecture SG&A conveys information about future profitability over and above current earnings, they would differentiate SG&A from the remaining components of earnings. The pricing coefficient on the negative of SG&A expenditure should be lower than the pricing coefficient on earnings before SG&A if investors view a part of SG&A as an asset. In other words, investors would penalize positive unexpected SG&A less than they penalize negative unexpected earnings because they conjecture that the positive unexpected SG&A creates some long-term value for the firm. Therefore, I state my second hypothesis in the alternative form as follows:

H2: The stock market places a lower pricing coefficient on the negative of SG&A expenditure than the pricing coefficient it places on earnings before SG&A.

H2a: The negative association between price and SG&A expenditure is lower when SG&A creates relatively greater future value.

3.3 Executive Compensation Implications of SG&A Expenditure

A further question I examine is whether the stock market is efficient in pricing SG&A expenditure. If the market efficiently prices the information contained in SG&A, I would not find any significant abnormal returns earned on any SG&A portfolios in the subsequent periods. If SG&A is a value-creating asset and the market fully recognizes the asset implication, I would not see any future abnormal returns earned on the SG&A portfolios where SG&A creates relatively greater future value. Therefore I state my hypothesis 3 as follows:

H3a: No significant abnormal returns can be earned in subsequent periods on any SG&A portfolios.

H3b: No significant abnormal returns can be earned in subsequent periods on SG&A portfolios that create relatively high future value.

Prior research has examined how compensation contracts help mitigate the agency problem embedded in investment decisions pertaining to capital expenditure (Larcker 1983) and research and development expenditure (Sanjay and Bailey 2001), but the implications for investment in SG&A expenditure have not yet been explored adequately. In this dissertation, I examine whether compensation committees recognize the intangible asset created by SG&A expenditure. Prior studies show that executive compensation contracts place different

weights on various components of earnings because they provide differential information about managerial actions (Clinch and Magliolo 1993, Natarajan 1996, Dechow, Huson and Sloan 1994, Kern and Leauby 1997, Gaver and Gaver 1998). When accounting earnings is used as a performance measure, managers have an incentive to cut long-term investment in order to boost short-term earnings (Murphy 1999, Dechow and Skinner 2000). When stock price is also used as a performance measure, managers may still reduce spending in intangible assets (Cheng 2004) because investors may undervalue firms investing heavily in intangible assets as greater uncertainties and higher information asymmetry are associated with these investments (Kothari, Laguerre and Leone 2002, Clinch 1991). This implies that executives may sacrifice the firm's long-term value for short-term benefits by cutting investment in SG&A expenditure. As a performance measure, SG&A expenditure may provide additional information over and above earnings and stock price about executive actions in controlling current expenses and investing in future assets. If the compensation committee recognizes the asset value created by SG&A, I would expect that while the compensation contract penalizes spending on SG&A to control expenses, the negative association between compensation and SG&A is lower when it is more important to prevent opportunistic reduction of investment in intangible SG&A asset.

H4: The change in executive compensation is negatively associated with the change in SG&A expenditure; however, this negative association is lower when the current SG&A expenditure creates relatively greater future value.

3.4 Managerial Decisions on SG&A Expenditure

3.4.1 SG&A Future Value Creation

Throughout this paper, I maintain the assumption that the ability of current SG&A expenditure to generate future value varies across firms. This assumption is motivated by the observation that a firm's business positioning determines the importance of long-term investments in achieving their desired corporate goals.[2] In the context of SG&A activities, companies focusing on short-term value drivers may spend heavily on sales commissions, price discounts and promotion materials. The economic benefits generated by these activities expire in the short-term (Stickney, Brown and Wahlen 2004). On the other hand, firms emphasizing long-term value drivers may invest extensively in advertising, marketing, R&D, information technology, human capital and customer relationship improvement. These activities lead to the creation of assets that generate value over an extended future period (Brynjolfsson and Hitt 2000; Cleland and Bruno 1996; Hauser, Simester and Wernerfelt 1994; Ittner and Larcker 1998; Banker, Potter and Srinivasan 2000).

Anecdotal evidence suggests that the relative emphasis on different components of SG&A expenditure varies significantly across firms. In mature industries with a stable environment, focusing on short-term activities such as improving cost structure and reducing working capital is important. For instance, in the first quarter of 2002 General Motors (GM) reported $88 million in SG&A associated with reducing manufacturing capacity, restructuring the dealer network and redefining its marketing strategy in Europe to achieve a "strengthened and optimized sales structure" and a "revitalized brand" (GM 10-K report for

fiscal year 2002). In contrast, firms in industries operating in a volatile environment and facing uncertain demand focus on long-term activities such as strengthening customer relationships, improving supply chain management and investing in information technology (Kaplan and Norton 2000). For example, Costco reported that "selling, general and administrative expenses as a percent of net sales increased to 8.71% during fiscal year 2000 from 8.67% during fiscal year 1999, primarily reflecting higher expenses associated with international expansion, the rollout of certain ancillary businesses and an increase in credit card merchant fees associated with the rollout of a new co-branded credit card program" (Costco 10-K report for fiscal year 2000). Anecdotal evidence such as the above suggests that the future value created by SG&A for a firm depends on its operating environment and external factors such as demand volatility and competition that are not under the control of management. Therefore in this paper I focus on managers' decisions about the amount of SG&A spending assuming that the allocation to different SG&A activities is dictated by the firm's operating environment and long-term strategy.

3.4.2 Equity Incentives and New Investments in SG&A

The first research question I examine is whether the association between new equity incentives and subsequent changes in SG&A expenditure is influenced by the future-value creating potential of SG&A. While there is evidence that the implementation of incentive plans leads to increase in sales force productivity (Banker, Lee, Potter and Srinivasan 2000), very little evidence exists on whether new incentive grants motivate desired investment

[2]Porter (1980) postulates that competitive environment and market structure influence corporate strategy and that some industries rely heavily on short-term value drivers while others emphasize a long-term growth perspective.

behavior of executives. Much of prior research has documented an on-average positive association between the level of long-term incentives and the level of long-term investments across firms. However, the evidence is mixed on whether new grants of long-term incentives induce managers to invest in activities that generate long-term value.

Prior studies that have examined whether new incentive grants lead to long-term investments have primarily focused on capital expenditure and R&D expenditure (Larcker 1983, Eng and Margaret 2001, Bens, Nagar and Wong 2002). The results are mixed in terms of whether long-term incentives lead to long-term investment. The mixed results may come from the presence of myopic managerial behavior in firms (Bushee 1998, Dechow and Sloan 1991, Baber, Fairfield and Haggard 1991).

Myopic behavior is less likely to dominate in firms where incremental long-term investments can generate sufficiently high future value to outweigh the short-term benefits from myopic behavior. Therefore, I argue that the extent to which long-term incentives affect managers' expenditure decisions depends on the future value creation by SG&A that varies across firms. In those firms where SG&A creates high future value, managers will respond to new equity grants by increasing their SG&A expenditure since they expect to receive greater payoffs when larger benefits from SG&A are realized in the future. Consequently, I expect to see an increase in SG&A spending as a result of new grants of equity incentives in these companies. In firms where SG&A creates low future value, managers will not increase SG&A spending to maintain or increase their short-term earnings-related compensation since they do not expect to sacrifice any significant future benefits by curtailing SG&A.

Summarizing the above arguments, I state the fifth hypothesis in the following alternative form:

H5: New grants of long-term incentives lead to an increase in SG&A spending when SG&A creates high future value.

3.4.3 SG&A future value and new equity grant decisions

Next I examine the implications of SG&A future value creation on firms' decisions to grant new equity incentives. A number of prior studies have examined the determinants of decisions to grant equity incentives. Gaver and Gaver (1993) and Baber, Janakiraman and Kang (1996) provide evidence consistent with the arguments in Demsetz and Lehn (1985) and Smith and Watts (1992) that firms pay high equity compensation when they expect high growth opportunities. Core and Guay (1999) examine the influence of existing level of equity incentives on the decision to provide new equity incentives. They find that firms use equity grants to rebalance CEOs' portfolio of equity incentives.

In addition to previously identified determinants of new equity grants, I also hypothesize that the SG&A spending intensity will have a significant positive association with new equity incentives, especially in those firms where SG&A activities have the potential to generate high future value. Since SG&A expenditure creates growth opportunities and future benefits for a firm, I argue that variations in the potential future value of SG&A should explain differences in firms' decisions to grant new equity. If a firm's operating environment is such that SG&A creates high future value, it is likely to grant additional equity incentives to motivate further investment in SG&A to exploit emerging growth opportunities. For example, a firm operating in a growing market may perceive

spending in advertising, R&D, mergers and acquisitions, improving customer service or enhancing distribution networks as creating new opportunities. As a result, it may expect higher future benefits from SG&A spending and design incentive schemes to induce managers to further increase the spending in SG&A in order to realize emerging opportunities.

Summarizing the above arguments, I state the sixth hypothesis in the alternative form in the following way:

H6: Ceteris paribus, firms grant more new equity incentives when SG&A creates high future value.

CHAPTER 4

RESEARCH MODEL, DATA AND SAMPLE

4.1 Value-Creation of SG&A Expenditure

I specify the following relationship between earnings before and SG&A and expenditure on SG&A (Lev and Sougiannis 1996):[3]

$$E_{it} = f(TA_{it,} SG\ \&\ A_{i,t-k};\ k = 1...k_S)$$

where E_{it} is earnings of firm i in period t, TA_{it} is total tangible assets, *SG&A* is selling, general and administrative expenditure excluding research and development expenditure and advertising expenditure, and k_S represent the number of years of lagged SG&A expenditure.

My measure for earnings E_{it} is operating income before depreciation and SG&A expenditure (OI). I deflate the variables by total assets (TA) to mitigate a possible heteroscedasticity problem:[4]

$$\left(\frac{OI}{TA}\right)_{i,t} = \alpha_0 + \alpha_1\left(\frac{1}{TA}\right)_{i,t-1} + \sum_{k=0}^{n}\alpha_{2,k}\left(\frac{SG\&A}{TA}\right)_{i,t-k} + \sum_{d}\alpha_{3,d}\,Industrydummies + e_{i,t} \qquad (1)$$

Equation (1) suffers from a potential simultaneity problem if a shock to the residuals affects both the dependent variable and some of the independent variables. I apply the instrumental variable method using a two-stage least squares (2SLS) regression to mitigate the simultaneity problem (Lev and Sougiannis 1996). The instruments used in a 2SLS regression

[3] We repeat our analysis by including current R&D, past four years of R&D, current advertising and past advertising and obtain similar results.

[4] Lev and Sougiannis (1996) use total sales as a deflator. We use total assets instead of total sales because both SG&A and R&D can contribute to increasing sales and deflating by sales would eliminate some of this effect of SG&A and R&D on increasing income (e.g., Peles 1970, Leone and Schultz 1980, Joshi and Hansses 2005).

should be uncorrelated with regression residuals while correlated with the original independent variables. I choose industry SG&A as instruments since industry variables are correlated with original firm-level variables while uncorrelated with firm-specific shocks contained in the residual. In the first stage, for each year and two-digit industry, SG&A expenditure (deflated by total assets) is regressed on the average SG&A expenditure (deflated by total assets) of the other firms in its four-digit SIC code:

$$\left(\frac{SG\&A}{TA}\right)_{i,t} = a + b\left(\frac{SG\&A}{TA}\_\_Industry\right)_{i,t} + u_{i,t} \qquad (2)$$

I use the predicted value of $(SG\&A/TA)_{i,t}$ from equation (2) as an instrument. In the second stage, I estimate model (1) with the instruments of $(SG\&A/TA)_{i,t}$, substituting for their actual values (Lev and Sougiannis 1996).

