Strategic Management Journal
Strat. Mgmt. J., **21**: 455–472 (2000)

THE FREE CASH FLOW HYPOTHESIS FOR SALES GROWTH AND FIRM PERFORMANCE

THOMAS H. BRUSH*[1], PHILIP BROMILEY[2] and MARGARETHA HENDRICKX[1]
[1]*Krannert School of Management, Purdue University, West Lafayette, Indiana, U.S.A.*
[2]*Carlson School of Management, University of Minnesota, Minneapolis, Minnesota, U.S.A.*

business is business!
And business must grow
–Dr. Seuss, The Lorax

The paper investigates the agency argument that sales growth in firms with free cash flow (and without strong governance) is less profitable than sales growth for firms without free cash flow. It also tests whether strong governance conditions improve the performance of firms with free cash flow and/or limit the investments in unprofitable sales growth. Consistent with agency theory, firms with free cash flow gain less from sales growth than firms without free cash flow. But different governance conditions affect sales growth and performance in different ways. Having substantial management stock ownership mitigates the influence of free cash flow on performance, despite allowing higher sales growth. In contrast, outside blocks held by mutual funds reduce sales growth substantially, but does not increase performance from sales growth.

INTRODUCTION

Most firms value sales growth. The business press and corporate annual reports frequently include statements like: "We plan to double sales in the next five years," or "Our objective is to be a $2 billion company within 7 years." The popular business press contains many examples of companies that focus on sales growth as a key to profitability. For example, Emerson Electric is well known for its string of 40 consecutive years of increased earnings. When asked for the secret, the CEO Chuck Knight replied, "You can't just cut, cut, cut, cut... You simply must have sales growth to get sustainable performance at the bottom line" (*Fortune*, 1998).

Academics, on the other hand, have argued that growth sometimes benefits managers rather than stockholders. The "managerial capitalism" tradition in economics investigates what happens when managers, as opposed to owners, run large corporations (Berle and Means, 1932; Marris, 1964; Baumol, 1967; Marris and Wood, 1971). Researchers in this tradition argue that managers sometimes make decisions in their own interest rather than the interest of the company's owners. Indeed, more than 200 years ago, Adam Smith (1776) pointed out that hired managers do not take as much care of their firms as do owners. Agency theory extends this logic. According to agency theory, managers pursue growth because growth benefits them personally—growth guarantees employment and salary increases for managers due to the greater responsibilities of managing a larger firm (Murphy, 1985). To solve the problem of conflicting interests, agency researchers seek mechanisms to align the interests of managers to those of shareholders (Jensen and

Key words: sales growth, agency, free cash flow, governance
*Correspondence to: Thomas H. Brush, Krannert School of Management, Purdue University, 1310 Krannert Building, West Lafayette, IN 47907-1310, U.S.A.

Received 9 May 1997
Final revision received 18 July 1999

Meckling, 1976; Jensen and Ruback, 1983; Fama and Jensen, 1983; Jensen, 1986; Jarrell, Brickley and Netter, 1988; Shleifer and Vishny, 1991).

Despite the important role sales growth plays in the world of managers, and its central role in agency theory, we know of no research that empirically examines the factors that moderate the association between sales growth and firm performance. This paper makes an initial effort to address this issue by investigating the effect of agency factors and corporate governance on the relations between sales growth and performance. We investigate whether firms with Free Cash Flow (FCF, undistributed cash flow in excess of that needed for positive net present value (NPV) projects) and weak governance tend to squander the firm's money by investing it in unprofitable sales growth. Basically, we ask six questions: (1) Does sales growth positively influence performance? (2) Is the positive influence of sales growth on performance lower in firms with FCF? (3) Do appropriate governance controls constrain the negative agency effects of FCF on the sales growth-performance relation? (4) Is the moderating effect of FCF sufficiently large to offset the performance benefits of sales growth in firms with weak governance? (5) Does cash flow positively influence sales growth? and (6) Do governance controls reduce the positive association between cash flow and sales growth in firms with FCF? We investigate questions (1) to (4) with an equation which explains performance using sales growth, FCF and governance variables. We investigate questions (5) and (6) with an equation which explains sales growth using cash flow and governance variables. Thus, the model controls for simultaneity between performance and sales growth with a recursive system of equations.

REVIEW OF THE LITERATURE

Positive interpretations of sales growth

Sales growth targets play a major role in the perceptions of top managers. Using surveys, Hubbard and Bromiley (1994) find sales is the most common objective mentioned by senior managers. Eliasson (1976) reports that planning systems generally begin with sales targets. An emphasis on sales growth also provides a useful and visible benchmark to motivate managers. Kaplan and Norton (1992, 1993, 1996) argue that firms must use a wide variety of goals, including sales growth, to effectively reach their financial objectives. Sales growth influences factors that range from internal motivation to promotion and retention of talented employees all the way to the implied opportunities for investments in new equipment and technologies that upgrade the production process as a whole. In addition, sales growth provides opportunities for economies of scale and learning curve benefits.

Separate literatures examine the association between market share and profitability (Gale, 1972; Mancke, 1974; Buzzell, Gale and Sultan, 1975; Henderson, 1980; Venkatraman and Prescott, 1990) and the association between increases in market share and profitability. The *market share* literature mainly investigates whether market share and underlying market characteristics, such as economies of scale, confer competitive advantage (Gale, 1972; Buzzell *et al*., 1975; Henderson, 1980). In other words, do firms with high market share have higher returns than those with low market share? Mancke (1974) suggests the market share benefits may come from unobserved variables that create a spurious relation. To empirically investigate this possibility, Jacobson and Aaker (1985) and Jacobson (1988; 1990) statistically control for unobserved characteristics and substantially reduce the estimated associations between market share and profitability. Woo (1987) also questions the market share profitability association by finding highly profitable low market share firms—generally firms with well protected niche positions.

Other studies investigate the relation between *market share growth* and profitability. Compared with the market share literature, the market share growth literature is relatively small. Studies on market share growth emphasize the competitive conditions in the industry and the benefits of timing, such as first mover advantages (Lieberman and Montgomery, 1988). These studies examine whether the benefits of additional market share justify the costs of developing it (i.e., growing more rapidly than the industry). Montgomery and Wernerfelt (1991) find that market share gains do not correlate with changes in firm value in the brewing industry. They conclude that the value of market share building strategies critically depends on industry-specific conditions. Rumelt and Wensley (1981) suggests market

share growth correlates with returns because the same unobserved variables influence both profitability and market share growth. Hence, they conclude investing in market share growth has no intrinsic value.

To summarize, these two literatures give only a partial picture of the association between sales growth and firm performance. First, market share growth and sales growth are different concepts. In a growing industry, a firm could grow more slowly than the industry and consequently have a decline in market share but an increase in total sales. Second, the market share literature primarily investigates the competitive aspects of sales growth—how investment in market share strengthens the product market position of the firm. This literature does not address possible mitigating conditions—weak governance and the presence of FCF -- under which investments in sales growth may actually decrease the returns to stockholders.

Agency theory – Under what conditions would sales growth not pay?

Agency theorists argue that sales growth does not always lead to increased returns to stockholders. The leveraged buyout literature makes these arguments most strongly (Jensen, 1993). They depend on three premises (Jensen, 1986). First, managers try to maximize their own wealth rather than shareholder wealth. This follows the standard economic assumption that individuals attempt to maximize their utility. Second, firm sales growth contributes to managerial wealth. As Jensen 1986: 323 argues:

> "Managers have incentives to cause their firms to grow beyond the optimal size. Growth increases managers' power by increasing the resources under their control. It is also associated with increases in managers' compensation, because changes in compensation are positively related to the growth in sales (see Murphy, 1985)."

