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Intangible Investments and the Pricing of Corporate SGA Expenses

Rongbing Huang
Kennesaw State University, rhuang1@kennesaw.edu

Gim S. Seow
University of Cincinnati - Main Campus

Joe S. Shangguan
Robert Morris University

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Intangible Investments and the Pricing of Corporate SGA Expenses

Rongbing Huang, Kennesaw State University
Gim S. Seow, University of Connecticut
Joe Z. Shangguan, Robert Morris University

Abstract

This study examined whether the market fully prices the reported Selling, General, and Administrative (SGA) expenses when this item includes an intangible investment component. For a sample of intangible investment-intensive firms, we showed that their SGA expenses benefit future operating performances. Evidence suggests some degree of market inefficiency in the pricing of SGA expenses and the intangible investment component. Furthermore, the financial analysts do not appear to appreciate fully the future benefits of the component in their earnings forecasts. Finally, the pertinent disclosures in firms' annual reports are so inadequate as to attenuate the market mispricing, suggesting a significant room for future improvement.

Keywords: Selling, General, and Administrative Expenses, Intangible Investment, Mispricing, Analyst Forecast, Disclosure
JEL Classification: M41, G10, G14

Introduction

Accounting standard setting often entails balancing between two primary information qualities, relevance and reliability[1], to accommodate the needs of different firm stakeholders. This balanced consideration may sometimes lead to the expensing, rather than capitalizing, of certain value-relevant firm expenditures. For instance, despite the Financial Accounting Standards Board's (FASB) acknowledgement that expenditures for R&D "constitute a significant element of the United States economy and are vital for its growth," Financial Accounting Standard (FAS) No. 2 mandates that all research and development (R&D) costs be charged to expense as incurred on the ground of uncertainty about the future benefits of individual R&D projects and the difficulty involved in assigning a causal relationship between expenditures and benefits. The same rationale underlies the full expensing, rather than either full or partial capitalizing, of some other firm expenditures that are important to firms' long-term success, thereby producing relatively lower reported profits and net assets.

The purpose of this paper was to examine empirically the market pricing of a summary expense item on the income statement[2], Selling, General, and Administrative (SGA) expenses, on the premise that it may conceal some capital investment-like expenditures for developing intangibles. The concealment raises the possibility that market participants "fixate" on the SGA expenses per se and fail to recognize fully the long-term value implications of the intangible investment component. A similar phenomenon was documented by Sloan (1996) in which investors tended to fixate on reported earnings while failing to recognize the differential value implications of its two components: cash and accruals. Prior research has documented that stock

prices reflect the value of R&D capital and that market valuation is meaningfully related to the fundamental benefits and risk of R&D (Chan, Sougiannis, & Lakonishok, 2001; Lev & Sougiannis, 1996; Lev & Zarowin, 1999). However, research also provided evidence of either a systematic mispricing of R&D or a compensation for an extra risk factor associated with R&D (Lev & Sougiannis) and evidence of higher return volatility for R&D-intensive firms (Chan et al.), suggesting an informational cost in the equity market associated with the R&D accounting treatment. We extended this line of research and examined whether similar informational cost exists for other investment-like components of the SGA expenses.

Many firms' economic rents stem from such intangibles as knowledge, intellectual capital, organizational capital, and customer loyalty. Most of these value-relevant intangibles, however, do not meet the asset recognition criteria and often are deemed as practically infeasible to be recognized as assets (Upton, 2001). As a result, the various firm expenditures aimed at or effectively generating these intangibles in house often are accounted for as operating expenses[3] and incorporated into the SGA expenses on the income statement. Given the dollar-by-dollar downward effect of SGA expenses on earnings and the importance of intangibles to firms' value creation, this study investigated whether the stock market can see through the conservative accounting treatment and overcome the general lack of pertinent firm disclosures and appropriately price the SGA expenses reported on the income statement.

To gain insight into this question, it would have been ideal to be able to measure accurately the intangible investment component of SGA expenses for each firm and to examine directly the cross-sectional association between stock prices (returns) and SGA expenses, with or without the intangible investment component included. However, this approach was implausible because firm-level data on intangible investment outlays were unavailable. Unlike the R&D expenditures, which are required to be disclosed, firms rarely disclose some other expenditures that are expensed pursuant to accounting standards but may effectively generate intangibles. Consequently, a realistic situation would be that investors perceive the inclusion of the intangible investment component in some firms' SGA expenses accounts, but do not know its exact amount. Our approach, accordingly, was to examine a group of firms that were characterized by this kind of valuation situation[4].

The sample we examined was based on the lists of 500 best information technology (IT) firm users published annually by the *InformationWeek* magazine. These firms not only invested heavily on information systems, but also made substantial complementary spending in areas such as employee training, work process redesign, and organizational reshuffling (Brynjolfsson & Hitt, 2000). The majority of these expenditures are summed into the SGA expenses for financial reporting purpose. In effect, however, they should be regarded as investment in intangibles insofar as they create a crucial source of firm value—organizational capital (Brynjolfsson & Hitt, 2000; Lev & Radhakrishnan 2004; Prescott & Visscher, 1980).

We first documented that the SGA expenses of the *Informationweek500* firms, because they included a significant intangible investment component, had a positive impact on future operating performance, in contrast with a larger industry and size-matched sample. We found a set of consistent evidence that suggested some degree of market mispricing of SGA expenses for the *InformationWeek500* firms. The stock market seemed to underestimate the contribution of the IT and other complementary spending to equity value. We also examined whether financial analysts fully impute the implications of the intangible investment component of SGA expenses for future profitability. The results suggested that these experts either fail to do so or appear to be

conservative in their earnings forecasts. Furthermore, the current level of firm disclosure in the annual reports was so inadequate as to attenuate the market mispricing.