I estimate equation (1) cross-sectionally allowing industry fixed effects at two-digit SIC code level (Hanlon, Rajgopal and Shevlin 2003). Estimation of equation (1) involves estimating a stream of coefficients on current and past SG&A. I use an unrestricted finite distributed lag model to estimate the number of lags and the coefficient on each lag of SG&A. The model selection is based on the Akaike Information Criterion (AIC) and the Schwartz Bayesian Criterion (SBC). An unrestricted distributed lag model has the advantage of not assuming any specific structure of coefficients compared with distributed lag models such as Almon lag and Koyck lag models. In general, an unrestricted distributed model may suffer from multicollinearity among different lags of independent variables, but this problem is much less severe with panel data estimation because more information is available for obtaining the average coefficients among firms (e.g., Greene 2001, pp. 719). If, on average,

SG&A expenditure creates long-term value as stated in hypothesis 1, I expect to see a positive series of $\alpha_{2,k}$ for several years before the current period.

4.2 Stock Returns and SG&A Expenditure

4.2.1 Contemporaneous Stock Returns and SG&A Expenditure

To further examine whether the stock market places a higher pricing coefficient on SG&A when SG&A creates higher asset value, I estimate the following equation:

$$R_{i,t} = \gamma_0 + \gamma_1 \frac{(OI_t - OI_{t-1})}{MV_{t-1}} + \gamma_2 \frac{(SG\&A_t - SG\&A_{t-1})}{MV_{t-1}} + \gamma_3 \frac{(SG\&A_t - SG\&A_{t-1})}{MV_{t-1}} * SG\&A\ futu\ re\ value + e_{i,t} \quad (3)$$

where *SG&A future value* is a measure of the future benefit-creating ability of SG&A expenditure. It is defined as the ratio of the sum of discounted coefficients on past SG&A over the sum of discounted coefficients on current and past SG&A ($\sum_{k=1}^{n} \frac{\alpha_{2,k}}{(1.1)^k} / \sum_{k=0}^{n} \frac{\alpha_{2,k}}{(1.1)^k}$). It gives the total impact of $1 current SG&A spending on future operating income before SG&A. To obtain the firm-year estimates of *SG&A future value*, I first estimate an optimal SG&A lag structure for each two-digit SIC industry using industry-specific time-series data starting from 1970. Based on the optimal lag structure of each two-digit SIC industry, I estimate firm-year specific *SG&A future value* using a rolling window time-series data starting from 1970. For example, to estimate *SG&A future value* for firm i of year 1992, I use the time-series data of firm i from 1970 to 1992. In support of hypothesis 2b, I expect γ_3 to be positive, indicating that the association between stock returns and SG&A expenditure is less negative when SG&A creates a relatively higher future value.

4.2.2 Future Stock Returns and SG&A Expenditure

I test my third hypothesis by examining excess returns earned on SG&A portfolios for up to three years after portfolio formation (e.g., Sloan 1996, Abarbanell and Bushee 1998). Consistent with hypothesis 2, I form portfolios based on change in SG&A (deflated by total assets) to capture the unexpected portion of SG&A (Eberhart, Maxwell and Siddique 2004). In support of hypothesis 3a, I expect that no excess returns can be detected in the future periods since investors may have already priced the information contained in SG&A efficiently. However, if positive excess returns are earned by the highest SG&A (deflated by total assets) portfolio, investors either did not understand that SG&A expenditure creates asset value or they failed to adjust price fully to reflect the asset value of SG&A when information on SG&A investment was disclosed. On the other hand, if negative excess returns are earned by highest SG&A (deflated by total assets) portfolio, investors evaluated SG&A as an asset when it was really an expense or investors under-penalized the firms with high SG&A spending in the current period

To examine whether investors fully recognize the asset value created by SG&A, I form portfolios based on change in SG&A interacted with *SG&A future value*. When *SG&A future value* is high, SG&A contains higher asset value and visa versa. In support of hypothesis 3b, I would not expect to find any significant returns earned on the SG&A portfolios that creates high future value since investors may have correctly priced the asset value created by SG&A.

I use the 2004 Compustat annual file covering firm-year observations from 1970 to 2004. Following Lev and Sougiannis (1996), I require at least four other firms in the four-digit SIC group to obtain the instruments for actual SG&A. If there are less than four other

firms in the same four-digit SIC group, I re-define the industry at the three-digit SIC level. I also require at least 20 firms in each two-digit SIC and year combination. Finally, I remove those observations with operating income before depreciation (scaled by total assets) and SG&A (scaled by total assets) that lie in the top or the bottom 1% of yearly distributions to mitigate possible outlier problems (Chen and Dixon 1972). The final sample contains 121,445 observations from 1970 to 2004. Table 1 presents descriptive statistics on the characteristics of sample observations. Sales, operating income before depreciation, total assets and SG&A all exhibit a wide range of variation. I also provide R&D and advertising data for comparison purposes.[5] R&D and advertising are small in comparison with SG&A. The mean (median) value of SG&A is $150 ($14) million, much higher than the $22 ($0) million mean (median) value of R&D, and the $11 ($0) million mean (median) value of advertising. The mean value of SG&A to total assets ratio is 27% while the mean value of the R&D to total assets ratio is only 3% and the mean value of the advertising to total assets ratio is only 2%.

4.3 Executive Compensation and SG&A Expenditure

To investigate the extent to which the executive labor market recognizes the asset value created by SG&A expenditure, I obtain data from Compustat 2004, CRSP 2004 and ExecuComp 2004. I impose the following restrictions on the sample: (1) No change in the CEO during the year and (2) the CEO served in the same company for at least two

[5] R&D and advertising expenditure are set to zero if they are missing or reported as immaterial.

consecutive years. I winsorize all variables at the top and bottom 1% level of yearly distributions. The final sample contains 5,261 CEO-year observations and 692 firms from

Table 1 Descriptive statistics on sample firms

	Mean	STD	Q1	Median	Q3
Total sales ($million)	1,023	5,451	20	80	356
Operating income before depreciation ($million)	145	796	1	8	43
Total assets ($million)	1,837	15,749	20	84	429
SG&A ($million)	150	731	4	14	57
R&D ($million)	22	201	0	0	2
Advertising ($million)	11	97	0	0	0
Operating income before depreciation, SG&A, R&D and advertising/Total assets	38%	0.27	18%	34%	52%
SG&A/Total assets	27%	0.58	9%	20%	35%
R&D/Total assets	3%	0.11	0%	0%	3%
Advertising/Total assets	2%	0.13	0%	0%	1%

1993 to 2004. I consider two performance measures: the change in operating income before depreciation and SG&A (deflated by total assets), the change in SG&A (deflated by total assets) (Sloan 1993). The Spearman correlation between the past change in SG&A and the current change in SG&A is only -0.03. Therefore, ignoring the past changes in SG&A in my model is not likely to cause a serious correlated omitted variable problem.

To evaluate whether the executive labor market recognizes the asset value created by SG&A, I use the following model:

$$\Delta \log(COMP)_{i,t} = \gamma_0 + \gamma_1\left(\frac{OI_{i,t}}{TA_{i,t}} - \frac{OI_{i,t-1}}{TA_{i,t-1}}\right) + \gamma_2\left(\frac{SG\&A_{i,t}}{TA_{i,t}} - \frac{SG\&A_{i,t-1}}{TA_{i,t-1}}\right) + \gamma_3\left(\frac{SG\&A_{i,t}}{TA_{i,t}} - \frac{SG\&A_{i,t-1}}{TA_{i,t-1}}\right) * SG\&A\ future\ value_{i,t} + \gamma_4 RET_{i,t} + e_{i,t} \quad (4)$$

For firms with low future value created by SG&A, I expect executive compensation to be negatively related to SG&A ($\gamma_2 < 0$). The negative coefficient may more than offset the positive coefficient (γ_1) on the operating income before SG&A to induce control of SG&A expense. On the other hand, I expect this negative association to be lower when current SG&A creates relatively greater future value and, therefore, I expect $\gamma_3 > 0$.

I consider salary, bonus, equity compensation and total compensation to estimate equation (4). Equity compensation is the total value of restricted stock granted and the total value of stock options granted (using Black-Scholes model adjusted for dividends). Total compensation comprises salary, bonus, and other annual payments, the total value of restricted stock granted, the total value of stock options granted (using Black-Scholes model adjusted for dividends), long-term incentive and all other payouts.

4.4 Equity Incentives and Managerial Decisions on SG&A Expenditure

4.4.1 Equity incentives and new investments in SG&A

I use the following model to test whether managers increase SG&A spending in response to new grants of long-term incentives when SG&A creates high future value.

$$\begin{aligned}(SG\&A/AVGTA)_{i,t} = {} & \gamma_0 + \gamma_1\,(New\ incentive\ grant)_{i,t-1} * SG\&A\ future\ value_i \\ & + \gamma_2\,(New\ incentive\ grant)_{i,t-1} + \gamma_3\,E(SG\&A/AVGTA)_{i,t} \\ & + \gamma_4\,Log\,(SALES)_{i,t} + \gamma_5\,SGAOPCASH_{i,t} + \gamma_6\,BM_{i,t} \\ & + \gamma_7\,\Delta Log(SALES)_{i,t} + \gamma_8\,RET_{i,t} + \gamma_9\,STDSALES_{i,t} \\ & + \Sigma\gamma_j\,Industrycontrol_j + \Sigma\gamma_k\,Yearcontrol_k + e_{i,t} \quad (5)\end{aligned}$$

In the above specification, I expect γ_1 to be significantly positive in support of hypothesis 1, consistent with the notion that SG&A spending in response to new equity grants is high in companies where SG&A value creation is high. For any given *SG&A future value*, the sensitivity of SG&A spending intensity to a unit change in new incentive grant in the above specification is γ_1 * *SG&A future value* + γ_2. The regression coefficients γ_1 and γ_2 can be used to evaluate this sensitivity at various levels of *SG&A future value*. While there is no prior expectation on the sign of γ_2, I do expect γ_1 to be positive and the relative magnitudes of γ_1 and γ_2 to be such that the estimated sensitivities for sample firms characterized by "high" *SG&A future value* estimates are positive, implying that a higher level of new incentives results in a higher level of new SG&A investments for these firms.

I estimate equation (5) using OLS for a pooled sample from 1993 to 2004 with one-digit SIC industry and year fixed effects. I use Huber-White robust standard errors to correct for both serial correlation and heteroscedasticity (Rogers 1993). *AVGTA* is the average of beginning and ending-year total assets. *SG&A/AVGTA* is the actual level of spending of SG&A in current year (deflated by average total assets). *New incentive grant* is the sum ($thousands) of the sensitivity of new grants of stock options and the sensitivity of restricted stock provided during the fiscal year to a 1% change in stock price (deflated by average total assets ($millions)) (Core and Guay 1999). The sensitivity measure approximates the change in CEO's personal wealth tied to the change in firm value or shareholder wealth. It is more appropriate than the dollar amount of new grants as it captures the long-term incentives provided to CEOs (Jensen and Murphy 1990; Yermack 1995).

To investigate how managers' SG&A spending decisions change in response to new grants of equity incentives, I need to control for the expected level of SG&A spending. I use the following model to obtain the expected level of SG&A spending (Anderson, Banker and Janakiraman 2003):

$$log(SG\&A_{i,t}/SG\&A_{i,t-1}) = \alpha + \beta_1 log(SALES_{i,t}/SALES_{i,t-1}) + \beta_2 log(SALES_{i,t}/SALES_{i,t-1}) * SALES\ decrease\ dummy_{i,t} + \varepsilon_{i,t} \quad (6)$$

Equation (6) captures how SG&A varies with sales as well as the "sticky" behavior of SG&A. The "sticky" behavior of SG&A indicates that SG&A costs do not decrease as much when sales decline as they increase when sales increase. Equation (6) is estimated using firm-specific time-series data. I require at least ten observations for each firm-specific time-series and at least 3 observations with sales declining. The expected level of SG&A spending, $E(SG\&A/AVGTA)_{it}$, is $e^{p} * SG\&A_{i,t-1}$, where p is the predicted value from estimation of equation (4).