Third, two corporate conditions determine whether managers can pursue sales growth at the expense of stockholders' wealth: the presence of FCF and weak governance. According to the Free Cash Flow Hypothesis (Jensen, 1989, 1991, 1993), internally generated cash in excess of positive NPV projects (termed Free Cash Flow (FCF)) allows managers to pursue personal goals without having to go to the bond or equity markets. Therefore, having FCF constitutes a necessary condition to put management's interests at odds with the interests of shareholders (Jensen, 1989, 1991, 1993). For example, Jensen (1993) cites GM, IBM, and Eastman Kodak in the 1980s as companies with failed internal control systems; these companies made massive unprofitable investments out of FCF in industries with excess capacity. On a larger sample, Jensen (1993) demonstrates similar inefficiencies in capital expenditures and R&D spending decisions of a substantial number of large firms. In general, over a ten year period, these firms did not generate returns that exceeded the returns that these firms would have received if the R&D and capital expenditures had been invested in marketable securities.

Weak corporate governance, the second condition identified by agency theory, refers to a lack of mechanisms to align managerial decisions with shareholders' interests. For example, if management dominates a board of directors, the board will represent managerial interests rather than those of shareholders. Given weak governance, managers pursue sales growth opportunities for their own sake, even if these opportunities offer low returns (Jensen, 1993).

Researchers have argued that governance operates through many different mechanisms. Many studies investigate the effect of inside and outside block ownership of stock (O'Reilly, Main, and Crystal, 1988; Tosi and Gomez-Mejia, 1989; Rediker and Seth, 1995; Gibbs, 1993; Bethel and Liebeskind, 1993; Hoskisson, Johnson and Moessel, 1994). Zahra and Pearce (1989) indicate that many studies find that the presence of outsiders on a corporate board has little effect because of the relative paucity of information available to outside directors. Hoskisson and Hitt (1988) and Hoskisson and Turk (1990) argue that outside directors know less about the businesses they monitor than inside directors or management, and so have difficulty in exerting control on strategic decisions. Consequently, outside directors tend to rely strictly on financial performance measures. Other dimensions of governance include board composition (percentage of outsiders on the board), board structure (Fama and Jensen, 1983; Singh and Harianto, 1989; Kesner and Johnson, 1990; Judge and Zeithaml, 1992; Johnson, Hoskisson and Hitt, 1993; Harrison, 1987 and Gibbs, 1993), and compensation of the

board (Walkling and Long, 1984; Kosnik, 1990), as well as capital structure (Jensen, 1986). Insights derived from research on capital structure agree with the agency literature on the role of leveraged buyouts.

Some agency research recommends governance changes to improve performance of firms that do not use FCF in shareholders' interests. Many scholars argue that corporate takeovers discipline managers who fail to pay FCF back to shareholders (Jensen, 1986, 1988; Shleifer and Vishny, 1991; Bethel and Liebeskind, 1993). Managers who waste shareholders' money find their companies purchased by corporations that invest in the shareholders' interest. Others argue that leveraged buyouts address the conflict between shareholders and managers over FCF; the combination of high equity ownership by managers and large outside debt obligations creates powerful incentives for managers to use FCF in the interests of bond and shareholders (Lehn and Poulsen, 1989; Fox and Marcus, 1992; Dial and Murphy 1995; Dial, 1995; Kaplan, 1989; Easterwood, Seth, and Singer, 1989; Liebeskind, Wiersema and Hansen, 1992).

Even though theory suggests that managers prefer sales growth and that FCF allows managers to make poor decisions, no prior study tests the underlying premise that FCF leads managers to pursue sales growth with below-par profitability and in turn whether governance moderates this affect.

HYPOTHESES

Agency and governance theories specify the conditions under which managers are likely to invest in sales growth at the expense of profitability—FCF combined with weak governance frees managers to pursue sales growth. This implies that 1) FCF and weak governance lead to high sales growth rates and 2) the sales growth that does occur has a low or negative impact on performance. To examine these two implications, we develop a model consisting of two equations, one for performance and one for sales growth. More specifically, this leads to four performance and two sales growth hypotheses.

Hypotheses concerning performance

Many arguments support the influence of sales growth on profitability. Whereas old lines of business may be continued if they simply cover their marginal costs or if closing down costs more than continuing, profit seeking managers only initiate business ventures that promise sufficiently high returns. Thus, increases in sales from new business should improve profits. Sales growth generally utilizes capacity more fully, which spreads fixed costs over more revenue resulting in higher profitability. Alternatively, if an industry has increasing economies of scale or learning curve effects, growing firms benefit from such effects, again increasing performance. Depending on the industry structure, sales growth may also provide additional market power which firms can use to increase performance. Similar arguments have been offered about the profit impact of market share. A positive effect of sales growth on performance would not be surprising; nevertheless, we include an hypothesis as a baseline for interpreting the subsequent interaction terms. Our first hypothesis is:

Hypothesis 1: Sales growth has a positive influence on performance.

The agency literature claims that firms with cash flow in excess of positive NPV projects invest this money to generate additional sales growth, even if this growth is not profitable (Jensen, 1986, 1988). Thus, agency theory predicts that the benefits of sales growth on performance will be lower for firms with higher values of FCF.

Hypothesis 2: FCF negatively moderates the positive influence of sales growth on performance. Sales growth has a less positive influence on performance for firms with higher values of FCF.

While initial agency studies focused primarily on the FCF as a sufficient condition for managers to act in their own interests, more recent studies argue that strong governance controls mitigate the influence of FCF (Rediker and Seth, 1995; Gibbs, 1993). Strong stockholder governance forces managers to invest FCF wisely or to return it to the stockholders. Thus, we expect that strong

governance reduces the tendency of FCF to lower the profitability of new investment.

Hypothesis 3: Governance controls moderate the extent to which FCF reduces the relation between sales growth and performance.

A stronger interpretation of the FCF Hypothesis argues that FCF and weak governance allow firms to increase sales in ways that actually destroy shareholder value (Jensen, 1993). Thus, the negative influences of FCF and weak governance exceed the positive direct benefits of sales growth for high values of FCF. This leads to the following hypothesis:

Hypothesis 4: For firms with weak governance and high levels of FCF, sales growth has a negative influence on performance. (The effect in Hypothesis 2 is sufficiently large to offset the benefits of sales growth.)

Sales growth hypotheses

The theoretical interest in the sales growth equation focuses on FCF and governance effects on sales. Jensen and others (Jensen and Ruback, 1983; Fama and Jensen, 1983; Shleifer and Vishny, 1991) argue that managers have a bias toward using cash flow to support unneeded sales growth. On the other hand, firms facing good investment prospects also use cash flow to support sales growth. Defining Total Cash Flow as both normal cash flow (for firms with good investment prospects) and FCF (for firms with poor investment prospects) we get the following hypothesis:

Hypothesis 5: Total Cash Flow positively influences Sales Growth.

While cash flow facilitates sales growth, according to the theory the firms with FCF lack profitable sales growth prospects. Given a managerial bias toward sales growth, managers in such firms waste FCF on unprofitable sales growth. Governance mechanisms should modify this tendency. For example, Shleifer and Vishny (1991:57) argue that the hostile takeover boom of the 1980s largely reversed over-investment by managers in the 1960s. They summarize the process as follows:

> "When managers in the '60s had their hands on large free cash flow, they spent it on unrelated diversification that hurt the shareholders in the long run. . .".

Following this logic, strong governance controls should moderate the influence of cash flow on sales growth for firms with poor prospects, i.e., firms with FCF. Without governance controls, managers may waste FCF on sales growth, but with strong governance, the closely monitored managers will not fund unprofitable sales growth. FCF should have a smaller impact on Sales Growth for firms with strong governance than for firms with weak governance. Thus our sales growth governance hypothesis is:

Hypothesis 6: For firms with FCF, governance controls negatively moderate the relation between Cash Flow and Sales Growth, i.e., FCF will have a less positive influence on sales growth for firms with strong governance mechanisms.

DATA AND METHODS

Variable definition

The model requires data on firm profitability, cash flow, industry sales, industry profitability, capital market returns, and corporate ownership. The Annual COMPUSTAT corporate data tapes provide firm level data, for example ROA, stockholder returns, Tobin's Q, cash flow and sales growth. We employ the line of business data from the COMPUSTAT Industry Segment data tapes to calculate ROA, stockholder returns and sales growth for the industries of the segments contained in each corporation. Table 1 summarizes the measures.