Our study is of potential interest to both firms and investors. We documented the market mispricing of a major information item on the income statement, the selling, general and administrative expenses, for the *InformationWeek500* firms. This group of firms invests heavily internally to develop intangibles that are increasingly important in today's economy. With the arguable limitations to the accounting treatment for this type of investment, firms need to find alternative ways to reduce the informational cost related to investors' difficulty in understanding the value relevance of the intangible investment. This need seems particularly imperative, given our evidence that the current level of firm disclosure is inadequate. For investors, our study provides some practical guidance as to what type of firms are most likely to have an intangible investment component concealed in the SGA expenses account.

Sample and Data

Our sample firms came from those identified by *InformationWeek* magazine as the most innovative and effective corporate IT users. The magazine conducts yearly surveys of both public and private U.S. firms with relatively intensive IT spending. Firms are evaluated and assigned scores in such areas as IT budgets, technology deployment, E-business, customer knowledge, infrastructure, and business and technology strategies. Around each September, the magazine publishes a list of top 500 firms based on the overall scores. We chose these firms to construct our sample because their reported SGA expenses were most likely to incorporate a significant intangible investment component.

To gauge the extent of intangible investment that may be concealed in the SGA expenses, we examined the limited information available on IT spending by the *InformationWeek500* firms provided by the magazine. Table 1 shows that the average IT budgets were $442 million in 2000 and $334 million in 2004, representing 4.31% and 3.68% of revenues, respectively. These budgets, if all treated as expenses[5], would have accounted for about 19.82% and 18.58% of SGA expenses (excluding R&D expenditures), respectively. Moreover, besides IT spending, firms often made complementary investments in areas such as employee training, work process redesign, and organization restructuring. These intangible investments that were accounted for as SGA expenses typically exceeded the IT spending. Brynjolfsson et al. (2002) documented that the widespread use of information technology had increased investments in intangible organizational assets. They used firm-level data and found that each dollar of installed computer capital in a firm was associated with at least five dollars of market value, after controlling for other assets. They interpreted this value as evidence of a large stock of intangible assets that complemented the computer investment.

Note that the IT budgets shown in Table 1 were only summary survey data; the exact amounts of IT spending, as well as other complementary intangible investments by individual firms, usually are unavailable to investors, because most firms do not report such information. Investors often have to rely on sporadic disclosures from various sources to infer the extent of IT and other complementary investments. For example, Owens & Minor Inc., an *InformationWeek500* firm, provided the following disclosure in its 2002 annual report:

> To support its strategic efforts, the company has developed information systems to manage virtually all aspects of its operations, including warehouse and inventory management, asset management and electronic commerce. … In July 2002, the company

entered into a new, seven-year information technology agreement with Perot Systems Corporation, expanding an existing outsourcing relationship.

Table 1. InformationWeek500 *Firms Dollars Spent on IT*

	2000	2001	2002	2003	2004
Average company revenue (Billion)	$10.26	$12.47	$9.43	$9.65	$9.09
Average dollars spent on IT (Million)	$442	$484	$320	$353	$334
Average IT budget as a % of revenue	4.31%	3.88%	3.39%	3.66%	3.68%
Average IT budget as a % of SGA expenses (excluding R&D expenditures)*	19.82%	23.17%	18.85%	18.58%	18.58%

Source: *InformationWeek* magazine

* Computed based on sample means of SGA expenses

Even this kind of information disclosure is rare among the firms[6]. This example represents the current information environment in which investors value the reported SGA expenses and the intangible investment component.

To form our sample, we started with the 4,500 *InformationWeek500* firms during 1996 through 2004. From them, we obtained 1,187 firm-year observations after eliminating firms not on Compustat and CRSP and without data on total assets, sales, SGA expenses, and operating income. We used this sample to examine the implications of SGA expenses for future operating performance. The sample size varied after imposing additional data requirements in the market efficiency tests and analysts' forecasts efficiency test.

Panel A in Table 2 presents basic accounting and market information for the *InformationWeek500* sample firms. These firms tended to be large, with median sales of $4.48 billion and market capitalization of $4.73 billion. The median SGA expenses to sales ratio was 0.16 and both median return on assets and median profit margin were 0.10. Panel B in Table 2 shows that the sample distribution across years was largely even. As for industry distribution (untabulated), the firms spanned a broad range of 52 two-digit SIC industries, with the most observations from Chemicals and Pharmaceuticals (SIC code 28, N=117 or 9.8%) followed by Machinery and Computer equipment (SIC code 35, N=107 or 9.0%). Therefore, our results were unlikely to be biased towards any particular years or industries.

Table 2. *Sample Descriptive Statistics*

Panel A: Accounting and Market Profiles of *InformationWeek500* Sample Firm-Years

Variable	***N***	**Mean**	**Median**	**Std Dev**	**Min.**	**Max.**
Total assets ($mil)	1,187	15,408	4,566	39,211	243	479,921
Sales ($ mil.)	1,187	10,576	4,481	20,426	157	192,319
Common equity ($ mil.)	1,187	4,001	1,659	6,794	3	78,927
Market value ($ mil.)	1,187	16,610	4,726	39,126	20	460,304
SGA expenses / Sales	1,187	0.18	0.16	0.11	0.00	0.70
Return on assets	1,187	0.11	0.10	0.08	(0.34)	0.57
Profit margin	1,187	0.11	0.10	0.12	(1.02)	0.53
Market model beta	1,187	1.00	0.94	0.49	0.01	4.00
Number of employees (thousand)	1,174	40.65	19.70	61.56	1.18	608.00