I define additional control variables as follows. *Log (SALES)* is the natural logarithm of total sales and controls for firm size (Smith and Watts 1992). While large firms are engaged in production and marketing activities (Holmstrom 1989), their centralized decision-making and bureaucratic procedures are also likely to inhibit innovation activities such as R&D (Holthausen, Larcker and Sloan 1995). Thus, the relationship between SG&A spending intensity and firm size is ambiguous. *SGAOPCASH* is a proxy for available cash measured as cash from operations plus SG&A expenditure (deflated by total assets). I expect it to be positively associated with SG&A spending since managers are more likely to invest when more resources are available for investment (Cleary 1999; Fazzari, Hubbard and Petersen 1988). *BM* is (book value of assets)/(book value of liabilities + market value of equity) and

proxies for investment opportunities. I expect it to be negatively associated with SG&A spending as firms with more investment opportunities are more likely to invest (Kaplan and Zingales 1997). *Δlog(SALES)* is the change in the natural logarithm of total sales from the prior year and controls for growth (Bens, Nagar and Wong 2002). *RET* is the one year holding period return on an investment in the firm's common stock and proxies for stock price performance. I expect it to be negatively related to SG&A spending as the stock market penalizes firms with an unexpected increase in SG&A expenditure (Lev and Thiagarajan 1993; Anderson, Banker, Huang and Janakiraman 2006). *STDSALES* is the standard deviation of sales revenue over the five years prior to the event year divided by the mean of sales revenue over the five years prior to the event year and captures demand volatility and life-cycle stage of the firm. I expect it to be positively related to SG&A spending since less mature firms are more likely to make long-term investments to stay competitive (Acs and Audretsch 1987).

4.4.2 SG&A future value and new equity grant decisions

I use the following specification to examine how SG&A value creation affects firms' grant decision of new equity incentives:

$$\begin{aligned}(\textit{New incentive grant})_{i,t} = {} & \delta_0 + \delta_1 (SG\&A/AVGTA)_{i,t-1} * SG\&A\ \textit{future value}_i \\ & + \delta_2 (SG\&A/AVGTA)_{i,t-1} + \delta_3\, \textit{Portfolio equity incentives}_{i,t-1} \\ & + \delta_4\, BM_{i,t-1} + \delta_5\ SGAOPCASH_{i,t-1} + \delta_6\, DIVCONSTRAINT_{i,t-1} \\ & + \delta_7\ RET_{i,t} + \delta_8\ RET_{i,t-1} + \Sigma\delta_j\ Industrycontrol_j + \Sigma\delta_k\ Yearcontrol_k \end{aligned} \quad (7)$$

In this specification, I expect δ_1 to be significantly positive in support of hypothesis 2, consistent with the notion that for a given level of SG&A spending intensity, high levels of

new equity grants are provided in companies where SG&A value creation is high. For any given *SG&A future value*, the sensitivity of new incentives to a unit change in SG&A spending intensity is δ_1 * *SG&A future value* + δ_2. The regression coefficients δ_1 and δ_2 can be used to evaluate this sensitivity at various levels of *SG&A future value*. I expect that the relative magnitudes of δ_1 and δ_2 are such that the estimated sensitivity for sample firms characterized by "high" *SG&A future value* estimates are positive.

OLS estimation of (7) will result in biased estimates (e.g., Greene 2000, pp. 927-933; Maddala 2001, pp. 333-336) since many observations have new grant value of zero. Therefore, following the prior literature on new incentive grants (Yermack 1995; Core and Guay 1999), I estimate equation (7) using a Tobit model for a pooled sample from 1993 to 2004 with one-digit SIC industry and year fixed effects.

I also include additional control variables that have been documented to determine the grant size. *Portfolio equity incentives* measures CEOs' holdings of equity incentives. It is defined as the sensitivity of the total value ($thousands) of stock and options held by the CEO to a 1% change in stock price measured at fiscal-year end (deflated by average total assets ($millions)). I use the one-year approximation method to estimate option portfolio sensitivity (Core and Guay 2002). *Portfolio equity incentives* can be negatively related to new grants of equity incentives as firms use new grants to adjust to the optimal level of equity holdings (Core and Guay 1999). On the other hand, given the fact that the existing level of equity holdings could be highly correlated with firm's growth opportunities and growth firms tend to grant more stock options (Anderson, Banker and Ravindran 2000), it is likely that new grants of equity incentives are positively related to existing level of equity holdings. *BM* is the ratio of (book value of assets) / (book value of liabilities + market value

of equity) measured at the end of fiscal year and expected to be negatively associated with new grants of equity incentives (Smith and Watts 1992; Gaver and Gaver 1993; Baber, Janakiraman and Kang 1996). *SGAOPCASH* is a proxy for the availability of cash flow and expected to be negatively associated with new grants of equity incentives since firms with more available cash tend to pay higher cash compensation and lower equity compensation (Jensen 1986; Himmelberg, Hubbard and Palia 1999). *DIVCONSTRAINT* is an indicator equal to one if the firm is dividend constrained in any of the three previous years. It is expected to be positively associated with new grants of equity incentives since firms that are dividend constrained use stock-based compensation instead of cash. I categorize a firm as dividend constrained if [(retained earnings at year-end + cash dividends and stock repurchases during the year) / the prior year's cash dividends and stock repurchases] is less than two. If the denominator is zero for all three years, I also categorize the firm as dividend constrained (Dechow, Hutton and Sloan 1996). RET_t and RET_{t-1} proxy for firm performance and are expected to be positively associated with new grants of equity incentives (Baber, Janakiraman and Kang 1996).

This Tobit estimation does not consider the self-selection problem where firms choose simultaneously whether to make a grant and how much to grant. To address this issue, I check the robustness of my results by applying the Heckman two-stage estimation procedure that uses the following model (Heckman 1979):

$$z_i^* = \gamma w_i + u_i \tag{8}$$

$$y_i = \beta x_i + \varepsilon_i \tag{9}$$

where y_i is only observed when the latent variable z_i^* is greater than zero. The vector of variables w_i contains determinants of whether to make a grant and the vector of variables x_i

contains determinants of grant size. The Heckman two-stage estimation procedure involves first estimating a probit model of equation (8) and then estimating an OLS model of equation (9). I provide both Tobit estimation results and the Heckman two-stage estimation results for comparison.

CHAPTER 5

EMPIRICAL RESULTS

5.1 Value Creation of SG&A Expenditure

5.1.1 Future Earnings and SG&A Expenditure

Table 2 shows the results of estimating the impact of a stream of past SG&A expenditure on current income. I present the mean coefficients from the second-stage estimation of year-by-year cross-sectional regression of equation (1) using instrumental variables. For each year between 1975 and 2004, I estimate equation (1) using all available data starting from 1970. I examine different lags of SG&A to identify the optimal unrestricted distributed lag model. In analysis not reported here, I compare AIC, SBC, adjusted R^2 and coefficients for different models ranging from no lags of SG&A (current SG&A) to seven lags of SG&A. I choose five lags of SG&A because all the coefficients are positive and significant ($\alpha_{2,0} = 0.326$, $\alpha_{2,1}$ =0.18˝, $\alpha_{2,2} = 0.155$, $\alpha_{2,3} = 0.101$, $\alpha_{2,4} = 0.144$, $\alpha_{2,5} = 0.252$), R^2 is the highest (0.38), and AIC and SBC are the lowest or close to the minumum (AIC = -3.23 and SBC = -3.13). If I include more lags as in a six-lag or a seven-lag model, some of the coefficients are not significant. The coefficient $\alpha_{2,k}$ means \$1 spending on SG&A in year t-k results in \$ $\alpha_{2,k}$ impact on current income. The sum of coefficients $\alpha_{2,k}$ is 1.165. Overall, table 2 provides support for hypothesis 1 by showing positive and significant coefficients on a series of current and past

SG&A in equation (1). On average, SG&A is a value-creating asset that has a six-year life cycle.

Table 2 Impact of lagged SG&A on return on assets

$$\left(\frac{OI}{TA}\right)_{i,t} = \alpha_0 + \alpha_1\left(\frac{1}{TA}\right)_{i,t-1} + \sum_{k=0}^{n}\alpha_{2,k}\left(\frac{SG\ \&\ A}{TA}\right)_{i,t-k} + \alpha_{3,d}Industrydummies + e_{i,t} \quad (1)$$

	Mean coefficient (Fama-MacBeth t-stat)
α_0	0.066 (12.39)
α_1	0.033 (2.14)
Lagged impact of SG&A	
$\alpha_{2,0}$	0.326 (9.99)
$\alpha_{2,1}$	0.187 (4.93)
$\alpha_{2,2}$	0.155 (3.96)
$\alpha_{2,3}$	0.101 (2.89)
$\alpha_{2,4}$	0.144 (4.17)
$\alpha_{2,5}$	0.252 (7.07)
Total impact of SG&A ($\sum\alpha_{2,k}$)	1.165
Adjusted R^2	0.38

Notes:
The above table shows mean coefficients of year-by-year cross-sectional regressions over the years 1975-2004, using unrestricted distributed lag model with instrumental variables. OI is operating income before depreciation and SG&A (Compustat annual item #13+ #189 - #46 - #45). TA is total assets (Compustat annual item #6). SG&A is selling, general and administrative expenditure excluding R&D and advertising expenditure (Compustat annual #189-#46-#45). I apply the instrumental variable method by using a two-stage least squares regression. In the first stage, for each year and two-digit industry, SG&A (deflated by assets) is regressed on the average SG&A (deflated by assets) of the other firms in the same industry defined using four-digit SIC code:

$$\left(\frac{SG\ \&\ A}{TA}\right)_{i,t} = a + b\left(\frac{SG\ \&\ A\_Industry}{TA}\right)_{i,t} + u_{i,t} \quad (2)$$

In the second stage, model (1) is estimated with the predicted value of $(SG\&A/TA)_{i,t}$ from equation (2), substituting for the actual value of $(SG\&A/TA)_{i,t}$. Coefficient estimates on two-digit SIC industry dummies are suppressed.

I also estimate the unrestricted distributed lag model separately for each two-digit SIC industry. Table 3 provides coefficient estimates from industry-by-industry pooled regressions of current operating income before depreciation, SG&A, R&D and advertising on lagged SG&A and R&D. I use industry-by-industry pooled specification with year dummies on intercept to ensure sufficient degrees of freedom for each regression. There is considerable variation in the total impact of lagged SG&A on current income. Observe that in the Oil and Gas Extraction industry (two-digit SIC code=13) the total impact of SG&A is low (0.014) and the lag structure does not persist into the previous years. A similar pattern exists for some other industries such as the Fabricated Metal Products industry (two-digit SIC code =34; total impact of SG&A on income = 0.401) and Machinery, (Except Electrical) industry (two-digit SIC code = 35; total impact of SG&A on income =0.117). These industries are not consumer oriented and require less marketing expenditure. In contrast, the Retail-household industry (two-digit SIC code = 57) has a high total impact of SG&A on income (=2.171) and a long estimated lag structure persisting into 5 lags. This is possibly due to the importance of SG&A costs to maintain customer relationship. Similarly, the Cars industry (two-digit SIC code = 37; total impact of SG&A on income =1.121), the Restaurants industry (two-digit SIC code = 58; total impact of SG&A on income = 1.021) and the Service-Accounting, R&D industry (two-digit SIC code = 87; total impact of SG&A on income =1.864) all have high total impact of SG&A on income. This may be because brand reputation and distribution channels are important intangible assets in enhancing future profitability in these industries. Overall table 3 provides additional support for hypothesis 1 by showing that there is a systematic cross-sectional variation in the intangible asset created by SG&A.