Free Cash Flow and Tobin's Q: Following, Lang, Stulz and Walkling (1991), we use Tobin's Q (Tobin and Brainard, 1968) to identify whether firms have positive net present value projects available. A $Q > 1$ indicates that the market values the firm above its book value implying the firm makes profitable investments. In contrast, $Q < 1$ indicates that the market values the firm below the value of its assets. Lang, Stulz and Walkling (1991) argue that firms with high values of FCF should be those firms with a Tobin's $Q < 1$ ($QDum_{J,T-1}$ equals 1 if $Q < 1$ and 0 otherwise) and higher values of *Cash Flow*. Thus,

Table 1. Measures*

$ROA_{J,T}$	Operating income divided by corporate assets for firm *J* in year *T*. Operating return is profits before interest, taxes and depreciation.
Stockholder Returns$_{J,T}$	Compound Growth Rate in Stockholder Returns, ln {(Market value per share for firm *J* in year *T*) + Dividends per Share)/(Market value per share for firm *J* in year *T*–1)–1)}. ln{(#199(t) + #26)/(#199(t–1))}.
Sales Growth$_{J,T}$	Compound Growth Rate in Sales. ln ($Sales_{J,T}/Sales_{J,T-1}$) for firm *J* in year *T*.
$Q_{J,T-1}$	Lagged market value divided by book value. Following (Perfect and Wiles, 1994), market value is the sum of year end values of the firm's common stock (#25 * #24), market value of the firm's preferred stock (#130), book value of the firm's long term debt (#9), book value of the firm's short term debt with a maturity less than one (#44). Book value was measured by the firm's year-end book value of total assets (#6).
$QDum_{J,T-1}$	1 if $Q < 1$; $QDum_{J,T-1} = 0$, if $Q_{J,T-1} \geq 1$.
Cash Flow$_{J,T-1}$	Lagged Operating Income before depreciation (#13) minus total income taxes (#16), minus change in deferred taxes from the previous year to the current year based on #35) minus gross interest expense (#15) minus preferred dividend requirement on cumulative preferred stock and dividends paid on non-cumulative preferred stock (#19) minus total dollar amount of dividends declared on common stock (#21). Following Lehn and Poulsen (1989) and Lang et al. (1991), Cash Flow is divided by Assets.
$FCT_{J,T-1}$	*Cash Flow*$_{J,T-1}$ *$QDum_{J,T-1}$.
Owner-Managed$_{T-1}$	At least one outside blockholder (owner of 5% or more) is an officer of the company.
Owner-Controlled$_{T-1}$	At least one outside blockholder is *not* a mutual fund or public pension fund.
Fund-Controlled$_{T-1}$	At least one outside blockholder is a mutual fund company
Industry Performance$_{J,T}$	Asset-weighted industry performance, averaged for the industries in which the firm's business units are active in year *T*.
Industry ROA$_{J,T}$	Asset-weighted industry operating return on assets, averaged for the industries in which the firm's business units are active in year *T*. Operating return on assets is profits before interest, taxes and depreciation. Industry figures (income and ROA) were calculated without the values for the given corporation to remove the possibility of simultaneity.
Industry Stockholder Returns$_{J,T}$	Asset-weighted industry stockholder returns, averaged for the industries in which the firm's business units are active in year *T*. Industry returns were calculated without the values for the given corporation to remove the possibility of simultaneity.
Debt/Assets$_{J,T-1}$	Total corporate debt divided by total assets for firm *J* in year *T*.
Quick Ratio$_{J,T}$	Cash and short term investments plus receivables divided by Current Liabilities.
Current Ratio$_{J,T}$	Current Assets divided by Current Liabilities.

*Data from COMPUSTAT are identified by their industrial COMPUSTAT item number as #.

FCF is defined as $QDum_{J,T-1}$ * *Cash Flow*$_{J,T-1}$. Consistent with Lang *et al*. (1991), FCF equals cash flow for firms with Tobin's Q below one and equals 0 for firms with $Q > 1$ since in theory they have profitable opportunities for investment.

Governance. Although Rediker and Seth (1995) argue researchers should use multiple measures of governance mechanisms and should examine the interactions among these mechanisms, researchers who need tractable measures of governance often measure governance by concentration of ownership and stock ownership by managers (Bethel and Liebeskind, 1993). One of the advantages of using indicators of block ownership (insider or outsider) is that information to construct these variables is readily available in SEC Form 10-K reports. In addition, it keeps a model comparatively simple.

Firms with widely dispersed stock ownership have weak governance. When no stockholder owns a substantial portion of the stock, no individual stockholder has reason to closely monitor managerial behavior. Furthermore, with small stockholdings, investors cannot influence management even if they observe inappropriate behavior. Agency theorists argue that concentrated stock ownership solves some of the problems (Demsetz and Lehn, 1985). If some stock-

holders hold large blocks of a corporation's stock, they have the incentive to closely monitor and control the behavior of corporate management (Shleifer and Vishny, 1986). If management, on the other hand, holds large blocks of stock, the managers have a very direct incentive to behave in ways that increase returns to stockholders.

Researchers classify corporations as Owner-Managed if any single employee owns 5% or more of the stock of the company (Tosi and Gomez-Mejia, 1989; O'Reilly *et al*., 1988). We consider firms to be Owner-Managed when officers (not including directors) of the firm, or partnerships in which officers are principals, own 5% or more of the company's stock. We also categorized firms with company sponsored employee savings plans with 5% or more stock ownership in the company as Owner-Managed because corporate managers participate in such plans (creating incentives to increase stock price) and because corporate managers often appoint fund managers who should therefore support management.

Alternatively, an outsider who owns a large amount of stock may monitor and exert control over the firm. Researchers consider a company to be Owner-Controlled if "any single individual or institution outside the firm owns 5% or more of the company's stock" (O'Reilly *et al*., 1988; Tosi and Gomez-Mejia, 1989: 176). But Brickley, Lease and Smith (1988) find that mutual funds, endowments, and public pension funds resist management more often than banks and insurance companies which may derive benefits from lines of business under management control. In contrast, one could argue mutual funds should have less interest in controlling management than other stockholders. Since mutual funds engage in trading stock, they may choose to sell stock rather than undertake the laborious process of influencing management.

It is an empirical question whether mutual funds or companies exert more control or different kinds of control as outside block owners. Given arguments that funds differ from corporate and individual ownership, we modify the definition of Owner-Controlled used by Tosi and Gomez-Mejia (1989) and O'Reilly *et al*. (1988) and distinguish between Owner-Controlled, which requires that at least one outside blockholder is *not* a mutual fund or public pension fund and Fund-Controlled, in which at least one outside owner is a mutual fund company. Thus we have four categories of governance: 1) weak governance (the absence of strong governance), 2) owner-managed, 3) owner-controlled, and 4) fund-controlled. Weak governance is the base case in the model where no specific strong governance variables appear.

We therefore need to define three measures of strong governance: Owner-Managed, Owner-Controlled and Fund-Controlled. To identify Owner-Managed firms, we use data from Compact Disclosure SEC of Bethesda, Maryland.

To distinguish between Owner-Controlled and Fund-Controlled, we need to distinguish between mutual funds and other outside block owners (individuals and non-mutual fund companies). Outside owners listed as "Security Advisers" in the *Directory of Mutual Funds and Other Investment Companies* (Investment Company Institute, 1997) are identified as mutual funds. In addition, certain non-public funds, such as University Endowment Funds and government pension funds such as State Retirement Mutual Funds (Wisconsin, Ohio, etc), are included with mutual fund companies. Our distinction between Owner-Controlled and Fund-Controlled lets us check whether these two kinds of owners differ in their control effects.

Performance measures: Strategic management researchers generally measure performance using either accounting profitability or returns to stockholders. We use both as each presents its own set of problems.