Panel B: Distribution of Sample Firms Across Years

Year	***N***	**%**
1996	115	9.69
1997	117	9.86
1998	112	9.44
1999	109	9.18
2000	147	12.38
2001	152	12.81
2002	150	12.64
2003	144	12.13
2004	141	11.88
Total	1,187	100.00

Empirical Analyses

The Implications of SGA Expenses for Future Operating Performance

Our analysis started with the examination of the impact of SGA expenses on future operating performance. Prior research suggested that the time-series behavior of earnings was by and large a random walk or a random walk with drift (Ball & Watts, 1972; Freeman, Ohlson, &. Penman, 1982), namely, the next-period earnings could best be predicted by the current-period earnings. Mozes (1992) suggested that the random walk earnings model could be expanded to an AR (2) model, which also includes the last-period earnings: $Earnings_{t+1} = a_0 + a_1 Earnings_t + a_2 Earnings_{t-1} + u_t$. To examine whether the SGA expenses had any additional predictive value for future earnings, we added it into the earnings forecast model and scaled all the variables by total assets (sales). This modification brought us to estimating the following two equations:

$$ROA_{t+1} = a_0 + a_1 ROA_t + a_2 ROA_{t-1} + a_3 SGA_t + u_t \qquad (3.1a)$$

$$PM_{t+1} = b_0 + b_1 PM_t + b_2 PM_{t-1} + b_3 SGA_t + e_t, \qquad (3.1b)$$

where *ROA* is return on assets measured as operating income (*OI*) (Compustat annual data item # 178) divided by average total assets (Data #6), *PM* is profit margin measured as operating income divided by sales (Data #12), and *t* indicates fiscal year t. *SGA* is SGA expenses excluding R&D expenditures (Data #189 – Data #46) and is divided by average total assets in (3.1a) and by sales in (3.1b).

If *SGA* indeed included only expenses, then by the nature of expense, it should not have affected future performance and we would have expected a_3 or b_3 to be insignificant. However, if SGA also included a portion of expenditures that could effectively generate intangible assets and, hence, impact a firm's long-term performance, as was likely the case for the *InformationWeek500* firms, then we would have expected a_3 and b_3 to be positive.

The estimation results shown in Table 3 confirmed our expectations. In Panel A, we first estimated (3.1a) and (3.1b) for the *InformationWeek500* sample. Both a_3 (estimate=0.025, *t*-stat.=3.30) and b_3 (estimate=0.111, *t*-stat.=3.48) were positive and significant at the 1% level, suggesting that for the *InformationWeek500* firms, the SGA expenses account had a component that benefits future performance.

As a comparison, we estimated the same equations for a sample of firms from Compustat that were matched with the *InformationWeek500* firms by industry and firm size during the same period (1996-2004)[7]. The results were distinctively different. In the return on assets regression, a_3 was positive but insignificant. In the profit margin regression, b_3 was even significantly negative. The results suggested that for the larger population of firms, overall, SGA expenses do not benefit future performance, consistent with the accounting definition of expenses.

Panel B of Table 3 provides the estimation results for the pooled sample. We introduced a dummy variable, DUM_t, for firms in the *InformationWeek500* sample and an interaction variable, $SGA_t \times DUM_t$. The models were as follows:

$$ROA_{t+1} = a_0 + a_1 ROA_t + a_2 ROA_{t-1} + a_3 SGA_t + a_4 SGA_t \times DUM_t + a_5 DUM_t + u_t \qquad (3.1c)$$

$$PM_{t+1} = b_0 + b_1 PM_t + b_2 PM_{t-1} + b_3 SGA_t + b_4 SGA_t \times DUM_t + b_5 DUM_t + e_t \qquad (3.1d)$$

In the above equations, coefficients a_3 or b_3 alone represents the effect of SGA expenses on future performance for the non-*InformationWeek500* firms, while $(a_3 + a_4)$ or $(b_3 + b_4)$ measures the effect for the *InformationWeek500* firms. The results in Panel B. confirmed those in Panel A. In the return on assets regression, a_3 was positive but insignificant, a_4 was positive and significant at the 5% level. In the profit margin regression, b_3 was significantly negative, but b_4 was much more positive and significant at the 1% level. Once again, the results suggested that the SGA expenses had a positive impact on future performance due to an intangible investment component for the *InformationWeek500* firms but not for the larger population of firms.

Table 3 *The Implication of SGA Expenses for Future Operating Performance*

Panel A: Separate OLS Estimations for the *InformationWeek500* Sample and the Matched Sample Based on Industry and Size

$$ROA_{t+1} = a_0 + a_1 ROA_t + a_2 ROA_{t-1} + a_3 SGA_t + u_t$$

	InformationWeek500 sample		Matched sample	
Parameter	Estimate	Adjusted *t*-stat.	Estimate	Adjusted *t*-stat.
a_0	0.012	(3.85)***	0.017	(9.56)***
a_1	0.893	(15.47)***	0.619	(11.64)***
a_2	-0.082	(-1.49)	0.025	(1.29)
a_3	0.025	(3.30)***	0.020	(1.28)
N	1,187		13,066	
Adjusted R^2	72.2%		50.4%	

$$PM_{t+1} = b_0 + b_1 PM_t + b_2 PM_{t-1} + b_3 SGA_t + e_t$$

	InformationWeek500 sample		Matched sample	
Parameter	Estimate	Adjusted t-stat.	Estimate	Adjusted t-stat.
b_0	0.002	(0.37)	0.041	(4.18)***
b_1	0.837	(9.16)***	0.684	(10.07)***
b_2	-0.038	(-0.35)	-0.088	(-3.38)***
b_3	0.111	(3.48)***	-0.072	(-2.42)**
N	1,187		13,742	
Adjusted R^2	72.5%		46.4%	

(Table continues)

Table 3 (continued)