Table 3 Industry-specific impact of lagged SG&A on return on assets

Two-digit SIC code	Industry	$\alpha_{2,0}$	$\alpha_{2,1}$	$\alpha_{2,2}$	$\alpha_{2,3}$	$\alpha_{2,4}$	$\alpha_{2,5}$	$\alpha_{2,6}$	$\alpha_{2,7}$	$\sum_{k=0}^{n} \frac{\alpha_{2,k}}{(1.1)^k}$	Adj R^2
13	Oil	0.014								0.014	0.07
17	Constr	0.879	0.455							1.293	0.29
20	Food	0.338	0.564							0.850	0.05
22	Textile	0.377	0.595							0.917	0.06
23	Apparel	0.501	0.288							0.763	0.02
24	Wood	0.444	0.348	0.204						0.929	0.11
25	Chair	0.489	0.507							0.950	0.03
26	Paper	1.068								1.068	0.29
27	Printing	0.455	0.135	0.229	0.250	0.406				1.232	0.10
28	Chems	0.637	0.232	0.347	0.488					1.502	0.32
30	Rubber	0.500	0.255	0.379						1.045	0.04
31	Leather	0.879	0.506							1.340	0.25
32	Glass	0.348	0.475	0.231						0.971	0.09
33	Metal	0.452	0.298	0.280						0.954	0.14
34	Mtlpr	0.401								0.401	0.04
35	Machn	0.117								0.117	0.04
36	Elctr	0.140	0.148	0.142	0.189	0.204	0.219			0.808	0.09
37	Cars	0.368	0.309	0.414	0.172					1.121	0.05
38	Instr	0.399	0.272							0.646	0.06
39	Manuf	0.535	0.571	0.646	0.500	0.589	0.487	0.384		2.885	0.04
44	WaterTrans	0.848	0.384							1.197	0.44
45	AirTrans	0.222	0.230	0.339	0.440	0.254	0.270			1.383	0.32
48	Phone	0.189	0.110							0.288	0.02

Table 3 Continued

Two-digit SIC code	Industry	$\alpha_{2,0}$	$\alpha_{2,1}$	$\alpha_{2,2}$	$\alpha_{2,3}$	$\alpha_{2,4}$	$\alpha_{2,5}$	$\alpha_{2,6}$	$\alpha_{2,7}$	$\sum_{k=0}^{n} \frac{\alpha_{2,k}}{(1.1)^k}$	AdjR^2
49	Utils	0.376	0.260							0.612	0.14
50	Wholesale-durable	0.562	0.256	0.453						1.169	0.05
51	Wholesale-nondurable	0.328	0.293	0.209	0.290					0.986	0.08
52	Retail-hardware	0.745	0.338							1.053	0.17
53	Retail-variety	0.563	0.329	0.325						1.131	0.16
54	Retail-food	0.752	0.355							1.074	0.22
56	Retail-apparel	0.600	0.326	0.382						1.212	0.06
57	Retail-household	0.593	0.354	0.564	0.531	0.300	0.301			2.171	0.08
58	Restaurants	0.317	0.315	0.112	0.134	0.328				1.021	0.30
59	Retail-drugstore	0.297	0.173	0.266	0.234					0.850	0.05
73	Business service	0.286	0.231	0.172	0.204					0.792	0.03
78	Motion picture	0.200								0.200	0.00
79	Entertainment	0.417	0.391	0.181						0.922	0.03
80	Healthcare	0.616	0.312							0.900	0.11
82	Education service	0.746	0.428							1.135	0.63
83	Social service	0.463								0.463	0.01
87	Accounting, R&D service	0.630	0.353	0.370	0.808					1.864	0.15

Table 3 Continued

Notes:

The above table shows coefficients on industry-by-industry pooled regressions from 1975 to 2004 of equation (1). Industry definition: Agric Agriculture production-crops: 0100-0199

Coal	Mining-coal: 1200-1299
Oil	Oil and gas extraction: 1300-1399
Cnstr	Construction-special contractors: 1700-1799
Food	Food and kindred products: 2000-2099
Smoke	Tobacco Products: 2100-2199
Textile	Textile mill products: 2200-2299
Apparel	Apparel and other finished products: 2300-2390
Wood	Lumber and Wood Products: 2400-2499
Chair	Furniture and Fixtures: 2500-2599
Paper	Paper and allied products: 2600-2661
Printing	Printing and publishing: 2700-2799
Chems	Chemicals and drugs: 2800-2899
Rubber	Rubber and miscellaneous plastics products: 3000-3099
Leather	Apparel-leather goods: 3100-3199
Glass	Stone, Clay and Glass Products: 3200-3299
Metal	Primary metal industries: 3300-3399
Mtlpr	Fabricated metal products: 3400-3499
Machn	Machinery, except electrical: 3500-3599
Elctr	Electrical and electronic equipment: 3600-3699
Cars	Transportation Equipment: 3700-3799
Instr	Instruments and related products: 3800-3879
Manuf	Miscellaneous manufacturing industries: 3900-3999
MotorTrans	Motor freight transportation, trucking: 4200-4299
WaterTrans	Water transportation: 4400-4499
AirTrans	Air transportation: 4500-4599
Phone	Telephone and telegraph communication: 4800-4829
Utils	Electric, Gas, and Water Supply: 4900-4999
Wholesale-durable	Wholesale-durable goods: 5000-5099
Wholesale-nondurable	Wholesale-durable goods: 5100-5199
Retail-hardware	Retail-paint, glass, hardware stores: 5200-5299
Retail-variety	Retail-general merchandise stores, variety stores: 5300-5399
Retail-food	Retail-food stores: 5400-5499
Retail-apparel	Retail-apparel, accessory: 5600-5699
Retail-household	Retail-home furnishings stores, household appliance stores: 5700-5799
Restaurants	Restaurants, hotels, motels: 5800-5899
Retail-drugstore	Retail-drugstore, bookstore: 5900-5999
Business service	Business services, advertising, computer programming: 7300-7399
Motion picture	Services - motion picture production and distribution: 7800-7899
Entertainment	Amusement and recreation services: 7900-7999
Healthcare	Services-health: 8000-8099
Education service	Services-educational: 8200-8299
Social service	Services-social services: 8300-8399
Accounting, R&D service	Services-accounting, engineering: 8700-8799

5.1.2 Construction and Validation of SG&A Future Value Creation Measure

I obtain firm-year estimates of SG&A future value based on the above industry-specific SG&A lag structure assuming all firms within the same 2-digit SIC industry have the same SG&A lag structure. I use a rolling window time-series starting from 1970 to obtain the estimates. Table 4 presents validation of the estimates *SG&A future value*. I regress *SG&A future value* on firm characteristics for the sample period from 1975 to 2004.

$$SG\&A\ future\ value_{i,t} = \theta_1 + \theta_2 \frac{PPE_{i,t}}{AVGTA_{i,t}} + \theta_3 \frac{GM_{i,t}}{SALES_{i,t}} + \theta_4 \frac{EMPLOYEE_{i,t}}{SALES_{i,t}} + \theta_5 \log(SALES)_{i,t} + \theta_6 \Delta \log(SALES)_{i,t} + \theta_7 HHI\ INDEX_{i,t} + \theta_8 STDROA_{i,t}$$

PPE is property, plant and equipment (Compustat annual #8); AVGTA is the average of beginning-year and ending-year total assets. I expect the coefficient on PPE/AVGTA to be negative as firms invest more on tangible assets tend to spend less on generate future intangible assets given the resource constraint. GM is gross margin (Compustat annual #12-#41). I expect the coefficient on GM/SALES to be positive since firms that are able to exploit higher profit margin may have better ability to generate future benefits from current SG&A spending. EMPLOYEE is number of employees (Compustat annual #29). I expect the coefficient on EMPLOYEE/SALES to be positive since firms with more employees tend to invest more in human capital that may generate future value. LOG (SALES) is logarithm of total sales (Compustat annual #12) and captures size or life-cycle of the firm. I expect it to be positively associated with *SG&A future value* because large firms invest more in future benefit generating activities. ΔLOG(SALES) is the change in logarithm of total sales (Compustat annual #12) from last year, capturing sales growth. I expect it to be positively related to *SG&A future value* as firms with more growth opportunities may have higher

SG&A future value. HHI INDEX is the degree of industry concentration, measured by Herfindahl-Hirschman Index. I expect it to be negatively associated with *SG&A future value* since firms operating in a more competitive industry tend to spend more on future value creating SG&A activities. STDROA is the standard deviation of ROA over the five years prior to the event year divided by the mean of ROA over the five years prior to the event year, where ROA is defined as earnings before extraordinary items (Compustat annual #18) scaled by average total assets. I expect it to be positively related to *SG&A future* as firms operating in a more uncertain environment captured by higher STDROA tend to spend more on future value creating SG&A activities. Table 4 shows that investment in tangible assets, number of employees, size, and industry competition have the predicted sign. This validates the estimates of *SG&A future value*.

5.2 Capital Market Implications of SG&A Expenditure

5.2.1 Contemporaneous Stock Returns and SG&A Expenditure

Table 5 presents the results of the test of hypothesis 2 about the relation between contemporaneous returns and unexpected SG&A. I regress annual buy-and-hold size and book-to-market adjusted returns on unexpected operating income (before depreciation and SG&A) and unexpected SG&A, assuming that SG&A expenditure follows a random walk process. The pooled regression estimation results show that the coefficient on the change in SG&A is negative and significant (coefficient = -0.343, t-statistic = -19.98), suggesting that the market prices SG&A as an expense. However, when I add together the coefficient on the change in operating income (before depreciation and SG&A) and the coefficient on the change in SG&A, I find evidence rejecting the sum to be zero (F-statistic = 34.41, p-value

<0.01). This suggests that the market do not treats SG&A entirely as an expense but rather recognizes it partially as a value-creating asset.

Table 4 SG&A future value and firm characteristics

Dependent variable		*SG&A future value*
Independent variables	Predicted sign	Coefficient (t-statistic)
INTERCEPT		0.442 (19.93)
PPE/AVGTA	-	-0.221 (-17.61)
GM/SALES	+	-0.022 (-1.12)
EMPLOYEE/SALES	+	4.087 (5.91)
LOG(SALES)	+	0.009 (4.99)
ΔLOG(SALES)	+	-0.013 (-0.92)
HHI INDEX	-	-0.009 (-2.30)
STDROA	+	-0.092 (-0.77)
Adjusted R^2		3.6%
Mean (*SG&A future value*)		0.531
STD (*SG&A future value*)		0.258
Q1 (*SG&A future value*)		0.335
Median (*SG&A future value*)		0.543
Q3 (*SG&A future value*)		0.740

I also separate profit firms from loss firms since prior studies find that earnings response coefficients for loss firms are not as informative as for profit firms due to the existence of liquidation option for loss firms (Hayn 1995). When I focus on profit firms, I find that the coefficients on the change in SG&A is negative and significant (coefficient = -0.372, t-statistic= -14.74). The sum of the coefficient on operating income (before depreciation and SG&A) and the coefficient on SG&A is significantly greater than zero (F-

statistic=7.52, p-value<0.01) indicating that investors do not view SG&A the same as the other components of earnings for profit firms. For loss firms, I find that the coefficient on the change in SG&A is also negative and significant (coefficient = -0.268, t-statistic = -11.87). The sum of the coefficient on operating income (before depreciation and SG&A) and the coefficient on SG&A is significantly less than zero (F-statistic=12.46, p-value <0.01), indicating that the stock market places a higher pricing coefficient on the negative of SG&A expenditure than the pricing coefficient it places on earnings before SG&A for loss firms. In summary, panel A of table 5 supports hypothesis 2 that the stock market differentiates SG&A from the remaining components of earnings and recognizes that SG&A has properties of a value-creating asset.

To further examine whether the market values SG&A expenditure differently for firms where SG&A creates high future value and where SG&A creates low future value, I regress annual buy-and-hold size and book-to-market adjusted returns on unexpected operating income (before depreciation and SG&A), unexpected SG&A, and unexpected SG&A interacted with *SG&A future value*. Results in panel B of table 5 show evidence that the stock market does differentiate between SG&A expenditure that creates high future value and low future value. The negative relationship between contemporaneous returns and change in SG&A expenditure is lower when SG&A expenditure creates relatively greater future value. The coefficient on change in SG&A is still negative and significant (coefficient = -0.526, t-statistic = -8.57). However, the coefficient on change in SG&A interacted with SG&A future value is positive and significant (coefficient = 0.276, t-statistic = 3.03). Overall, the results in table 5 supports hypothesis 2b that the stock market seems to recognize the asset value created by SG&A expenditure. The stock market places a lower pricing

coefficient on the negative of SG&A expenditure than the pricing coefficient it places on earnings before SG&A, and the negative association between price and SG&A expenditure is lower when SG&A creates relatively greater future value.