Economists criticize accounting returns because accounting treats advertising and R&D expenditures as expenses instead of investments with future payoffs (Carlton and Perloff, 1990: 362). This overstates current expenses, but also understates the assets of the firm by ignoring most intangible assets (including those generated by advertising and R&D). Furthermore, management decisions that have no impact on tangible business activities or cash flows can influence reported profits and assets. These decisions include the accounting treatment of options-based compensation, write-offs of acquisition premiums as in-process R&D, and the selection of depreciation schedules. Problems with accounting returns can also influence the measurement of other variables. For example, the measurement of FCF depends on Tobin's Q which in turn depends on an estimate of the assets. Errors in measurement of intangible assets will influence both the perform-

ance measure (return on assets) and the measurement of FCF.

Stockholder returns have also been criticized (Bromiley, 1986, 1990). Using stockholder returns assumes capital market efficiency. Under efficient market theories, the returns largely reflect surprises to the market. Thus, if the market anticipates a firm's sales growth and profitability, even highly profitable sales growth should not show up in stockholder returns in the period in which it occurred.

These potential problems with the measures should not undermine our results for two reasons. First, to handle possible associations between FCF and accounting returns based on errors in valuation of intangible assets, we include a dummy for Tobin's Q in the regression equations. If FCF has a spurious relation with ROA due to errors in Q (which figures in the construction of FCF), the dummy variable for Q will control for this spurious relation. Any measurement error in FCF based on measurement errors in Q will naturally appear in both FCF and Q and will not influence the parameter estimate on FCF when Q appears in the equation. Second, and more important, accounting problems do not affect our results using stockholder returns. Similarly, results obtained with accounting profits do not depend on efficient capital markets. Thus, if results agree across these two measures, we have additional confidence in their validity, despite the limitations of both performance measures.

To remove any possibility of simultaneity between $ROA_{J,T}$ and *Industry* $ROA_{J,T}$, we calculate the *Industry* $ROA_{J,T}$ for a given corporation J's business segment by removing that segment from the relevant industry operating income and industry total assets. A similar procedure is followed to remove the firm's sales when calculating the Industry Sales used to derive *Industry Sales* $Growth_{J,T}$.

Empirical model

The performance equation below tests four hypotheses. The equation also includes several control variables. Since we use a dummy variable in our measurement of FCF to indicate whether or not a firm's Tobin's Q is less than one ($QDum_{J,T-1} = 1$ if $Q < 1$), we also include this dummy as a separate term so that any FCF effect ($QDum_{J,T-1} * Cash\ Flow_{J,T-1}$) can be clearly differentiated from any direct effect of $QDum_{J,T-1}$ (Lehn and Poulsen 1989; Lang, Stulz and Walkling, 1991). Similarly, we include $Cash\ Flow_{J,T-1}$ and $FCF_{J,T-1}$ to control for possible direct effects of Cash Flow and FCF. Lagged firm performance, $Performance_{J,T-1}$, captures prior capabilities and achievements of the firm. *Industry* $Performance_{J,T}$ controls for industry effects including macro-economic effects in the current year. Leverage ($Debt/Total\ Assets_{J,T-1}$) controls for corporate effects from financing. The performance equation is:

$$\begin{aligned} Performance_{J,T} &= \alpha_0 + \alpha_1\ QDum_{J,T-1} + \\ &\alpha_2\ Cash\ Flow_{J,T-1} + \alpha_3\ FCF_{J,T-1} \\ &+ \alpha_4\ Sales\ Growth_{J,T} + \alpha_5\ Sales\ Growth_{J,T} \\ &* FCF_{J,T-1} \\ &+ \alpha_6\ Sales\ Growth_{J,T} * FCF_{J,T-1} \\ &* Owner\text{-}Managed_{J,T-1} \\ &+ \alpha_7\ Sales\ Growth_{J,T} * FCF_{J,T-1} \\ &* Owner\text{-}Controlled_{J,T-1} \\ &+ \alpha_8\ Sales\ Growth_{J,T} * FCF_{J,T-1} \\ &* Fund\text{-}Controlled_{J,T-1} \\ &+ \alpha_9\ Performance_{J,T-1} + \alpha_{10}\ Industry \\ &\ Performance_{J,T} \\ &+ \alpha_{11}\ Debt/Total\ Assets_{J,T-1} + \epsilon_{J,T} \end{aligned} \quad (1)$$

The sales growth equation includes the basic FCF and governance variables from the performance equation: $FCF_{J,T-1}$, $Owner\text{-}Managed_{J,T-1}$, $Owner\text{-}Controlled_{J,T-1}$ and $Fund\text{-}Controlled_{J,T-1}$ and the interaction between $FCF_{J,T-1}$ and the governance mechanisms. To differentiate $FCF_{J,T-1}$ from straight cash flow, we include *Cash Flow J,T-1* and a dummy for Tobin's Q. Finally, we add past performance to control for past firm success and current Industry Sales Growth to control for industry and macro-economic effects. The sales growth equation is:

$$\begin{aligned} Sales\ Growth_{J,T} &= \beta_0 + \beta_1\ QDum_{J,T-1} \\ &+ \beta_2\ Cash\ Flow_{J,T-1} + \beta_3\ FCF_{J,T-1} \\ &+ \beta_4\ Owner\text{-}Managed_{J,T-1} * FCF_{J,T-1} \\ &+ \beta_5\ Owner\text{-}Controlled_{J,T-1} * FCF_{J,T-1} \end{aligned}$$

$$+ \beta_6 \, Fund\text{-}Controlled_{J,T-1} * FCF_{J,T-1}$$
$$+ \beta_7 \, Performance_{J,T-1}$$
$$+ \beta_8 \, Industry\ Sales\ Growth_{J,T} + \epsilon_{J,T} \qquad (2)$$

For firms without FCF, Hypothesis 5 deals strictly with $Cash\ Flow_{J,T-1}$ (i.e., β_2); for firms with FCF, it deals with the total of $Cash\ Flow_{J,T-1}$ and $FCF_{J,T-1}$ effects (i.e., $\beta_2 + \beta_3$).

In addition to testing these two hypotheses, the sales growth equation handles potential simultaneity problems. In the performance equation, unobserved variables might influence both performance and sales growth. This would bias our estimate of the effect of sales growth on performance. We account for this possibility by removing the effect of such unobserved variables with an instrument for sales growth in the performance equation.

Estimation

We estimate the model as a recursive system using instrumental variables to control for the possibility that unobserved variables influence both sales growth and performance in a given year. For example, a product introduction may influence both performance and sales growth.

First, we develop instruments for $Sales\ Growth_{J,T}$. To estimate the instruments, we use lagged $Sales\ Growth_{J,T-1}$, current and one year lags on the exogenous variables in the model ($Industry\ Sales\ Growth_{J,T}$, $Cash\ Flow_{J,T-1}$, and $FCF_{J,T-1}$), and one and two year lags on additional corporate accounting data (current ratio and quick ratio).

We use lagged dependent variables in the performance equation to control for firm specific effects (e.g., difference in prior firm efficiency) and a variety of more general effects (e.g., random shocks to firms in a geographic area). Although some studies use fixed effects to control for firm characteristics (Schmalensee, 1985), we choose lagged performance for two reasons. First, it truly holds past performance constant, whereas, fixed effect models only control for a constant firm effect over the time period. Second, the fixed effects approach uses many degrees of freedom, one per corporation. With relatively few time periods per corporation, this results in a considerable loss of efficiency in estimation. We also estimated the model with firm fixed effects rather than lagged performance and the results agree with those reported here.

Ideally, we would like to control for competitive strategy variables such as advertising expenditures, or price cuts, which represent investments in sales growth. We could only obtain firm advertising data for a subset of firms. When inserted in the model, change in advertising expenditures had the expected positive sign in the Sales Growth equation, but the other results did not change in sign or magnitude, and the available sample dropped to 215 observations. We omit advertising to retain sample size.

We test for heteroskedasticity using the White test. We test for auto-regressive disturbances using the Durbin-Watson procedure for the sales growth equation and the Durbin-Watson h procedure for the performance equation (because it has a lagged dependent variable). The Durbin-Watson tests are insignificant for all four equations. However, the White test indicates heteroskedasticity in all four equations. To address this problem, we use the Generalized Method of Moments estimator to adjust the error matrix for heteroskedasticity (SAS, 1993: 555).