Panel B Pooled OLS estimations

(a) $ROA_{t+1} = a_0 + a_1 ROA_t + a_2 ROA_{t-1} + a_3 SGA_t + a_4 SGA_t \times DUM_t + a_5 DUM_t + u_t$

(b) $PM_{t+1} = b_0 + b_1 PM_t + b_2 PM_{t-1} + b_3 SGA_t + b_4 SGA_t \times DUM_t + b_5 DUM_t + e_t$

(a)			(b)		
Parameter	Estimate	Adjusted *t*-stat.	Parameter	Estimate	Adjusted *t*-stat.
a_0	0.016	(9.38)***	b_0	0.040	(4.17)***
a_1	0.627	(12.02)***	b_1	0.688	(10.28)***
a_2	0.023	(1.18)	b_2	-0.088	(-3.41)***
a_3	0.020	(1.28)	b_3	-0.070	(-2.37)**
a_4	0.031	(2.53)**	b_4	0.219	(5.20)***
a_5	0.006	(1.56)	b_5	-0.023	(-3.17)***
N		14,253		14,929	
Adjusted R^2		51.4%		46.9%	

** and *** indicate statistical significance at the 5% and 1% level, respectively. White (1980) t-statistics are used.

Variable definition (for corresponding fiscal years):

ROA - return on assets measured as operating income divided by average total assets

PM - profit margin percentage measured as operating income divided by sales

SGA - selling, general and administrative expenses (excluding R&D) scaled by average total assets in the *ROA* regression and by sales in the *PM* regression

DUM - a dummy variable equal to 1 for the *InformationWeek500* observations and 0 otherwise

Table 4 provides further evidence of the positive impact of SGA expenses on future performance for the *InformationWeek500* sample. We laid out a common measure of operational productivity, sales per employee, for the year (year 0) when a firm was selected into the *InformationWeek500* list and the four subsequent years. As the table shows, overall sales per employee increased over time for both mean (from $305,310 in year 0 to $341,010 in year 4) and median (from $214,070 in year 0 to $237,770 in year 4). In each of the five years, the *InformationWeek500* firms had higher sales per employee than the median firms in their two-digit industries. For industry-adjusted sales per employee, the median increased (from $22,520 in year 0 to $29,630 in year 4) while the mean decreased (from $93,440 in year 0 to $84,340 in year 4) over time. These results also suggested heavy IT spending by the *InformationWeek500* firms because IT is often a substitute for human labor. The difference appeared quite distinctive.

Table 4. *Sales per Employee (in $1,000) in and After the Year When Firms Are Selected Into the* InformationWeek500 *List***.** (Year 0 Is When a Firm Is Selected Onto the *InformationWeek500* List (*N*=646))

Sales per employee	Mean	Median
Year 0	305.31	214.07
Year 1	317.84	220.87
Year 2	319.48	224.59
Year 3	319.05	232.19
Year 4	341.01	237.77
Industry-adjusted sales per employee		
Year 0	93.44	22.52
Year 1	97.58	24.63
Year 2	92.48	24.30
Year 3	82.19	28.83
Year 4	84.34	29.63

Variable definition:
Sales per employee - sales divided by number of employees
Industry-adjusted sales per employee - firm sales per employee minus two-digit industry median sales per employee

The Market Pricing of SGA Expenses for* InformationWeek500 *Firms

In this section, we built on the above evidence that for the *InformationWeek500* firms the SGA expenses had a positive effect on future operating performance due to an intangible investment component (IT and complementary spending) and examined whether the stock market fully prices this effect.

We conducted this analysis in two steps. First, we examined whether the stock market perceives the reported SGA expenses as carrying value-relevant information. A standard procedure in the finance literature is to examine whether there is any association between contemporaneous stock returns and the variable of interest (i.e., the SGA expenses) while controlling for factors known to affect returns (Fama & French, 1993; Rajgopal, Shevlin, & Venkatachalam, 2003). Accordingly, we estimated the following equation:

$$SAR_t = \alpha + \beta_1 BETA_t + \beta_2 \ln MV_t + \beta_3 \ln BTM_t + \beta_4 EP_t + \beta_5 SGA_t + \varepsilon_t \qquad (3.2a)$$

where *SAR* is size-adjusted abnormal return measured as the firm's raw buy-and-hold return for the 12-month period ending 3 months after fiscal year-end minus the buy-and-hold return on a size-matched portfolio during the same period, *BETA*, *lnMV*, and *lnBTM*, represented the three Fama-French factors: systematic risk, size, and book-to-market equity ratio. *BETA* was estimated from the market model using 60 monthly returns prior to year t (at least 24 monthly returns were required). *lnMV* was measured as the natural logarithm of market value at the fiscal year-end. *lnBTM* was measured as the natural logarithm of book-to-market equity ratio. *EP* was the earnings-price ratio (year-end stock price at *t*-1 is used) intended to control for potential E/P ratio anomaly (Basu, 1977). *SGA* was the variable of interest. A significant coefficient on *SGA*

implied that it contains value-relevant information reflected in the contemporaneous returns. Thus, we expected β_5 to be significantly positive.

A complementary test of market efficiency was to regress subsequent returns (SAR_{t+1}) on the same set of explanatory variables. Specifically, we estimated the following equation:

$$SAR_{t+1} = \alpha + \beta_1 BETA_t + \beta_2 \ln MV_t + \beta_3 \ln BTM_t + \beta_4 EP_t + \beta_5 SGA_t + \varepsilon_t \quad (3.2b)$$

A significant coefficient (β_5) on *SGA* would have implied that the market was correcting itself by incorporating value-relevant information contained in *SGA* in the subsequent period; hence, the absence of full efficiency in the concurrent period.