Table 5 Contemporaneous returns and valuation of SG&A expenditure

Panel A Contemporaneous returns and change in SG&A expenditure

$$R_{i,t} = \gamma_0 + \gamma_1 \frac{(OI_{i,t} - OI_{i,t-1})}{MV_{i,t-1}} + \gamma_2 \frac{(SG\&A_{i,t} - SG\&A_{i,t-1})}{MV_{i,t-1}} + Industry\_dummies + Year\_dummies + e_{i,t} \quad (3)$$

Coefficient (t-statistic)	Full Sample		Profit-firm Sample		Loss-Firm Sample	
γ_0	-0.028	(-2.11)	0.067	(4.85)	-0.254	(-8.30)
γ_1	0.430	(44.91)	0.426	(31.73)	0.194	(13.10)
γ_2	-0.343	(-19.98)	-0.372	(-14.74)	-0.268	(-11.87)
F-test of equality						
$\gamma_1 = -\gamma_2$	34.41	(p<0.01)	7.52	(p<0.01)	12.46	(p<0.01)
Adj R^2	4.9%		5.1%		3.7%	
N	70,622		51,691		18,931	

Panel B Contemporaneous returns and change in SG&A expenditure conditional on SG&A future value

$$R_{i,t} = \gamma_0 + \gamma_1 \frac{(OI_{i,t} - OI_{i,t-1})}{MV_{i,t-1}} + \gamma_2 \frac{(SG\&A_{i,t} - SG\&A_{i,t-1})}{MV_{i,t-1}} + \gamma_3 \frac{(SG\&A_{i,t} - SG\&A_{i,t-1})}{MV_{i,t-1}} * SG\&A\ future\ value_i + Industry\_dummies + Year\_dummies + e_{i,t} \quad (3)$$

Coefficient	Full Sample	(t-statistic)	Profit-firm Sample	(t-statistic)	Loss-Firm Sample	(t-statistic)
γ_0	0.014	(0.58)	0.066	(2.73)	-0.158	(-1.77)
γ_1	0.471	(19.43)	0.402	(12.31)	0.339	(8.97)
γ_2	-0.526	(-8.57)	-0.584	(-7.33)	-0.472	(-5.26)
γ_3	0.276	(3.03)	0.238	(2.14)	0.038	(0.29)
Adj R^2	8.1%		7.7%		8.0%	
N	11,005		9,265		1,740	

5.2.2 Subsequent Stock Returns and SG&A Expenditure

To test whether stock price fully value firm's intangible assets created by SG&A, I check returns in the subsequent three-year periods on portfolios formed based on SG&A information. I obtain the long-term excess returns using the Fama and French (1993) three-factor model:

$$R_{pt} - R_{ft} = a + b(R_{mt} - R_{ft}) + sSMB_t + hHML_t + \varepsilon_{pt}$$

At the end of June each year from 1975 to 2004, I form portfolios by assigning firms into quintiles based on the change in SG&A (deflated by total assets). I only keep observations with positive change in SG&A to focus on firms that increase their expenditure (Eberhart, Maxwell, Siddique 2004). R_{pt} is the monthly return on portfolio p in calendar month t, R_{ft} is 1-month T-bill return, R_{mt} is the CRSP value-weighted market index return, SMB_t is the return a portfolio of small stocks minus the return a portfolio of large stocks, and HML_t is the return on a portfolio of stocks with high book-to-market ratios minus the return on a portfolio of stocks with low book-to-market ratios. I estimate the model using monthly returns from each of the first three years following portfolio formation. The intercept (a) in the above equation is the abnormal return measure. I obtain data for R_f, *SMB*, and *HML* from Kenneth French's website: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french. I document in panel A of table 6 the mean excess returns earned on portfolios formed annually based on change in SG&A (deflated by total assets). In support of hypothesis 3a, I do not find any significant excess returns earned on any portfolio in the subsequent three years after portfolio formation. The mean excess return earned on the highest SG&A portfolios is 3.0% in the first year after portfolio formation. It is statistically insignificant with a t-value of 1.56. The mean excess return earned on the lowest SG&A portfolios is -1.1% in the first year after

Table 6 Factor model regressions on SG&A portfolios
(Sample period: 1975-2004)

Panel A Factor model regressions on portfolios formed on ΔSG&A/TA

	(ΔSG&A/TA) Portfolio	a	t(a)	b	t(b)	s	t(s)	h	t(h)	Adj. R^2
First year	0 (Low)	-0.107	-0.79	1.051	31.02	0.997	22.75	0.074	1.43	0.86
after portfolio	1	-0.017	-0.20	1.003	47.53	0.705	25.87	0.329	10.24	0.91
formation	2	0.024	0.30	0.962	48.19	0.525	20.37	0.533	17.55	0.90
	3	0.170	1.68	1.008	39.57	0.813	24.71	0.338	8.72	0.89
	4(High)	0.305	1.56	1.015	20.49	1.206	18.86	0.014	0.18	0.77
Second year	0 (Low)	-0.047	-0.33	1.050	29.81	0.954	20.93	0.145	2.71	0.85
after portfolio	1	-0.019	-0.22	1.008	45.23	0.682	23.63	0.353	10.40	0.90
formation	2	0.109	1.34	0.965	47.16	0.530	20.01	0.534	17.12	0.90
	3	0.120	1.27	0.991	41.97	0.822	26.89	0.315	8.76	0.90
	4(High)	0.287	1.57	1.005	21.97	1.195	20.18	0.021	0.30	0.80
Third year	0 (Low)	0.083	0.58	1.033	28.84	0.965	20.84	0.163	3.00	0.85
after portfolio	1	0.044	0.49	1.005	45.10	0.694	24.09	0.377	11.13	0.91
formation	2	0.029	0.34	0.972	45.55	0.518	18.75	0.528	16.27	0.89
	3	0.111	1.13	1.002	40.96	0.778	24.59	0.345	9.28	0.90
	4(High)	0.168	0.98	1.005	23.54	1.111	20.12	0.044	0.68	0.82

Table 6 Continued

Panel B Factor model regressions on portfolios formed on ΔSG&A/TA* SG&A future value

	(ΔSG&A/TA) Portfolio	a	t(a)	b	t(b)	s	t(s)	h	t(h)	Adj. R^2
First year	0 (Low)	0.027	0.18	0.866	20.09	0.474	9.47	0.530	9.28	0.74
after	1	-0.016	-0.12	0.886	23.11	0.408	9.19	0.638	12.62	0.78
portfolio	2	0.077	0.62	0.952	26.79	0.407	9.86	0.515	10.97	0.82
formation	3	-0.080	-0.56	0.985	24.39	0.625	13.25	0.556	10.32	0.82
	4(High)	0.025	0.14	0.974	19.76	0.700	12.22	0.438	6.72	0.77
Second	0 (Low)	0.127	0.81	0.786	17.81	0.501	9.92	0.445	7.67	0.73
year after	1	-0.063	-0.43	0.881	21.29	0.379	8.06	0.626	11.59	0.75
portfolio	2	-0.196	-1.58	0.984	27.99	0.408	10.15	0.565	12.29	0.84
formation	3	-0.050	-0.31	0.930	20.28	0.537	10.29	0.482	8.07	0.77
	4(High)	-0.174	-0.98	0.986	19.73	0.682	11.56	0.519	7.80	0.77
Third year	0 (Low)	0.054	0.32	0.828	16.99	0.391	7.25	0.509	8.33	0.68
after	1	0.002	0.01	0.857	18.90	0.435	8.73	0.654	11.52	0.73
portfolio	2	0.017	0.13	0.898	23.51	0.341	8.04	0.469	9.71	0.80
formation	3	-0.108	-0.74	0.916	21.79	0.521	11.13	0.455	8.57	0.80
	4(High)	-0.195	-1.09	0.886	17.36	0.500	8.53	0.379	5.80	0.72

portfolio formation. It is statistically insignificant with a t-value of -0.79. Mean excess returns exhibit a similar pattern in the second and the third years after portfolio formation. I extend my analysis further by forming portfolios on change in SG&A interacted with SG&A future value and report the results in panel B of table 6. In support of hypothesis 2b, I again do not find high excess returns earned on high SG&A portfolio or low SG&A portfolio. The mean excess return earned on the highest SG&A interacted with SG&A future value portfolios is 2.5% and statistically insignificant (t-value = 0.14) in the first year after portfolio formation. The mean excess return earned on the lowest SG&A interacted with SG&A future value portfolios is 2.7% and statistically insignificant (t-value = 0.18) in the first year after portfolio formation. Mean excess returns exhibit a similar pattern in the second and the third years after portfolio formation. Overall the results in table 6 support hypothesis 3a and 3b that the contemporaneous market price already reflects the asset value of SG&A and consequently no excess returns can be earned on SG&A portfolios in the subsequent periods.

5.3 Executive Compensation Implications of SG&A Expenditure

5.3.1 Cash Compensation and SG&A Expenditure

I show the results of estimating equation (4) using different components of compensation and total compensation in table 8. The first column shows the results on using salary as the compensation measure. I do not find any evidence that SG&A is used as a performance measure in determining salary compensation. The coefficient on change in SG&A (γ_2) -0.405 is insignificant (t-statistic = -1.11). Similarly, the coefficient on change in SG&A interacted with *SG&A future value* 0.271 is insignificant (t-statistic = 0.47). This is

Table 7 Sample statistics on compensation and performance measures

	Mean	STD	Q1	Median	Q3
Salary ($thousands)	656	320	453	611	802
Bonus($thousands)	647	900	152	407	852
Equity Compensation ($thousands)	2,258	4,199	239	900	2,435
Total Compensation ($thousands)	3,561	4,780	1,072	2,051	4,065
Δlog(Salary)	0.050	0.355	-0.014	0.033	0.077
Δlog(Bonus)	0.092	0.761	-0.208	0.084	0.405
Δlog(Equity Compensation)	0.152	1.559	-0.323	0.125	0.675
Δlog(Total Compensation)	0.090	0.580	-0.172	0.083	0.385
ΔOI	-0.005	0.047	-0.023	-0.002	0.018
ΔSG&A	-0.002	0.025	-0.008	0.000	0.005
SG&A future value	0.535	0.255	0.339	0.549	0.746

consistent with the notion that salary is not used as incentive compensation to link executive pay to company performance measures (Core, Guay and Larcker 2003).