Minimum levels of FCF may be required before the managerial potential for excessive investment in sales growth exists. In other words, the Agency variables and firm $Sales\ Growth_{J,T}$ may relate in a non-linear manner. If a linear model was used when a non-linear model was warranted then the residuals would not have a normal distribution (Kennedy, 1985: 99). Tests indicate the residuals are normally distributed, which is a sufficient condition for concluding that the linear specification of our model is appropriate.

Sample

The data cover the years 1988 to 1995. After dropping observations with missing data, COMPUSTAT provides 3,320 firm-year observations. Calculating lagged variables on years 1986 and 1987 loses an additional 1,004 observations, which results in a sample of 2,316 firm-year observations. We have no information from Compact Disclosure to calculate inside ownership and block ownership for 463 firm-year observations, which results in 1,853 observations. Lack of data to calculate market returns

eliminates another 227 firm-year observations, which results in 1626 observations. We drop 30 firm-year observations due to extreme values of Firm ROA > 0.50 or <-0.3 and Industry ROA > 0.50 or <-0.3, and drop nine influential observations based on a cutoff of DFFITS >2 or <-2 in the calculation of instruments. This is a conservative cut-off level (see Belsley, Kuh, and Welsch, 1980). We also use this cutoff of DFFITS for the model itself and drop 17 influential cases. This gave a sample with 1,570 firm year observations for 8 years of usable data (after lags) or an average of 196 firms per year. The numbers of firms per year for each year are: 1988–181, 1989–190, 1990–194, 1991–209, 1992–209, 1993–203, 1994–195, 1995–189. To be in the sample, firms have to be present for two years prior to the first year's sample observation in order to calculate lags. One hundred and twenty-four firms have data for all 8 years of the sample. For firms that are present less than 8 years, there are 25 for 7 years, 20 for 6 years, 22 for 5 years, 19 for 4 years, 15 for 3 years, 14 for 2 years and 24 for 1 year.

Table 2 presents descriptive statistics for the total sample and sub-samples of Owner-Managed, Owner-Controlled and Fund-Controlled firms. We use this information for evaluating the derivatives. Table 3 presents a correlation matrix of the variables used.

EMPIRICAL RESULTS

The performance equation

Table 4 reports the estimation of the models including coefficients and the significance of the interaction coefficients. Because the hypotheses largely deal with interaction terms which are often the sum of multiple coefficients, direct examination of the estimation results in Table 4 may not be sufficient. Therefore, we examine the derivatives of performance with respect to sales growth, and sales growth with respect to cash flow. Table 5 presents the values of the derivatives evaluated at the mean of the variables in the derivative and tests whether these values differ from zero.

The derivative of $Performance_{J,T}$ with respect to $Sales\ Growth_{J,T}$ is the change in Performance for a one unit change in $Sales\ Growth_{J,T}$:

$$\begin{aligned} &\mathrm{d}Performance_{J,T}/\mathrm{d}\ Sales\ Growth_{J,T} \\ &= \alpha_4 + \alpha_5\ FCF_{J,T\text{-}1} \\ &+ \alpha_6\ FCF_{J,T\text{-}1}\ {*}Owner\text{-}Managed_{J,T\text{-}1} \\ &+ \alpha_7\ FCF_{J,T\text{-}1}\ {*}Owner\text{-}Controlled_{J,T\text{-}1} \\ &+ \alpha_8\ FCF_{J,T\text{-}1}\ {*}Fund\text{-}Controlled_{J,T\text{-}1} \end{aligned} \quad (3)$$

Since several of the right hand side variables take on the value of zero for various sets of observations, the performance equation can be simplified as follows:

- For firms *without FCF* (i.e., $Q > 1$), the derivative simplifies to just α_4.
- For firms *with FCF* (i.e., $Q > 1$; FCF $\neq 0$) and weak governance (i.e., neither Owner-Managed or Owner-Controlled), the derivative simplifies to $\alpha_4 + \alpha_5\ FCF_{J,T\text{-}1}$
- For firms *with FCF which are Owner-Managed*, the derivative simplifies to $\alpha_4 + \alpha_5\ FCF_{J,T\text{-}1} + \alpha_6\ FCF_{J,T\text{-}1}$
- For firms *with FCF which are Owner-Controlled*, the derivative simplifies to $\alpha_4 + \alpha_5\ FCF_{J,T\text{-}1\ +\ \alpha 7}\ FCF_{J,T\text{-}1}$
- For firms *with FCF which are Fund-Controlled*, the derivative simplifies to $\alpha_4 + \alpha_5\ FCF_{J,T\text{-}1} + \alpha_8\ FCF_{J,T\text{-}1}$

Replacing the parameters with their estimated values (from Table 4) provides the following estimated derivative for the performance equation where performance is measured by ROA:

$$\begin{aligned} &\mathrm{d}\ ROA_{J,T}/\mathrm{d}\ Sales\ Growth_{J,T} \\ &= 0.749 - 9.230\ FCF_{J,T\text{-}1} \\ &+ 2.833\ FCF_{J,T\text{-}1}\ {*}Owner\text{-}Managed_{J,T\text{-}1} \\ &+ -1.737\ FCF_{J,T\text{-}1}\ {*}Owner\text{-}Controlled_{J,T\text{-}1} \\ &+ -1.723\ FCF_{J,T\text{-}1}\ {*}Fund\text{-}Controlled_{J,T\text{-}1} \end{aligned} \quad (4)$$

For Performance measured by stockholder returns, inserting the estimated parameter values results in:

$$\begin{aligned} &\mathrm{d}\ Stockholder\ Return_{sJ,T}/\mathrm{d}\ Sales\ Growth_{J,T} \\ &= 2.929 - 56.571\ FCF_{J,T\text{-}1} \\ &+ 21.720\ FCF_{J,T\text{-}1}\ {*}\ Owner\text{-}Managed_{J,T\text{-}1} \\ &- 6.188\ FCF_{J,T\text{-}1}\ {*}\ Owner\text{-}Controlled_{J,T\text{-}1} \\ &- 24.540\ FCF_{J,T\text{-}1}\ {*}\ Fund\text{-}Controlled_{J,T\text{-}1} \end{aligned} \quad (5)$$