We ran three alternative estimations to ensure the robustness of results. Panel A of Table 5 reports the simple OLS estimation results. The estimates for β_5 are -0.277 in the contemporaneous returns regression and 0.226 in the subsequent returns regression, both were significant at the 10% level. Panel B reports heteroskedasticity-consistent results using nonlinear OLS estimation, while Panel C reports results based on the Newey-West (1987) estimation method to adjust for potential heteroskedasticity and serial correlation in error terms. Results in Panels B and C are largely consistent with those in Panel A. We considered our results as evidence of market inefficiency. The market does not appear to price fully the positive impact of SGA expenses on future operating performance for the *InformationWeek* firms, as documented in Table 3.

Table 5. *Regressions of Contemporaneous and Subsequent Stock Returns on SGA Expenses* (*N*=941)

Model: SAR_t or $SAR_{t+1} = \alpha + \beta_1 BETA_t + \beta_2 \ln MV_t + \beta_3 \ln BTM_t + \beta_4 EP_t + \beta_5 SGA_t + e_t$

Panel A: Simple OLS estimation

	SAR_t		SAR_{t+1}	
Parameter	Estimate	T-stat.	Estimate	T-stat.
α	0.146	1.33	-0.039	-0.43
β_1	0.099	2.68***	0.035	1.14
β_2	-0.027	-2.18**	-0.011	-1.06
β_3	-0.136	-5.45***	0.004	0.20
β_4	-0.703	-1.80*	1.440	4.42***
β_5	-0.277	-1.71*	0.226	1.68*
Adj. R^2 (%)	4.1		2.7	

Panel B: Heteroskedasticity-Consistent Nonlinear OLS Estimation

	SAR_t		SAR_{t+1}	
Parameter	Estimate	Adjusted t-stat.	Estimate	Adjusted t-stat.
α	0.146	1.44	-0.039	-0.42
β_1	0.099	2.08**	0.035	1.03
β_2	-0.027	-2.12**	-0.011	-1.06
β_3	-0.136	-2.88***	0.004	0.21
β_4	-0.703	-1.95*	1.440	3.57***
β_5	-0.277	-1.51	0.226	1.67*
Adj. R^2 (%)	5.0		3.1	

Panel C: Nonlinear GMM Estimation Using Newey-West Method

	SAR_t		SAR_{t+1}	
Parameter	Estimate	Adjusted *t*-stat.	Estimate	Adjusted **t**-stat.
α	0.140	1.71*	-0.039	-0.44
β_1	0.091	2.56**	0.035	1.46
β_2	-0.025	-2.49**	-0.011	-1.15
β_3	-0.129	-2.79***	0.004	0.28
β_4	-0.716	-1.96*	1.440	3.45***
β_5	-0.265	-1.74*	0.226	2.43**
Adj. R^2 (%)	4.6		2.6	

*, ** and *** indicate statistical significance at the 10%, 5% and 1 % level, respectively.

Variable definition:

SAR - size-adjusted abnormal return measured as the firm's raw buy-and-hold return for the 12-month period ending 3 months after fiscal year-end (of t or t+1) minus the buy-and-hold return on a size-matched portfolio during the same holding period

BETA - beta estimated from the market model using 60 monthly returns prior to year t (at least 24 monthly returns are required)

lnMV - natural logarithm of market value

lnBTM - natural logarithm of book-to-market equity ratio

EP - earnings-to-price ratio (year-end stock price at t-1 is used)

SGA - selling, general, administrative expenses (excluding R&D) scaled by sales

Mishkin Test of Market Efficiency in Pricing SGA Expenses

In this sub-section, we add further evidence on whether the market fully prices the intangible investment component of the SGA expenses by using an alternative method. Recently, researchers have adopted the Mishkin (Abel & Mishkin, 1983; Mishkin 1983,) method to test market efficiency in a variety of settings. For example, Sloan (1996) used it to test whether the market is efficient in pricing the differential implications of the accrual and cash components of earnings for future earnings. Rajgopal et al. (2003) used this method to test whether the market fully appreciates the implications of firms' backlogs for future earnings. Similar to prior studies, we specified the models as follows:

$$OI_{t+1} = \gamma_0 + \gamma_1 OIB_t + \gamma_2 SGA_t + v_t \qquad (3.3a)$$

$$SAR_{t+1} = \beta\ (OI_{t+1} - \gamma_0 - \gamma_1^* OIB_t - \gamma_2^* SGA_t) + u_t \qquad (3.3b)$$

where *OI* is operating income scaled by average total assets at the beginning and the end of the fiscal year, *OIB* is operating income before *SGA* expenses scaled by average total assets, namely, *OIB* = (*OI* + *SGA)*. *SAR* and *SGA* are as defined before. Equation (3.3a) is referred to as the forecasting equation. It estimates the forecasting ability (or persistence) of the two components of earnings for future earnings, as represented by γ_1 and γ_2. The purpose of decomposing *OI* into *OIB* and *SGA* was to facilitate the examination of market pricing of the implications of SGA expenses for future earnings. This was in the same spirit as Sloan (1996), in which earnings were purposefully decomposed into accrual and cash components in order to examine their differential persistence. Equation (3.3b) could be referred to as the rational pricing equation. According to this model, the market reacts to unexpected change in earnings, namely, OI_{t+1}-expectation of OI_{t+1}, where the expectation of OI_{t+1} is simply $\gamma_0 + \gamma_1 OIB_t + \gamma_2 SGA_t$ based on equation (3.3a). Market efficiency imposes that $\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$. In other words, it imposes a market rationality constraint by allowing investors to anticipate the implications of the two earnings components for future earnings. A rejection of the joint constraints would indicate market inefficiency.