In the second column for bonus compensation, I find that the coefficient on the change in SG&A (γ_2) is – 8.316 (t-statistic = -5.60). This supports the notion that bonus compensation penalizes high spending on SG&A when SG&A asset creation value is low. On the other hand, I find that the coefficient γ_3 on the change in SG&A interacted with *SG&A future value* is 4.443 (t-statistic = 2.19). This evidence supports hypothesis 4 that the negative association between executive compensation and the change in SG&A is less negative when the SG&A future value creation is greater. The positive pay-for-performance sensitivity on the future value portion of SG&A suggests that the compensation committee recognizes and rewards the asset created by current SG&A expenditure. The net effect γ_2 + γ_3 * *median SG&A future value* indicates *SG&A future value* for the average firm is negative

Table 8 Estimated relation between executive compensation and SG&A

$$\Delta \log(COMP)_{i,t} = \gamma_0 + \gamma_1\left(\frac{OI_{i,t}}{AGTA_{i,t}} - \frac{OI_{i,t-1}}{AVGTA_{i,t-1}}\right) + \gamma_2\left(\frac{SG\&A_{i,t}}{AVGTA_{i,t}} - \frac{SG\&A_{i,t-1}}{AVGTA_{i,t-1}}\right) + \gamma_3\left(\frac{SG\&A_{i,t}}{AVGTA_{i,t}} - \frac{SG\&A_{i,t-1}}{AVGTA_{i,t-1}}\right) * SG\&A future\ value_{i,t} + \gamma_4 RET_{i,t} + e_{i,t}$$

	Predicted sign	Salary	Bonus	Equity Compensation	Total Compensation
		Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
γ_0		0.013	-0.004	0.130	0.082
		(4.42)	(-0.26)	(6.80)	(5.40)
γ_1	+	0.249	4.980	1.397	2.097
		(1.78)	(7.07)	(2.32)	(5.00)
γ_2	-	-0.405	-8.316	-6.112	-5.125
		(-1.11)	(-5.60)	(-3.03)	(-4.00)
γ_3	+	0.271	4.443	7.694	4.119
		(0.47)	(2.19)	(2.51)	(2.10)
γ_4	+	0.007	0.429	0.146	0.253
		(0.57)	(8.45)	(1.92)	(5.63)
Weight on ΔSG&A as a performance measure		Value (p-value)	Value (p-value)	Value (p-value)	Value (p-value)
$\gamma_2 + \gamma_3$*median SG&A future value*		-0.256	-5.881	-1.719	-2.082
		(0.06)	(0.01)	(0.09)	(0.01)
$\gamma_2 + \gamma_3$		-0.134	-3.873	1.582	-1.006
		(0.53)	(0.01)	(0.46)	(0.08)
Difference between weight on ΔOI and weight on ΔSG&A		Value (p-value)	Value (p-value)	Value (p-value)	Value (p-value)
$\gamma_1 + \gamma_2$		-0.156	-3.336	-4.715	-3.028
		(0.56)	(0.07)	(0.02)	(0.04)
$\gamma_1 + \gamma_2 + \gamma_3$*median SG&A future value*		-0.007	-0.901	-0.322	-0.704
		(0.98)	(0.22)	(0.54)	(0.10)
$\gamma_1 + \gamma_2 + \gamma_3$		0.115	1.107	2.979	1.091
		(0.60)	(0.55)	(0.09)	(0.64)
Adj R^2		4.2%	13.6%	4.2%	7.2%

and significant (value = -5.881 and F-test of equality to zero is rejected at 1% level). This indicates that the compensation committee recognizes the need to motivate managers to control high spending on SG&A on average.

5.3.2 Total Compensation and SG&A Expenditure

Core, Guay and Verrecchia (2003) observe that predictions from standard agency theory find support when CEO cash compensation is examined, but not when total compensation is examined. To address this concern, I repeat my analysis using equity compensation and total compensation and report the results in the third and fourth column of table 8. In the third column of equity compensation, the coefficient on the change in SG&A expenditure (γ_2) is negative and significant (coefficient = - 6.112 and t-statistic = -3.03). The coefficient on the change in SG&A interacted with *SG&A future value* (γ_3) is again positive and significant (coefficient = 7.694 and t-statistic = 2.51). This again supports hypothesis 4 that the compensation committee recognizes and rewards the asset created by current SG&A expenditure. Results on total compensation also show that the negative association between change in executive compensation and change in SG&A is lower when SG&A has the potential to create high future value. The coefficient on (γ_2) is negative and significant (coefficient = -5.125 and t-statistic = -4.00) while the coefficient on (γ_3) is positive and significant (coefficient = 4.119 and t-statistic = 2.10). Overall the results in table 8 indicate that the compensation committees seem to recognize the asset value created by SG&A.

5.4 Equity Incentives and Managerial Decisions on SG&A Expenditure

5.4.1 Managers' Decisions on SG&A Expenditure

To investigate the relationship between equity incentives and managers' expenditure decisions, I obtain data from Compustat 2004, CRSP 2004 and ExecuComp 2004. I impose the following restrictions on the sample: 1) No CEO change during the year and 2) CEO served in the same company for at least two consecutive years. Based on the optimal lag structure of each two-digit SIC industry, I estimate firm-specific *SG&A future value* using time-series data from 1975 to 2004. The sum of discounted coefficients on past SG&A, *SG&A future value*, gives the total impact of $1 SG&A spending on future operating income before SG&A. The impact should not be negative to justify the spending of SG&A. I delete observations with *SG&A future value* less than 0. I also winsorize all variables at the top and bottom 1% level of yearly distributions. The final sample contains 3,001 CEO-year observations from 1994 to 2003, in which new grants of equity incentives are made in 2,222 CEO years. Table 9 shows descriptive statistics of various determinants of SG&A expenditure decisions and equity grant decisions. The distribution of sample characteristics is consistent with similar distributions documented in the prior literature (Core and Guay 1999; Bens, Nagar and Wong 2002). The firm-specific estimates of *SG&A future value* are generally higher than those reported in Table 3 since I focus on a subsample where the future value created by SG&A is nonnegative.

Table 10 provides results of testing hypothesis 5 using equation (5). Consistent with the prediction in hypothesis 5, I find that managers increase spending on SG&A in response to new equity grants only when SG&A creates high future value. The coefficient on new

equity grant interacted with future value creation is positive and significant (coefficient = 0.021; t-statistic = 2.68). This indicates that the association between new grants of equity incentives and SG&A spending is increasing in the future value created by SG&A expenditure. The estimated sensitivity of SG&A spending intensity to a unit change in new incentive grant (γ_1 * *SG&A future value* + γ_2) is positive for firms with high levels of *SG&A future value*, indicating that new grants of equity incentives lead to an increase in SG&A spending in these firms. The estimated sensitivity is 0.026 for a firm whose *SG&A future value* is at the upper quartile of the cross-sectional distribution. This sensitivity declines to 0.016 and 0.008 for representative firms with *SG&A future value* at the median and at the lower quartile, respectively.

Table 9 Descriptive statistics on various determinants

Variables	Mean	STD	Q1	Median	Q3
Log(SALES)	7.18	1.49	6.06	7.12	8.36
SGAOPCASH	0.39	0.20	0.23	0.35	0.51
BM	0.64	0.25	0.44	0.64	0.82
Δlog(SALES)	0.07	0.22	-0.02	0.06	0.16
RET	0.16	0.53	-0.15	0.08	0.36
STDSALES	0.21	0.15	0.09	0.17	0.27
DIVCONSTRAINT	0.46	0.50	0.00	0.00	1.00
SG&A/AVGTA	0.29	0.17	0.15	0.27	0.41
E(SG&A/AVGTA)	0.30	0.18	0.15	0.28	0.42
Portfolio equity incentives	0.26	0.40	0.03	0.10	0.28
New incentive grant	0.05	0.11	0.00	0.01	0.04
SG&A future value	1.26	0.85	0.72	1.08	1.63

In addition, the coefficients on most control variables have the predicted sign. The coefficient on *E(SG&A/AVGTA)* is positive and significant with a large t-statistic (coefficient = 0.852; t-statistic = 31.27). This indicates that the expected value of SG&A derived from the

Anderson, Banker and Janakiraman (2003) model explains a large part of actual spending of SG&A. The coefficient on operating cash flow before SG&A (*SGAOPCASH*) is positive and significant (coefficient = 0.121; t-statistic = 4.78), indicating that firms with better internal financing spend more on SG&A since external financing is costly (Bens, Nagar and Wong 2002; Shyam-Sunder and Myers 1999). The coefficient on *BM* is not significant (coefficient = -0.002; t-statistic = -0.37), consistent with the finding in Bens, Nagar and Wong (2002) that the association between R&D spending and book-to-market ratio is not significant. The coefficient on *RET* is negative and significant (coefficient = -0.015; t-statistic = -4.37), consistent with the finding in Lev and Thiagarajan (1993) that contemporaneous stock market reaction penalizes higher than expected SG&A spending. The coefficient on *STDSALES* is positive (coefficient = 0.011; t-statistic = 1.33), consistent with the notion that demand uncertainty leads to higher investments. Overall the results in Table 10 provide support for hypothesis 5 that new grants of equity incentives lead to higher SG&A expenditure when SG&A creates relatively high future value.

5.4.2 Equity Grant Decisions and SG&A Expenditure

Table 11 shows results of testing hypothesis 6 using equation (7). Consistent with hypothesis 6, I find that firms grant higher equity incentives when they expect SG&A to create higher future value. The third column shows results based on Tobit estimation. The coefficient on past SG&A spending interacted with SG&A future value creation is positive and significant (coefficient = 0.054; p-value<0.01). This suggests that for a given level of SG&A spending, more equity grants are provided in companies where SG&A has higher future value creation. The estimated sensitivity of new incentive grant to a unit change in past

SG&A spending intensity (δ_1 * *SG&A future value* + δ_2) is higher for firms with high levels of *SG&A future value*. For example, for a firm whose *SG&A future value* is at the upper

Table 10 OLS estimation of the relation between SG&A investment and new grant of equity incentives

Dependent variable		$(SG\&A/AVGTA)_t$
Independent variables	Predicted sign	Coefficient (t-statistic)
Intercept		-0.012 (-1.13)
$(New\ incentive\ grant)_{t-1}$ * *SG&A future value* ($\hat{\gamma}_1$)	+	0.021 (2.68)
$(New\ incentive\ grant)_{t-1}$ ($\hat{\gamma}_2$)	?	-0.006 (-1.09)
$E(SG\&A/AVGTA)_t$	+	0.852 (31.27)
$Log(SALES)_t$	?	0.001 (0.79)
$SGAOPCASH_t$	+	0.121 (4.78)
BM_t	-	-0.002 (-0.37)
$\Delta log(SALES)_t$	?	0.016 (3.27)
RET_t	-	-0.015 (-4.37)
$STDSALES_t$	+	0.011 (1.33)
Sensitivity of SG&A spending intensity to new incentive grant at various quartiles of *SG&A future value*		
$\hat{\gamma}_1$ *Q1(SG&A future value) + $\hat{\gamma}_2$		0.008
$\hat{\gamma}_1$ *Median(SG&A future value) + $\hat{\gamma}_2$		0.016
$\hat{\gamma}_1$ *Q3(SG&A future value) + $\hat{\gamma}_2$		0.026
Adjusted R^2		96.6%

quartile of the cross-sectional distribution, the estimated sensitivity is 0.108. For a firm whose *SG&A future value* is at the median of the cross-sectional distribution, the estimated

sensitivity is 0.078. However, for a firm whose *SG&A future value* is at the lower quartile, the estimated sensitivity is only 0.055.

The regression coefficients on all the control variables have the predicted signs. *Portfolio equity incentives* is positively associated with new grants of equity incentives (coefficient = 0.008; p-value<0.01), indicating that a high level of existing holdings of equity incentives is associated with high growth opportunities. *BM* is negatively associated with new grants of equity incentives (coefficient = -0.078; p-value<0.01), consistent with the notion that growth firms grant more equity incentives. The coefficient on *SGAOPCASH* is negative but insignificant (coefficient = -0.031; p-value = 0.24). The coefficient on *DIVCONSTRAINT* is positive and significant (coefficient = 0.016; p-value<0.01), indicating that firms that are dividend constrained pay more equity-based compensation. The coefficient on *RET* is positive and significant (coefficient = 0.052; p-value<0.01), indicating that firms with better performance grant more equity incentives.