Table 2. Descriptive statistics

Variable	N	Mean	Std. Dev.	Min.	Max.
Total Sample					
$QDum_{J,T-1}$	1570	0.6567	0.4750	0	1.00
Cash $Flow_{J,T-1}$	1570	0.0649	0.0465	–0.2114	0.2765
Free Cash $Flow_{J,T-1}$	1570	0.0346	0.0439	–0.2114	0.2041
Sales $Growth_{J,T}$	1570	0.0603	0.1407	–0.8672	0.9690
*Sales Growth *FCF*	1570	0.0018	0.0081	–0.0692	0.0590
$SG_{J,T}$*$FCF_{J,T-1}$**Owner-Managed*$_{J,T-1}$	1570	0.0007	0.0039	–0.0277	0.0545
$SG_{J,T}$*$FCF_{J,T-1}$**Owner-Controlled*$_{J,T-1}$	1570	0.0012	0.0067	–0.0653	0.0545
$SG_{J,T}$*$FCF_{J,T-1}$**Fund-Controlled*$_{J,T-1}$	1570	0.0007	0.0009	–0.0555	0.0590
Cash $Flow_{J,T-1}$**Owner-Managed*$_{J,T-1}$	1570	0.0105	0.0304	–0.1130	0.1621
Cash $Flow_{J,T-1}$**Owner-Controlled*$_{J,T-1}$	1570	0.0219	0.0451	–0.2114	0.2041
Cash $Flow_{J,T-1}$**Fund-Controlled*$_{J,T-1}$	1570	0.0189	0.0336	–0.2114	0.1711
Industry $ROA_{J,T}$	1570	0.1150	0.1709	–0.7986	5.5728
Industry Stockholder $Returns_{J,T}$	1570	0.0484	0.2188	–1.7040	1.6754
$ROA_{J,T}$	1570	0.0395	0.0474	–0.3539	0.2440
Stockholder $Returns_{J,T}$	1570	0.0445	0.3123	–1.3863	1.3868
Industry Sales $Growth_{J,T}$	1570	0.0971	0.3268	–0.9789	4.9133
Debt/Total $Assets_{J,T-1}$	1570	0.2389	0.1353	0.0000	0.9302
Q > 1(Free Cash Flow = 0)					
Sales $Growth_{J,T}$	539	0.0930	0.1292	–0.8610	0.8941
Owner-Managed$_{J,T-1}$	539	0.2839	0.4512	0	1
Owner-Controlled$_{J,T-1}$	539	0.5584	0.4970	0	1
Fund-Controlled$_{J,T-1}$	529	0.6215	0.4855	0	1
Q < 1(Free Cash Flow ≠ 0)					
Sales $Growth_{J,T}$	1031	0.0432	0.1435	–0.8672	0.9690
Free Cash $Flow_{J,T-1}$	1031	0.0527	0.0445	–0.2114	0.2041
Owner-Managed$_{J,T-1}$	1031	0.2726	0.4455	0	1.000
Owner-Controlled$_{J,T-1}$	1031	0.5412	0.4985	0	1.000
Fund-Controlled$_{J,T-1}$	1031	0.3948	0.4890	0	1.000
***Q < 1 and Owner-Managed**$_{J,T-1}$					
Sales $Growth_{J,T}$	281	0.0565	0.1279	–0.5096	0.9689
Free Cash $Flow_{J,T-1}$	281	0.0587	0.0425	–0.1126	0.1617
Owner-Controlled$_{J,T-1}$	281	0.7865	0.4105	0	1.000
Fund-Controlled$_{J,T-1}$	281	0.5196	0.5005	0	1.000
***Q < 1 and Owner-Controlled**$_{J,T-1}$					
Sales $Growth_{J,T}$	661	0.0462	0.1529	–0.8672	0.9690
Free Cash $Flow_{J,T-1}$	661	0.0520	0.0442	–0.2114	0.2041
Owner-Managed$_{J,T-1}$	661	0.3343	0.4721	0	1.000
Fund-Controlled$_{J,T-1}$	661	0.5416	0.4986	0	1.000
***Q < 1 and Fund-Controlled**$_{J,T-1}$					
Sales $Growth_{J,T}$	558	0.0403	0.1235	–0.6215	0.7509
Free Cash $Flow_{J,T-1}$	558	0.0586	0.0426	–0.1352	0.2041
Owner-Managed$_{J,T-1}$	558	0.1720	0.3778	0	1.000
Owner-Controlled$_{J,T-1}$	558	0.6416	0.4800	0	1.000

*Note, for $Q < 1$ there are 221 firms that are Owner-Managed and Owner-Controlled, 146 are Owner-Managed and Fund-Controlled, 358 are Owner-Controlled and Fund-Controlled, while 108 are all three.

Let us consider these derivatives with respect to the hypotheses.

Hypothesis 1: Sales Growth Positively Influences Performance. For firms without FCF (and with weak governance), the effect of a change in sales on performance is simply the parameter on *Sales* $Growth_{J,T}$, the intercept in the derivatives. In the ROA equation, *Sales* $Growth_{J,T}$ has a statistically significant positive parameter (parameter equals 0.749, $p < 0.001$): a one percentage point increase in Sales Growth results in an increase in ROA of 0.75 percentage points. In the stockholder returns equation, sales growth also has a strong and statistically significant direct influence on stockholder

Table 3. Pearson correlation coefficients (Probabilities in parentheses)

Variable	*QDum*	*Cash Flow*	*Industry Growth*	*Sales Growth*	*SG*Free Cash Flow*	*SG*FCF* Owner-Managed*	*SG*FCF* Owner-Ctrlled*	*SG*FCF* Fund-Cntrlled*	*FCF* Owner-Managed*	*FCF* Owner-Cntrlled*	*FCF* Fund-Cntrlld*	*Industry ROA*	*Ind. StkHldr Return*	*ROA*	*Stock-holder-Returns*	*FCF*	*Dept/ Total Assets*
QDum	1.00 (0.0)																
Cash Flow	–0.363 (0.000)	1.00 (0.0)															
Industry	–0.113	0.054	1.00														
Sales Growth	(0.000)	(0.032)	(0.0)														
Sales	–0.168	0.126	0.112	1.00													
Growth	(0.000)	(0.000)	(0.000)	(0.0)													
*SG*Free*	0.162	0.093	0.026	0.537	1.00												
Cash Flow	(0.000)	(0.000)	(0.298)	(0.000)	(0.0)												
*SG*FCF**	0.084	0.065	–0.005	0.346	0.654	1.000											
Own-Mngd	(0.001)	(0.010)	(0.843)	(0.000)	(0.000)	(0.0)											
*SG*FCF**	0.097	0.030	–0.007	0.419	0.742	0.465	1.00										
Own-Ctrlld	(0.00)	(0.239)	(0.795)	(0.000)	(0.000)	(0.000)	(0.0)										
*SG*FCF**	0.099	0.092	0.051	0.296	0.598	0.416	0.635	1.00									
Fund-Ctrlld	(0.00)	(0.000)	(0.043)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0)									
*FCF**	0.218	0.291	–0.022	0.018	0.166	0.445	0.168	0.143	1.00								
Own-Mged	(0.00)	(0.00)	(0.382)	(0.468)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0)								
*FCF**	0.308	0.269	–0.021	–0.010	0.131	0.190	0.262	0.154	0.475	1.00							
Own-Ctrlld	(0.000)	(0.000)	(0.402)	(0.695)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0)							
*FCF**	0.327	0.239	–0.023	–0.049	0.141	0.151	0.144	0.266	0.232	0.427	1.00						
Fund-Ctrlld	(0.000)	(0.000)	(0.363)	(0.053)	(0.392)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.0)						
Industry	–0.071	0.095	0.033	0.023	–0.001	0.002	0.008	0.005	–0.002	0.022	0.052	1.00					
ROA	(0.005)	(0.000)	(0.190)	(0.355)	(0.977)	0.938	(0.739)	(0.831)	(0.633)	0.902	(0.510)	(0.0)					
InStk-	0.089	–0.028	–0.039	0.006	0.014	0.031	0.013	–0.008	0.029	0.048	–0.000	0.146	1.00				
Return	(0.000)	(0.269)	(0.126)	(0.815)	(0.567)	0.225	(0.605)	(0.753)	(0.257)	(0.059)	(0.980)	(0.562)	(0.0)				
ROA	–0.474	0.593	0.095	0.246	0.012	–0.007	0.022	–0.027	0.009	0.015	0.07	0.124	0.01	1.00			
	(0.000)	(0.000)	(0.000)	(0.000)	(0.611)	0.789	(0.376)	(0.290)	(0.730)	(0.548)	(0.01)	(0.000)	(0.79)	(0.0)			
Stkhldr-	0.121	–0.035	–0.006	0.098	0.049	0.051	0.014	0.017	0.036	0.066	0.055	–0.012	0.230	0.136	1.00		
Returns	(0.000)	(0.155)	(0.799)	(0.000)	(0.050)	(0.044)	(0.589)	(0.504)	(0.157)	(0.009)	(0.028)	(0.630)	(0.000)	(0.000)	(0.0)		
FCF	0.570	0.430	–0.053	–0.045	0.253	0.189	0.179	0.175	0.455	0.711	0.675	0.006	0.054	0.050	0.107	1.00	
	(0.000)	(0.000)	(0.034)	(0.076)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.824)	(0.033)	(0.046)	(0.000)	(0.0)	
Debt/	0.251	–0.241	–0.063	0.038	0.057	–0.029	0.048	–0.000	0.030	0.059	–0.053	–0.074	0.023	–0.311	0.025	0.072	1.00
Assets	(0.001)	(0.000)	(0.012)	(0.131)	(0.023)	(0.251)	(0.057)	(0.986)	(0.234)	(0.020)	(0.035)	(0.003)	(0.369)	(0.000)	(0.314)	(0.005)	(0.0)

Table 4. Results (P-Values in parentheses)