The two equations, (3.3a) and (3.3b), were estimated jointly using iterative weighted non-linear least squares method (Abel & Mishkin, 1983; Mishkin 1983). The restrictions imposed by market efficiency were tested using a likelihood ratio statistic that is distributed asymptotically $\chi^2(q)$: $2n\ln(SSR^r / SSR^u)$, where q is the number of restrictions imposed by market efficiency, n is the number of observations, SSR^r is the sum of squared residuals from the restricted weighted system, and SSR^u is the sum of squared residuals from the unrestricted weighted system.

Table 6. *Mishkin Test of Market Efficiency in the Pricing Implications of SGA Expenses for Subsequent Earnings (N*=1,125)

Nonlinear generalized least squares regression is applied to the following equations system:

(1) $OI_{t+1} = \gamma_0 + \gamma_1 OIB_t + \gamma_2 SGA_t + v_t$

(2) $SAR_{t+1} = \beta(OI_{t+1} - \gamma_0 - \gamma_1^* OIB_t - \gamma_2^* SGA_t) + u_t$

Parameter	Estimate	Asymptotic Standard Error	*t*-stat.
γ_0	0.008	0.002	3.66***
γ_1	0.807	0.017	49.06***
γ_1*	0.915	0.075	12.28***
γ_2	-0.773	0.020	-37.96***
γ_2*	-0.983	0.106	-9.30***
β	2.259	0.343	6.59***

*** indicates statistical significant at the 1% level.

Test of market efficiency: $\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$

Likelihood ratio statistic: 9.25

Marginal significance level: 0.01

Variable definition (for corresponding fiscal years):

OI- operating income (Compustat data item # 178) scaled by average total assets

SGA - selling, general, and administrative expenses scaled by average total assets

OIB - OI before SGA expenses scaled by average total assets, namely, *OI+SGA*

SAR - size-adjusted abnormal return measured as the firm's raw buy-and-hold return for the 12-month period ending 3 months after fiscal year-end (of t+1) minus the buy-and-hold return on a size-matched portfolio during the same holding period

Table 6 reports the estimation results. The joint hypothesis $\gamma_1 = \gamma_1^*$ and $\gamma_2 = \gamma_2^*$ was rejected at the 1% significance level (likelihood ratio statistic = 9.25). The estimate of γ_1 was 0.807, while the estimate of γ_1^* is 0.915. This implied that the stock market perceived the *OIB* component of earnings as being more persistent than suggested by the time-series forecasting equation (i.e., 3.3a). Turning to *SGA*, its coefficient estimate from equation (3.3a) γ_2 was equal to -0.773, while from equation (3.3b) γ_2^* was equal to -0.983, indicating that the market perceived the *SGA* component of earnings as being more persistent than suggested by equation (3.3b). Meanwhile, γ_2^* = -0.983 meant that the market treats SGA expenses as reducing firm value nearly dollar by dollar, This generally may be true but was inconsistent with the evidence in Section 3.1 that SGA expenses of the *InformationWeek500* firms encompassed significant capital investments. Therefore, the Mishkin test provided further evidence that the market did not fully price the value implications of the SGA expenses for the *InformationWeek500* firms.

Does Firm Disclosure Help Attenuate the Market Inefficiency?

The mispricing of SGA expenses documented above could be attributable to investors' difficulty in interpreting the reported amounts. The difficulty arises from both the full expensing accounting rule and the current status of inadequate firm disclosure regarding the intangible

investment component of SGA expenses. As we pointed out at the beginning, the FASB may have valid reasons to mandate full expensing of expenditures whose outcomes were highly uncertain. The investors thus relied more on firms providing adequate information disclosure. We then examined whether the current disclosures in firms' annual reports improved market valuation.

We based our analysis on equations (3.2a) and (3.2b) and introduced a new variable for firm disclosure on IT investment and other related spending. The model specification was as follows:

$$SAR_t \text{ or } SAR_{t+1} = \alpha + \beta_1 BETA_t + \beta_2 \ln MV_t + \beta_3 \ln BTM_t + \beta_4 EP_t + \beta_5 SGA_t + \beta_6 SGA_t * discl\_it_t + \beta_7 discl\_it_t + e_t, \quad (3.4)$$

where $discl\_it$ is a dummy variable for disclosure of IT-related information in management discussions of SGA expenses and all other variables are as defined previously. The coding of $discl\_it$ required reading each sample firm's annual report. We randomly selected 10% (93) firms from the sample used for equation (3.2b) that had accessible annual reports in the EDGAR database. We then read these firms' annual reports with primary focus on the discussions of SGA expenses in the Management Discussion and Analysis (MD&A) section and the footnotes to the financial statements. If there was any discussion of IT and other complementary spending or any description of IT programs, $discl\_it$ was coded as 1, otherwise 0 was assigned. In total, we identified 15 firms with IT disclosures in the discussions of SGA expenses. For example, Magnetek, Inc. had the following disclosure in its 1997 annual report:

> Selling, general and administrative (SG&A) expense was $159.9 million (13.4% of net sales) in fiscal 1997 compared to $164.9 million (14.2% of net sales) in fiscal 1996… While the Company continues to review opportunities to reduce support costs, expenses associated with upgrades in information systems, quality programs and organizational capability will limit the ability to reduce SG&A expense in fiscal 1998.

The interaction variable in equation (3.4), $SGA * discl\_it$, is the variable of interest. Theory (Verrecchia, 2001) and empirical evidence have suggested that voluntary disclosure helps reduce information asymmetry. If investors are informed that SGA expenses encompass IT and complementary spending, they would weigh SGA expenses less negatively when forecasting future earnings. Thus, *ceteris paribus*, the market inefficiency documented in the preceding sections will be attenuated for the disclosing firms. For this reason, we expect the coefficient on $SGA * discl\_it$ to be negative (i.e., $\beta_6 < 0$).