The fourth and fifth columns in Table 11 provide results of the Heckman two-stage estimation. The fourth column of Table 11 shows the results of the first-stage Probit estimation of the decision to provide new equity incentives. I find that the decision to make a grant is positively associated with the existing holdings of equity incentives (coefficient = 99.102; p-value<0.01). I also find that *BM* (coefficient = -0.408; p-value<0.01) and *SGAOPCASH* (coefficient = -0.560; p-value = 0.03) significantly influence the grant decision. However, I do not find that the level of SG&A spending and the future value created by SG&A have a significant impact on the decision to make a grant. Turning to the grant size equation shown in the fifth column, I find that the level of SG&A spending interacted with *SG&A future value* positively affects the size of the new grants (coefficient =

Table 11 Tobit and Heckman two-stage estimation of the association between new grant of equity incentives and SG&A investment

		Tobit estimation	First-stage Probit estimation	Second stage OLS estimation
Dependent variable		*(New incentive grant)$_t$*	*(Grant decision)$_t$ =1 if (New incentive grant)$_t$>0 (Grant decision)$_t$=0 if (New incentive grant)$_t$=0*	*(New incentive grant)$_t$*
Independent variables	Predicted sign	Coefficient (p-value based on χ^2 statistic)	Coefficient (p-value based on χ^2 statistic)	Coefficient (p-value based on two-tailed t-statistic)
Intercept		0.192 (<0.01)	-0.482 (<0.01)	0.084 (<0.01)
*(SG&A/AVGTA)$_{t-1}$ * SG&A future value* ($\hat{\delta}_1$)	+	0.054 (<0.01)	0.016 (0.95)	0.052 (0.02)
(SG&A/AVGTA)$_{t-1}$ ($\hat{\delta}_2$)	?	0.020 (0.50)	-0.115 (0.70)	0.025 (0.17)
Portfolio equity incentives $_{t-1}$	?	0.008 (<0.01)	99.102 (<0.01)	0.009 (<0.01)
BM_{t-1}	-	-0.078 (<0.01)	-0.480 (<0.01)	-0.078 (<0.01)
$SGAOPCASH_{t-1}$	-	-0.031 (0.24)	-0.560 (0.03)	-0.015 (0.45)
$DIVCONSTRAINT_{t-1}$	+	0.016 (<0.01)	0.054 (0.27)	0.016 (<0.01)
RET_t	+	0.052 (<0.01)	-0.054 (0.29)	0.038 (<0.01)
RET_{t-1}	+	0.006 (0.20)	-0.175 (<0.01)	0.002 (0.60)
Inverse Mills ratio				0.009 (0.03)
Sensitivity of new incentive grant to SG&A spending intensity at various quartiles of *SG&A future value*				
$\hat{\delta}_1$ **Q1(SG&A future value)* + $\hat{\delta}_2$		0.055		0.060
$\hat{\delta}_1$ **Median(SG&A future value)* + $\hat{\delta}_2$		0.078		0.082
$\hat{\delta}_1$ **Q3(SG&A future value)* + $\hat{\delta}_2$		0.108		0.111

0.052; p-value = 0.02). This indicates that firms with high level of SG&A spending grant more equity incentives when SG&A creates more future value. Finally the inverse Mills ratio ($\lambda = 0.009$; p-value = 0.03) suggests that the Heckman two-stage estimation procedure is more appropriate than the Tobit model. Overall the results in Table 11 provide evidence in support of hypothesis 5 suggesting that firms grant more equity incentives when SG&A spending creates higher future value.

5.4.3 R&D, advertising and SG&A Expenditure

I have so far focused on SG&A that excludes R&D and advertising. Next I examine differences in the contribution of the different components of expenditure to future value and evaluate whether new grants of equity incentives differentially affect the investments in these different components. Toward this end, I first estimate future value creation of R&D, advertising and SG&A using the following model:

$$(OI/TA)_{i,t} = \alpha_0 + \alpha_1 (1/TA)_{i,t-1} + \sum_{k=0}^{4} \alpha_{2,k} (R\,\&\,D/TA)_{i,t-k} + \sum_{k=0}^{1} \alpha_{3,k} (Adv/TA)_{i,t-k} + \sum_{k=0}^{n} \alpha_{4,k} (SG\,\&\,A/TA)_{i,t-k} + e_{i,t} \quad (10)$$

I use four lags of *R&D/TA* because a 20% straight-line amortization rate is commonly used in the prior literature for estimating the contribution of R&D to firm value (e.g., Griliches 1979; Chan, Lakonishok and Sougiannis 2001; Hall, Cummins, Laderman and Mundy 1988). Following prior literature (Lev and Sougiannis 1996), I use one lag of *Adv/TA* because there is evidence that the impact of advertising on future sales is short (Peles 1970). Furthermore, estimating a stable advertising lag structure requires a long time-series. However, advertising data for many firm-years are missing. I allow the lag structure for

SG&A/TA to vary and estimate the optimal lag structure using an unrestricted distributed model. I use the 2SLS procedure described earlier to estimate *R&D future value, Adv future value* and *SG&A future value*. Once again, I focus only on subsamples where the total impact of $1 R&D (advertising, SG&A) spending on future operating income is nonnegative.

Table 12 shows the results of testing hypothesis 5 separately for R&D, advertising and SG&A expenditure. Consistent with hypothesis 5, I find R&D spending in response to new equity grants is higher in companies where R&D value creation is high. The coefficient on *new incentive grant*$_{t-1}$ interacted with *R&D future value* is positive and significant (coefficient = 0.112; t-statistic = 4.93). The results suggest that managers increase R&D expenditure after receiving new grants of equity incentives. The increase in R&D expenditure is higher for firms with higher *R&D future value.* The results on advertising expenditure and SG&A expenditure also suggest that the association between new grants of equity incentives and the subsequent innovation in expenditure is increasing in future value created by each expenditure. The coefficient on *new incentive grant*$_{t-1}$ interacted with *Adv future value* (coefficient = 0.014; t-statistic = 3.01) as well as the coefficient on *new incentive grant*$_{t-1}$ interacted with *SG&A future value* (coefficient = 0.016; t-statistic = 2.32) are also positive and significant. Overall, the results presented in Table 12 indicate that the results in Table 10 are robust when we examine the various components of expenditure that have the same future value-creating ability.

Table 13 reports the results of testing hypothesis 6 separately for R&D, advertising and SG&A expenditure. Consistent with hypothesis 6, I find that firms with high R&D spending grant more equity incentives when R&D creates higher future value. The coefficient on *(R&D/AVGTA)*$_{t-1}$ interacted with *R&D future value* is positive and significant

(coefficient = 0.281; p-value<0.01). Similarly, I find that firms with a high level of SG&A expenditure grant more equity incentives when SG&A creates higher future value. The coefficient on $(SG\&A/AVGTA)_{t-1}$ interacted with *SG&A future value* is positive and significant (coefficient = 0.090; p-value = 0.06). However, I do not find a similar association between new equity grants and advertising expenditure, possibly due to the relatively short-term impact of advertising expenditure on future profitability. Overall, the results on R&D and SG&A provide evidence in support of hypothesis 6 that firms with high level of R&D and SG&A spending grant more equity incentives when the future value created by the expenditure is high.

5.4.4 Joint Determination of Managers' Expenditure Decisions on SG&A and Firms' New Equity Grant Decisions

Agency theory suggests that executive incentive compensation and corporate investment policies are endogenously determined (Kang, Kumar and Lee 2006). My primary analysis relies on the premise that managers' investment decisions and firms' grant decisions are determined sequentially. Given that firms make endogenous choices along different dimensions (Watts and Zimmerman 1990), it is possible that the SG&A expenditure decisions and equity grant decisions are jointly determined. Prior studies have shown that higher equity-based compensation is associated with higher investment. However, theses studies either treat investment opportunities as exogenous (Smith and Watts 1992; Bizjak, Brickley and Coles 1993; Core and Guay 1999) or treat equity-compensation schemes as exogenous (Dechow and Sloan 1991; Bens, Nagar and Wong 2002). It is difficult to make inferences about the relation between executive compensation contracts and investment decisions when either of them is treated as exogenous (Larcker 1983). Holthausen, Larcker

Table 12 OLS estimation of the relation between components SG&A investment and new grant of equity incentives

Dependent variable		$(R\&D/AVGTA)_t$	$(Adv/AVGTA)_t$	$(SG\&A/AVGTA)_t$
Independent variables	Predicted sign	Coefficient (t-statistic)	Coefficient (t-statistic)	Coefficient (t-statistic)
Intercept		-0.051 (-5.19)	-0.001 (-0.29)	-0.015 (-0.93)
$(New\ incentive\ grant)_{t-1}$ *R&D (Adv, SG&A) future value ($\hat{\gamma}_1$)	+	0.112 (4.93)	0.014 (3.01)	0.016 (2.32)
$(New\ incentive\ grant)_{t-1}$ ($\hat{\gamma}_2$)	?	0.002 (0.06)	-0.007 (-4.24)	-0.007 (-1.51)
$E(R\&D(Adv, SG\&A)/AVGTA)_t$	+	0.875 (55.83)	0.913 (23.86)	0.942 (86.16)
$Log(SALES)_t$	?	-0.000 (-2.12)	0.000 (0.71)	0.001 (2.20)
$R\&D\ (Adv, SG\&A)\ OPCASH_t$	+	0.001 (2.65)	0.005 (1.20)	0.025 (5.55)
BM_t	-	-0.008 (-5.35)	-0.004 (-1.12)	0.003 (1.52)
$\Delta log(SALES)_t$	?	0.001 (0.28)	-0.005 (-1.34)	0.004 (0.62)
RET_t	-	-0.005 (-2.18)	0.000 (0.22)	-0.009 (-8.58)
$STDSALES_t$	+	0.007 (2.98)	0.003 (0.51)	-0.005 (-0.37)
Sensitivity of R&D (Adv, SG&A) intensity to new incentive grant at various quartiles of *future value*				
$\hat{\gamma}_1$ *Q1(future value) + $\hat{\gamma}_2$		0.102	0.005	0.002
$\hat{\gamma}_1$ *Median(future value) + $\hat{\gamma}_2$		0.289	0.015	0.013
$\hat{\gamma}_1$ *Q3(future value) + $\hat{\gamma}_2$		0.650	0.046	0.035
Adjusted R^2		79.4%	97.3%	97.3%

Table 13 Tobit estimation of the association between new grant of equity incentives and investment in SG&A components

		Tobit estimation	Tobit estimation	Tobit estimation
Dependent variable		*(New incentive grant)$_t$*	*(New incentive grant)$_t$*	*(New incentive grant)$_t$*
Independent variables	Predicted sign	Coefficient (p-value based on χ^2 statistic)	Coefficient (p-value based on χ^2 statistic)	Coefficient (p-value based on χ^2 statistic)
Intercept		0.077 (0.02)	-0.089 (0.31)	0.105 (0.09)
*(R&D/AVGTA)$_{t-1}$*R&D future value*	+	0.281 (<0.01)		
*(Adv/AVGTA)$_{t-1}$*Adv future value*	+		0.312 (0.48)	
*(SG&A/AVGTA)$_{t-1}$*SG&A future value*	+			0.090 (0.06)
(R&D/AVGTA)$_{t-1}$ *((Adv/AVGTA)$_{t-1}$, (SG&A/AVGTA)$_{t-1}$)*	?	-0.062 (0.44)	-0.755 (0.02)	0.029 (0.62)
Portfolio equity incentives $_{t-1}$	?	0.029 (<0.01)	0.110 (<0.01)	0.039 (<0.01)
BM$_{t-1}$	-	-0.061 (<0.01)	-0.100 (0.03)	-0.180 (<0.01)
R&D (Adv, SG&A) OPCASH$_{t-1}$	-	0.014 (0.37)	0.027 (0.67)	-0.084 (0.06)
DIVCONSTRAINT$_{t-1}$	+	0.009 (0.08)	0.022 (0.32)	0.020 (0.01)
RET$_t$	+	0.028 (<0.01)	0.076 (<0.01)	0.093 (<0.01)
RET$_{t-1}$	+	-0.006 (0.22)	0.019 (0.45)	-0.002 (0.04)

and Sloan (1995) address this problem by examining the relation between the number of patents granted and long-term compensation using a simultaneous framework. Following the spirit of their arguments, I treat both SG&A expenditure decisions and equity grant decisions as endogenous variables and allow them to be jointly determined. I use the following simultaneous equation model to examine the contemporaneous association between these decisions.

$$\begin{aligned}(SG\&A/AVGTA)_{i,t} = {} & \gamma_0 + \gamma_1 (New\ incentive\ grant)_{i,t} * SG\&A\ future\ value_i \\ & + \gamma_2 (New\ incentive\ grant)_{i,t} + \gamma_3 E(SG\&A/AVGTA)_{i,t} \\ & + \gamma_4 Log\ (SALES)_{i,t} + \gamma_5 BM_{i,t} + \gamma_6 SGAOPCASH_{i,t} \\ & + \gamma_7 STDSALES_{i,t} + \gamma_8 RET_{i,t} + \gamma_9 \Delta Log(SALES)_{i,t} + e_{i,t} \end{aligned} \quad (11)$$

$$\begin{aligned}(New\ incentive\ grant)_{i,t} = {} & \delta_0 + \delta_1 (SG\&A/AVGTA)_{i,t} * SG\&A\ future\ value_i \\ & + \delta_2 (SG\&A/AVGTA)_{i,t} + \delta_3 Portfolio\ equity\ incentives_{i,t-1} \\ & + \delta_4 BM_{i,t} + \delta_5 SGAOPCASH_{i,t} + \delta_6 DIVCONSTRAINT_{i,t} \\ & + \delta_7 RET_{i,t} + u_{i,t} \end{aligned} \quad (12)$$

Equation (11) specifies how SG&A spending depends on new grants of equity incentives. As before, I expect $\gamma_1 > 0$ based on the argument that managers may increase SG&A spending in response to new equity grants in firms where SG&A creates high future value. Equation (12) represents how new grants of equity incentives depend on the ability of current SG&A spending to create future value. I expect $\delta_1 > 0$ since firms grant high equity incentives when they expect high future value creation. The simultaneous estimation model includes OLS estimation of equation (11) and Tobit estimation of equation (12) (D'Souza 1998).[6]

[6] D'Souza (1998) examines a simultaneous equation model consisting of an OLS equation and a Probit model.