Dependent Var:	$ROA_{J,T}$	$Sales\ Growth_{J,T}$ (ROA)	Stock-holder-Returns$_{J,T}$	$Sales\ Growth_{J,T}$ (Stock-holder Returns)
Constant	–0.007	0.058***	–0.076	0.054***
	(0.533)	(0.000)	(0.062)	(0.000)
$QDum_{J,T-1}$	0.009	–0.022	0.087	–0.016
	(0.376)	(0.175)	(0.131)	(0.324)
$Cash\ Flow_{J,T-1}$	–0.365**	0.378*	–1.663***	0.312^
	(0.002)	(0.079)	(0.000)	(0.053)
$Free\ Cash\ Flow_{J,T-1}$	0.596***	–0.055	4.152***	–0.048
	0.000	(0.813)	(0.000)	(0.833)
$Free\ Cash\ Flow_{J,T-1}$ * $Owner\text{-}Managed_{J,T-1}$		0.355*		0.324*
		(0.012)		(0.020)
$Free\ Cash\ Flow_{J,T-1}$ * $Owner\text{-}Controlled_{J,T-1}$		–0.074		–0.018
		(0.658)		(0.919)
$Free\ Cash\ Flow_{J,T-1}$ * $Fund\text{-}Controlled_{J,T-1}$		–0.467**		–0.503**
		(0.008)		(0.004)
$Sales\ Growth_{J,T}$	0.749***		2.929***	
	(0.000)		(0.000)	
$Sales\ Growth_{J,T}$ * $Free\ Cash\ Flow_{J,T-1}$	–9.230***		–56.571***	
	(0.000)		(0.000)	
$Sales\ Growth_{J,T}$ * $FCF_{J,T-1}$ * $Owner\text{-}Managed_{J,T-1}$	2.833*		21.720*	
	(0.017)		(0.035)	
$Sales\ Growth_{J,T}$ * $FCF_{J,T-1}$ * $Owner\text{-}Controlled_{J,T-1}$	–1.737		–6.188	
	(0.261)		(0.555)	
$Sales\ Growth_{J,T}$ * $FCF_{J,T-1}$ * $Fund\text{-}Controlled_{J,T-1}$	–1.723		–24.540*	
	(0.294)		(0.016)	
$Performance_{J,T-1}$	0.784***	–0.091	–0.207***	0.055***
	(0.000)	(0.504)	(0.000)	(0.000)
$Industry\ Performance_{J,T}$	0.007		0.251***	
	(0.242)		(0.000)	
$Industry\ Sales\ Growth_{J,T}$		0.027*		.037*
		(0.040)		(0.004)
$Debt/Total\ Assets_{J,T-1}$	–0.071***		–0.189^	
	(0.000)		(0.032)	
R^2	0.628	0.032	0.110	0.054
N	1570	1570	1570	1570

*** = |Probability ≤ 0.001, ** = |Probability ≤ 0.01
* = |Probability ≤ 0.05, ^ = |Probability ≤ 0.10

returns (parameter of 2.929, $p < 0.001$). These results support Hypothesis 1.

Hypothesis 2: Free Cash Flow Negatively Moderates the Positive Influence of Sales Growth on Performance: For firms with FCF and weak governance, the effect of a change in sales on performance depends on both the Sales Growth parameter and the interaction of FCF with Sales Growth. In both ROA and stockholder returns equations, the interaction of $FCF_{J,T-1}$ and $Sales\ Growth_{J,T}$ has negative and significant coefficients (–9.230, $p < 0.01$ and –56.571, $p < 0.001$ respectively). Thus, Hypothesis 2 is strongly supported in both equations.

Hypothesis 3: Governance moderates the extent to which FCF reduces the influence of Sales Growth on Performance. Hypothesis 3 has mixed support (Table 4). Consistent with H3, owner-managed governance interactions have positive and significant coefficients with both types of performance ($p < 0.05$). Contrary to H3, *Owner-Controlled* firms have negative coefficients in both equations, but neither is significant. *Fund-Controlled* coefficients are also negative in both

Table 5. Derivatives of Performance with Respect to Sales Growth and Sales Growth with Respect to Cash Flow Evaluated at Mean Values of Free Cash Flow. (Test statistics reflect the probability that the derivatives are significantly different from zero when evaluated at the mean level of Free Cash Flow for these sub-samples.)

Sub-Samples	Firm ROA	Stockholder Returns
Performance With Respect to a Change in Sales Growth		
Free Cash Flow = 0:	0.749***	2.929**
Free Cash Flow ≠ 0 and Weak Governance:	0.260**	–0.069
Free Cash Flow ≠ 0 and Owner-Managed Governance:	0.372***	0.873^
Free Cash Flow ≠ 0 and Owner-Controlled Governance:	0.179	–0.334
Free Cash Flow ≠ 0 and Fund-Controlled Governance:	0.168	–1.370^
Sales Growth with Respect to a Change in Cash Flow		
Free Cash Flow = 0	0.378*	0.312^
Free Cash Flow ≠ 0 and Weak Governance:	0.323^	0.264
Free Cash Flow ≠ 0 and Owner-Managed Governance:	0.678**	0.588**
Free Cash Flow ≠ 0 and Ownder-Controlled Governance:	0.249	0.246
Free Cash Flow ≠ 0 and Fund-Controlled Governance:	–0.144	–0.239^

*** = |Probability ≤ 0.001, ** = |Probability ≤ 0.01
* = |Probability ≤ 0.05, ^ = |Probability ≤ 0.10

equations, and the coefficient is significant in the stockholder returns equation ($p < 0.05$). Thus, for *Fund-Controlled* firms, FCF reduces the benefits of sales growth even more than it does for weak governance firms.

Hypothesis 4: For high levels of FCF and weak governance, returns from sales growth become negative: Hypothesis 4 tests whether firms with high levels of FCF and weak governance make investments in sales growth that not only has lower returns than usual but have negative returns. Since $FCF_{J,T-1}$ is a continuous variable, the impact of sales growth on returns varies with the level of FCF. For firms with FCF (i.e., $Q < 1$ and hence non-zero values of $FCF_{J,T-1}$), the mean value of $FCF_{J,T-1}$ is 0.053 (See Table 2). Inserting this value into the ROA derivative using the estimated parameter values gives $0.749 + (-9.230) * (0.053) = 0.260$, (See Table 5). This positive derivative at the mean value of FCF means that the firms with the average value of FCF and weak governance still increase ROA with an increase in sales growth but at a rate less than firms without FCF. Solving for the value of FCF that makes the derivative zero indicates that firms with FCF greater than 0.081 do not increase ROA with an increase in Sales Growth. Of the 1031 firms with FCF in the sample, 243 (23.6%) have a FCF value >0.081. For ROA, Hypothesis 4 is not supported at the mean value of FCF but is supported for a fifth of the sample with FCF.

For performance measured in terms of stockholder returns, the derivative at the mean value of $FCF_{J,T-1}$ (0.053) is $2.929 + (-56.571) * (0.053) = -0.069$ (See Table 5). For firms with weak governance, expected returns from sales growth are negative at the mean of free cash flow which supports Hypothesis 4. The derivative is negative for values of FCF$>$ 0.052. Of the 1031 firms with FCF in the sample, 539 (52.3%) have a FCF value >0.052, and thus for half of the sample with FCF, the results support Hypothesis 4.

Control variables: Many of the control variables are statistically significant. $QDum_{J,T-1}$, a variable which is 1 for firms with values of Tobin's Q <1 and 0 otherwise, has positive coefficients in both models, statiscally significant in the stockholder returns model. In other words, firms which the market identified as low performers tend to increase stockholder performance. Cash flow has a negative direct effect and FCF a positive direct effect in both models. Both are statistically significant. Industry performance has positive coefficients for both types of performance but is only significant for stockholder returns. $Debt/Assets_{J,T-1}$ has negative and significant coefficients in both equations; high debt levels were not conducive to increasing performance.