Table 7. *The Effect of Disclosure About IT Investment on the Market Pricing Adjustment Relating to SGA Expenses* (*N*=93)

Model: $$SAR_t \text{ or } SAR_{t+1} = \alpha + \beta_1 BETA_t + \beta_2 \ln MV_t + \beta_3 \ln BTM_t + \beta_4 EP_t + \beta_5 SGA_t + \beta_6 SGA_t \times discl\_it + \beta_7 discl\_it_t + e_t$$

	SAR_t		SAR_{t+1}	
Parameter	Estimate	t-stat.	Estimate	t-stat.
α	0.209	0.69	-0.072	-0.25
β_1	0.084	0.81	0.024	0.25
β_2	-0.034	-1.08	-0.012	-0.40
β_3	-0.200	-2.51**	-0.036	-0.48
β_4	-0.865	-0.78	1.870	1.79*
β_5	-0.812	-1.72*	-0.129	-0.29
β_6	1.038	0.91	0.775	0.72
β_7	-0.181	-0.84	-0.170	-0.83
Adj. R^2 (%)	3.8		-2.4	

* and **indicate statistical significance at the 10 % and 5% level, respectively
Variable definition (for corresponding fiscal years):
discl - a dummy variable equal to 1 if a firm provides voluntary disclosure on IT investment in connection with SGA expenses in its annual report of year t, and 0 otherwise
Other variables are as defined in Table 5.

Table 7 reports the OLS estimation results for the combined sample (disclosure and nondisclosure firms). In the contemporaneous returns (SAR_t) regression, the coefficient on *SGA,* β_5, was negative and significant at the 10% level. Inconsistent with our expectation, the coefficient on $SGA * discl\_it$, β_6, was positive but insignificant. In the subsequent returns (SAR_{t+1}) regression, neither β_5 nor β_6 was significant. We concluded that the IT-related disclosures in firms' discussions of SGA expenses in annual reports did not provide much useful information to investors; thus, they did not help mitigate market mispricing. It is likely that firms may have disclosed IT-related information through other channels. Nevertheless, our examination of annual reports revealed that firms' disclosures were often too brief and qualitative in nature, leaving significant room for future improvement on this information channel.

Do Analysts Fully Appreciate the Investment Nature of the Spending Reported as SGA Expenses?

We examine whether financial analysts fully appreciate the capital investment nature of spending reported as SGA expenses. Financial analysts act as information intermediaries in the stock market. Compared to average investors, they have developed strong financial expertise through training and experience and have greater access to corporate information. Insights into how analysts incorporate information contained in SGA expenses can help us better understand the market mispricing of SGA expenses.

To see how analysts fare, we adopted a method similar to that in Rajgopal et al. (2003), who examined how analysts weigh information contained in firms' order backlogs in their earnings forecasts. Specifically, we estimated the following three regressions:

$$EPS_{t+1} = \beta_0 + \beta_1 EPS_t + \beta_2 SGA_t + e_t \quad (3.5a)$$

$$FEPS_{t+1} = \lambda_0 + \lambda_1 EPS_t + \lambda_2 SGA_t + u_t \quad (3.5b)$$

$$FERROR_{t+1} = (\lambda_0 - \beta_0) + (\lambda_1 - \beta_1) EPS_t + (\lambda_2 - \beta_2) SGA_t + (u_t - e_t) \quad (3.5c)$$

where *EPS* is reported earnings per share, excluding extraordinary items obtained from Compustat (item #58), *FEPS* is I/B/E/S consensus forecast of earnings per share reported in the fourth month after fiscal year-end. The lag of three to four months ensures that SGA expenses information is available to analysts. Both *EPS* and *FEPS* are scaled by the stock price on the last trading day of fiscal year t. *FERROR* is equal to *FEPS* - *EPS* and stands for analysts' forecast error. *SGA* is as defined before.

Equation (3.5a) was a time-series forecast model for reported earnings. Coefficients β_1 and β_2 captured the information content of current earnings and SGA expenses in the time-series forecast of future earnings. Coefficients λ_1 and λ_2 in equation (3.5b), on the other hand, represented the weights analysts assigned to the two variables in their forecasts of future earnings. Whether analysts properly assign the weights was seen by comparing the two pairs of coefficients. In particular, if $\lambda_2 < \beta_2$ (both coefficients should be negative because SGA represents expenses), it meant that analysts overestimated the negative implications of the current reported SGA expenses for future earnings. On the contrary, analysts underestimated it. Equation (3.5c) was obtained by subtracting equation (3.5a) from equation (3.5b). This procedure allowed the statistical testing of the coefficient differences (λ_1 - β_1) and (λ_2 - β_2). We expected (λ_2 - β_2) < 0. Although analysts have expertise, the lack of adequate disclosure on the intangible investment component may still have impaired their ability to make effective assessment about the implications of SGA expenses for future earnings.

Table 8 reports the estimation results for (3.5a) - (3.5c) based on a sample of 625 firms with necessary data available from Compustat and I/B/E/S. Examining the coefficient on EPS_t, Panel A shows β_1=0.340 (t-stat.=11.94). Panel B shows λ_1=0.199 (t-stat.=4.72). The difference (β_1 - λ_1) was statistically significant as shown in Panel C (t-stat.=-3.00), indicating that analysts underestimated the persistence of earnings. This result was consistent with prior research (Ahmed et al. 2002, Rajgopal et al. 2003). More interestingly, the coefficient on *SGA* β_2=-0.021 (*t*-stat.=-1.21) in Panel A and λ_2=-0.080 (*t*-stat.=-3.10) in Panel B, and Panel C shows the difference (λ_2 - β_2) =-0.058 was statistically significant at the 5% level (*t*-stat.=-2.02). These results, consistent with our expectation, indicated that analysts assigned a more negative weight on SGA expenses in their forecasts than that implied by the time-series forecast model. Like average investors, analysts failed to fully appreciate the benefits of IT investment and other complementary spending concealed in the reported SGA expenses[8]. This result was consistent with the finding of Lev and Radhakrishnan (2004) that financial analysts' earnings forecasts did not fully reflect the value of organizational capital resulted from IT and other related investments. Given this inability of analysts, it was not surprising that the overall market misprices the SGA expenses reported by the *InformationWeek500* firms.