I use the following two-stage estimation method. In the first stage, I regress (*SG&A/AVGTA)* on all exogenous variables using OLS. I use the predicted value as the instrument of (*SG&A/AVGTA).*[7] Similarly, I obtain the instrument of (*New incentive grant)* using the predicted value from Tobit estimation of (*New incentive grant)* as a function of exogenous variables.[8] In the second stage, I replace (*New incentive grant)* in equation (11) with the predicted value of (*New incentive grant)* and estimate the equation using OLS. Similarly, I replace (*SG&A/AVGTA*) in equation (12) with the predicted value of (*SG&A/AVGTA*) and estimate the equation using a Tobit model.

Table 14 provides the results of the estimation of the system of equations in (11) and (12). Consistent with the predictions in hypothesis 5, I find that managers increase SG&A spending in response to new equity grants when SG&A future value creation is high. The coefficient on *new incentive grant* interacted with *SG&A future value* is positive and significant (coefficient = 0.017; p-value=0.04). Consistent with the predictions in hypothesis 6, I find that new grants of equity incentives are positively associated with SG&A spending in companies where SG&A future value creation is high (coefficient = 0.039; p-value =0.02).

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[7] The predicted value of (*SG&A/AVGTA)* is obtained from OLS estimation of the following model:

$$\begin{aligned}(SG\ \&\ A/AVGTA)_{i,t} = {} & \lambda_0 + \lambda_1 SG\&A\ future\ value_i + \lambda_2 E(SG\ \&\ A/AVGTA)_{i,t} + \lambda_3 Log(SALES)_{i,t} \\ & + \lambda_4 BM_{i,t} + \lambda_5 SGAOPCASH_{i,t} + \lambda_6 STDSALES_{i,t} + \lambda_7 RET_{i,t} + \lambda_8 \Delta Log(SALES)_{i,t} \\ & + \lambda_9 Portfolio\ equity\ incentives_{i,t-1} + \lambda_{10} DIVCONSTRAINT_{i,t} + e_{i,t}\end{aligned} \quad (13)$$

[8] The predicted value of (*New incentive grant)* is obtained from Tobit estimation of the following model:

$$\begin{aligned}New\ incentive\ grant_{i,t} = {} & \eta_0 + \eta_1 SG\&A\ future\ value_i + \eta_2 E(SG\ \&\ A/AVGTA)_{i,t} + \eta_3 Log(SALES)_{i,t} \\ & + \eta_4 BM_{i,t} + \eta_5 SGAOPCASH_{i,t} + \eta_6 STDSALES_{i,t} + \eta_7 RET_{i,t} + \eta_8 \Delta Log(SALES)_{i,t} \\ & + \eta_9 Portfolio\ equity\ incentives_{i,t-1} + \eta_{10} DIVCONSTRAINT_{i,t} + e_{i,t}\end{aligned} \quad (14)$$

Table 14 Second stage results of OLS and Tobit estimation of the simultaneous relation between new grant of equity incentives and SG&A investment

	Equation (9)—OLS estimation			Equation (10)—Tobit estimation	
Dependent variable		$(SG\&A/AVGTA)_t$	Dependent variable		*New incentive grant* $_t$
Independent variables	Predicted sign	Coefficient (p-value)	Independent variables	Predicted sign	Coefficient (p-value)
Intercept		-0.016 (p=0.05)	Intercept		0.008 (p=0.79)
Predicted (New incentive grant) $_t$ * *SG&A future value*	+	0.017 (p=0.04)	*Predicted* $(SG\&A/AVGTA)_t$ * *SG&A future value*	+	0.039 (p=0.02)
Predicted (New incentive grant) $_t$	?	-0.004 (p=0.89)	*Predicted* $(SG\&A/AVGTA)_t$	?	0.127 (p=0.18)
$E(SG\&A/AVGTA)_t$	+	0.889 (p<0.01)	*Portfolio equity incentives* $_{t-1}$	?	0.129 (p<0.01)
$Log(SALES)_t$	?	0.001 (p=0.49)	BM_t	-	-0.063 (p=0.02)
BM_t	-	0.009 (p=0.09)	$SGAOPCASH_t$	-	-0.102 (p=0.19)
$SGAOPCASH_t$	+	0.090 (p<0.01)	$DIVCONSTRAINT_t$	+	0.020 (p=0.12)
$STDSALES_t$	+	0.015 (p=0.04)	RET_t	+	0.039 (p<0.01)
RET_t	-	-0.009 (p<0.01)			
$\Delta log(SALES)_t$	?	0.010 (p=0.03)			

This suggests that firms correctly anticipate the SG&A spending decisions of managers and incorporate that into equity grant decisions. Firms that make new grants of equity incentives expect managers to spend more on SG&A when SG&A creates higher future value. Overall the results in Table 14 suggest that the contemporaneous association between innovation in SG&A spending and new grants of equity incentives is increasing in the future value created by SG&A.

CHAPTER 6

CONCLUSIONS AND IMPLICATIONS

6.1 Summary of Results

In this dissertation, I investigate whether SG&A expenditure creates a long-lived asset for a firm although GAAP mandates immediate expensing of SG&A. I find that, on average, the current income (before depreciation and SG&A) is positively associated with current SG&A and the past one to five years of spending on SG&A. The length and the magnitude of the impact of SG&A on income are greater for the wholesale and retail industries than for the primary goods industries. The evidence is consistent with the notion that SG&A generates future economic benefits by enhancing brand reputation and operating efficiency.

To evaluate whether the market recognizes the asset value created by SG&A, I compare the response coefficient on change in SG&A with the response coefficient on change in earnings before SG&A. I find that the contemporaneous stock market does not view all SG&A expenditure as an expense incurred in the current period. The market seems to view some SG&A as an asset and differentiate SG&A expenditure from the remaining components of earnings. I do not find any excess returns associated with portfolios formed on SG&A information. This suggests that stock prices may have fully impounded the value created by SG&A expenditure.

I also investigate whether the executive labor market recognizes the asset value created by SG&A expenditure. I find that the change in bonus and equity compensation is

negatively associated with the change in SG&A expenditure, but this negative association is lower when the current SG&A expenditure creates more value.

I document that there is considerable variation in the future value created by SG&A across firms and industries. I first examine how the future value created by SG&A impacts SG&A expenditure decisions in response to new grants of equity incentives. The results indicate that new grants of equity incentives lead to an increase in SG&A spending only in those firms where SG&A creates high future value. This supports the notion that the influence of long-term incentives on expenditure decisions is context-specific--it depends on how much future value the expenditure can generate. Next I investigate whether future value created by SG&A impacts firms' decisions to make new grants. I find that after controlling for other factors that affect grant decisions, firms grant more equity incentives when they expect SG&A to create higher future value.

I also examine the value creation by different components of SG&A. The results indicate that managers increase spending in R&D, advertising and SG&A in response to new grants of equity incentives in companies where they create high future value. The evidence also suggests that firms with high level of spending in R&D and SG&A grant more equity incentives when the future value created by such spending is high. To address the concern that investment decisions and new grant decisions may be jointly determined, I allow both of them to be endogenous and examine the association using a simultaneous equations model. The evidence suggests that managers make rational spending decisions upon receiving new grants of equity-based compensation and firms efficiently offer long-term incentives anticipating managers' expenditure behavior. In sum, this study shows that the association

between long-term incentives and expenditure is increasing in the future value created by the expenditure.

6.2 Contribution to Literature

This study contributes to the literature in several ways. First, different from prior studies that focus on rewarding managers for higher financial outcomes and non-financial value drivers, this study emphasizes on input resource expenditure and examines how to alleviate the penalty for incurring the expense on value-enhancing activities. I hypothesize and show that expenditure on activities that creates long-term value is not penalized by compensation contract (i.e., treating them as short-term expenditure). Second, I empirically document that SG&A expenditure creates long-term value that varies systematically across firms and industries. Despite the fact that SG&A expenditure has long-term impact on firm value, financial analysts and regulators often treat SG&A as a current period expense when comparing the ratio of SG&A to sales across firms and years (Abarbanell and Bushee 1997; Lev and Thiagarajan 1993). Third, this study expands the literature on valuation and incentive contracting of intangible assets. Prior studies have only investigated intangible assets created by R&D and advertising expenditure. However, none of the studies have examined the intangible assets created by SG&A expenditure. The amount of SG&A expenditure is more substantial than R&D and advertising. The intangible assets created by SG&A expenditure have a greater impact on both the capital and executive labor markets. I show that both the capital and executive labor markets recognize the long-term value created by SG&A expenditure and differentiate the asset and expense components of SG&A. Fourth, this study extends our understanding of how incentives influence managers' behavior

by showing that the impact is contextual. Prior studies have examined how performance improves subsequent to the adoption of the performance-based compensation contract (Larcker 1983; Banker, Lee, Potter and Srinivasan 2000). This study shows that the extent to which managers react to long-term incentives depends on the future value they can create in their operating context. Fifth, this study contributes to the literature on determinants of new grants of equity incentives (Smith and Watts 1992; Yermack 1995; Core and Guay 1999) by documenting that firms grant more new equity incentives when they perceive the contribution of SG&A expenditure to future value to be relatively high.

6.3 Limitations

There are several limitations of this study. First, the measure of SG&A expenditure used in this study is a summary measure of all the expenditure on various activities. Companies either do not disclose the detailed information of SG&A or the disclosure is not comparable across companies. Therefore I do not have a clean measure of specific expenditure item on specific value-creating activities. For example, the expenditure on customer satisfaction management is not available. Second, I cannot draw any causality conclusions based on the empirical models presented in this study. Although I use a lead-lag structure to examine the relationship between managers' expenditure decisions and firms' equity grant decisions, it can only demonstrate the sequence of the events rather than provide the causal relationship. Third, the simultaneous framework suffers from notorious problems such as the selection of instruments and over-identification.

6.4 Implications for Future Research

Overall, my results support the need to adjust reported earnings to recognize that SG&A creates a long-lived intangible asset that should be amortized over several years. This practice is repeatedly done in EVA® by consulting firms such as Stern Stewart. My results, however, caution against a uniform treatment of SG&A across all industries. I find that investors do not fixate on reported earnings and differentiate SG&A from other components of earnings, consistent with the efficient market hypothesis. My analysis of the executive labor market suggests that compensation committees do seem to recognize the asset creation implication of SG&A expenditure. Thus, this initial inquiry into the intangible asset creation by SG&A expenditure suggests a promising avenue for research on the role of SG&A expenditure in a variety of areas such as incentive compensation contracts for mid-level managers, capital project investment decisions by executives and valuation of acquisition targets by companies.

In this study of the average association between equity incentives and managers' expenditure decisions, I have considered future value creation to be exogenous. Since managers may have discretion in allocating resources, it is possible that future value creation is endogenous and managers can choose both the level and the type of spending. Future research can shed light on how managers' investment behavior and compensation scheme change in response to an exogenous shock to the system. Finally, this study only examines the long-term incentives that are related to equity-based compensation. It will also be interesting to see how companies use cash-based compensation such as salary and bonus to influence the trade-off between long-term expenditure and short-term expenditure.

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