Table 8. *Analysis of Whether Analysts Fully Appreciate the Information Contained in SGA Expenses in Their Earnings Forecasts* (N=625)
The following equations were estimated:

(1) $EPS_{t+1} = \beta_0 + \beta_1 EPS_t + \beta_2 SGA_t + e_t$

(2) $FEPS_{t+1} = \beta_0 + \beta_1 EPS_t + \beta_2 SGA_t + e_t$

(3) $FERROR_{t+1} = (\lambda_0 - \beta_0) + (\lambda_1 - \beta_1) EPS_t + (\lambda_2 - \beta_2) SGA_t + (u_t - e_t)$

Parameter		Estimate	*t*-stat
Panel A: Equation (1)	Adj. R^2 = 19.4%		
β_0		0.025	6.52***
β_1		0.340	11.94***
β_2		-0.021	-1.21
Panel B: Equation (2)	Adj. R^2 = 5.4%		
λ_0		0.059	10.5***
λ_1		0.199	4.72***
λ_2		-0.080	-3.10***
Panel C: Equation (3)	Adj. R^2 = 1.5%		
$\lambda_0 - \beta_0$		0.034	5.42***
$\lambda_1 - \beta_1$		-0.142	-3.00***
$\lambda_2 - \beta_2$		-0.058	-2.02**

, and * indicate statistical significance at the 5% and 1 % level, respectively
Variable definition (for corresponding fiscal years):
EPS- earnings per share excluding extraordinary items (Compustat item #58) scaled by the previous year-end share price
SGA - selling, general, and administrative expenses (excluding R&D) scaled by sales
FEPS - I/B/E/S consensus forecast of earnings per share reported in the fourth month after fiscal year end scaled by the previous year-end share price
FERROR - analysts' forecast error, equal to *FEPS* - *EPS*

Conclusion

The SGA expenses reported on many firms' income statements included substantial expenditures with a capital investment nature because they effectively may have generated intangibles that are crucial for firms' long-term success. The full expensing of these expenditures and the lack of pertinent disclosure could create a difficulty for investors' valuation, thereby causing an informational cost in the equity market.

Our evidence was consistent with this view. For a sample of *InformationWeek500* firms that were perceived as intensive in IT and other complementary investments, we found that these firms' SGA expenses were positively associated with future operating performance, a phenomenon that did not exist for the larger population of other firms. However, the market did not seem to fully price the value implication of the intangible investment component of the SGA expenses or the item as a whole. Neither did the financial analysts fully appreciate the implication in their earnings forecasts. Our results also showed that the current level of disclosure in firms' annual reports was not enough to attenuate this particular market mispricing.

Two caveats are worth mentioning regarding the interpretation of our results. First, our results should not be over-generalized. We do not infer that for *all* firms the reported SGA expenses encompassed an intangible investment component or that there was a market mispricing of their value implications. Our analyses apply best to those firms that rely more on intangibles to compete and need to invest heavily to develop them. Second, we do not view our results as a favor for proposing a change in the current accounting standard, namely, the full expensing of such intangible investment-like expenditures, although it contributes to an informational cost in the equity market. As mentioned in the beginning, accounting standard setting often requires a delicate balancing between different stakeholders. Our results, however, do suggest that there is a significant room for improving the pertinent disclosures on the firms' part.

End Notes

[1] Financial Accounting Standards Board (FASB) Concepts Statement No. 2

[2] Another major summary expense item on the income statement is Cost of Sales.

[3] We do not deny that a portion of these expenditures may qualify as capital investment.

[4] In another approach, Kovacs (2004) and Shangguan (2005) extract a capital investment component out of SGA expenses and find that this component is positively associated with future operating performance. They first estimate the industry-level 'amortization rates' of SGA expenses by regressing earnings on a chain of current and lagged SGA expenses using large cross-sectional samples. The capital investment component is measured as the sum of the unamortized SGA expenses. This estimated capital component is then used to test the market valuation of firms' investment-type spending. However, their approach is not without limitations. First, a large cross-sectional sample may include many firms for which the SGA expenses account contains little or no capital investment components. Second, the amortization rates of SGA expenses estimated based on large sample cross-sectional regression are invariant at least for firms within an industry. Thus, their approach does not help distinguish different intensities of spending on intangibles for firms within an industry.

[5] It is without a doubt that firms would capitalize a portion of IT spending such as purchase of computers. Our point, as we will illustrate immediately, is that at least another, and often significant, portion of IT spending, along with other investment-like expenditures, are accounted for as operating expenses.

[6] This view is partly substantiated by our investigation of firm disclosures discussed in Section 3.4. Only 15 out of 93 sample firms briefly mention the IT component in their discussion of SGA expenses in annual reports. No firm discloses specific amounts of the IT and complementary spending.

[7] We first sort all available Compustat firms' sales into five quintiles. The firm-years of those non-*InformationWeek500* firms with the same two-digit SIC codes and sales quintiles as those of the *InformationWeek500* firms are used to form the matched sample.

[8] Another potential explanation is that analysts are conservative in their forecasts and valuation due to the high uncertainty associated with IT investment outcome. Dehning et al. (2006), for example, show that IT spending increases earnings forecast dispersion and error, which in turn translates into lower market value for the firm.

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