While the parameter estimate on lagged ROA is positive and statistically significant (0.765, $p < 0.001$), the coefficient on $Stockholder\text{-}Returns_{J,T-1}$ is significant but negative (–0.206, $p < 0.001$). The negative coefficient suggests a possible regression to the mean after peaks or troughs in stock performance.

The sales growth equation

Hypothesis 5: Total Cash Flow positively influences sales growth. In both Sales Growth equa-

tions (measuring performance by ROA and stockholder returns), cash flow has a strong positive influence on sales growth (0.378 and 0.312 respectively, $p < 0.05$ and $p < 0.10$, Table 4). But for firms with FCF ($Q < 1$), the effect is the combination of the Cash Flow coefficient and the FCF coefficient. FCF has small, negative and insignificant coefficients in both equations (–0.055 and –0.048 respectively). When adjusted for FCF, the net effect of cash flow for such firms (firms with $Q < 1$) is positive at 0.323 and 0.264 respectively, about a 16% drop (See Table 5). Cash flow enables sales growth, and firms with FCF use it similarly to firms without FCF.

Hypothesis 6: FCF will have a less positive influence on sales growth for firms with strong governance mechanisms. Directly contrary to the hypothesis, for *Owner-Managed* firms the coefficient is positive and significant in both ROA and stockholder versions of the equation (0.355, $p < 0.05$ and 0.324 $p < 0.05$ respectively). In other words, *Owner-Managed* firms with FCF grow at roughly twice the rate from a given amount of cash flow as firms with weak governance (and even faster than firms without FCF); inserting values into the derivative, the net effect of a 1 percentage point increase in cash flow results in additional sales growth of 0.68 (ROA version) or 0.59 (shareholder returns version) percentage points (See Table 5). The parameter on the interaction with *Owner-Controlled* firms is negative but statistically insignificant in both equations. However, the coefficient on *Fund-Controlled* firms is negative and significant in both equations (–0.467, $p < 0.05$ ROA version and –0.503, $p < 0.05$ stockholder returns version). Examining the derivatives indicates that firms with mutual fund block owners grow less as FCF increases; at mean FCF, a 1 percentage point increase in $Cash\ Flow_{J,T-1}$ causes a –0.144% in sales growth for the ROA version and –0.239% for stockholder returns version (See Table 5). Mutual Fund monitoring of sales growth appears to be strong enough to completely offset the tendency of management to invest cash flow into sales growth oriented projects. Indeed, for Fund-Controlled firms FCF has a negative influence on sales growth, perhaps reflecting choices that simultaneously increase FCF and reduce sales growth in order to provide high dividends.

Interpreting the performance and sales growth equations as a system yields further insights. For firms without FCF (i.e., $Q > 1$), the system has a simple interpretation. Cash flow positively influences sales growth and sales growth increases performance. For firms with FCF and weak governance (i.e., $Q < 1$), cash flow positively influences sales growth, but the sales growth has a lower return for these firms than for firms without FCF. Even at mean levels of FCF, we find sales growth can result in a negative change in performance for stockholder returns. In short, these firms appear to grow sales less than other firms, and their sales growth is less profitable.

$Industry\ Sales\ Growth_{J,T}$ controls for the environmental determinants of $Sales\ Growth_{J,T}$. As expected, $Industry\ Sales\ Growth_{J,T}$ has a significant positive association with $Sales\ Growth_{J,T}$. The lagged firm performance ($Performance_{J,T-1}$) term is positive and significant as expected in the stockholder returns version but is negative and insignificant in the ROA version.

CONCLUSIONS

The findings show the straightforward result that cash flow increases sales growth, and sales growth increases performance for three types of firms: 1) firms without FCF, 2) firms with low levels of FCF and without strong governance, and 3) Owner-managed firms with low levels of FCF. The results involving firms with FCF and different types of strong governance present a puzzle. The theory argues that strong governance should improve decision making in firms with FCF.

We find that different types of strong governance affect performance and sales growth in different ways. Owner-Managed firms with FCF use it to grow faster than firms without FCF (average of 5.7% compared to averages around 4.5%, see Table 2), and this higher sales growth results in the highest performance among firms with FCF. In sharp contrast, firms with mutual fund block ownership do not use FCF for sales growth and increase sales much more slowly than Owner-Managed firms, but the return from that sales growth is also much lower. Indeed, for such firms, increases in cash flow result in negative sales growth. Firms with non-mutual fund companies or individuals as outside block owners have sales growth and performance similar to firms with FCF and weak governance.

For firms with mutual fund owners, we offer the following conjecture to explain this puzzle. Firms without FCF represent the top third in terms of Tobin's Q—the higher performers. Cash Flow provides such firms resources to exploit market opportunities (i.e., positive NPV projects) resulting in profitable sales growth. Firms with FCF (i.e., Q less than one) face fewer good opportunities. Mutual fund owners may determine that paying such funds out as dividends provides greater shareholder returns than investing in sales growth.

Owner-Managed firms with FCF grow faster than those without and have the highest performance for FCF firms; this presents an interesting problem. Perhaps Owner-Managed firms simply search harder for sales growth opportunities. Note that such sales growth opportunities provide positive shareholder returns for most firms with FCF. Owner-managers have incentives to increase profits rather than their salaries (Baker and Wruck, 1989). This increases search activities for projects with higher returns (Easterwood, Seth, and Singer, 1989; Fox and Marcus, 1992). Holderness and Sheehan's (1988) results on firms with managers as majority shareholders (owning over 50%) agree with this finding. In other words, having top management with high levels of stock provides the incentive to seek out profitable avenues for sales growth and the power to move the corporation toward them (Bourgeois, 1981). Traditional agency arguments assume the stock of profitable projects exists largely independent of the efforts of the firm; they focus on the choice among extant projects. Our conjecture that Owner-Managed firms search harder than others for sales growth opportunities acknowledges that firms do not face pools of projects but rather find projects by search. In such a case, the standard measure of the availability of positive net present value projects ($Q < 1$) poorly represents the project creation process.

Our analysis uses FCF along with four governance mechanisms (including the absence of strong governance) and financial leverage. We distinguish between the effects of governance on sales growth and on performance, and thereby track how different governance mechanisms affect decision making in firms. While this improves on the common practice of using FCF alone as an indicator of an agency problem, it does not exhaust the potential list of governance control mechanisms. Other governance factors (or their absence) may reduce the likelihood that FCF lets managers waste funds. Such factors include a weak corporate board (relative to corporate management), weak corporate oversight of division management, compensation of top management, and compensation of board members. Multiple governance mechanisms may work in concert. By using only four measures of governance effects with an emphasis on ownership structure, while controlling for a fifth (leverage), we may have missed interactions (Rediker and Seth, 1995). A deeper understanding of governance variables and their interaction merits examination. Given multiple measures of governance, we need a behavioral theory that explains their interaction.

To summarize, these results support both the value of sales growth and the problems of very high levels of FCF. They open the doors to two new areas of research. First, we need additional research to better understand the role of sales growth in the firm and the relations between sales growth and performance. Second, we need a finer-grained analysis of agency problems—different forms of governance may be required to effectively control different corporate decisions. Such research areas may further enhance our understanding of these central issues concerning growth and corporate control.

ACKNOWLEDGEMENTS

We are grateful for discussions with Anju Seth, Robert Wiseman, David Denis, and Rao Kadiyala. Constructive comments from two anonymous reviewers were very important for the development of the paper.

REFERENCES

Baker, G. P. and K. H. Wruck (1989). 'Organizational changes and value creation in leveraged buyouts: The case of the O.M. Scott & Sons company', *Journal of Financial Economics*, **25**, pp. 163–190.

Baumol, W. (1967). *Business Behavior, Value and Growth.* Harcourt, Brace and World, New York.

Belsley, D. A., E. Kuh, and R. E. Welsch (1980). *Regression Diagnostics*. John Wiley, New York.

Berle, A. A. and G. C. Means (1932). *The Modern Corporation and Private Property*. Macmillan, New York.

Bethel, J. E. and J. Liebeskind (1993). 'The effects of ownership structure on corporate restructuring', *Strategic Management Journal*, Summer Special Issue, **14**, pp. 15–31.

Bourgeois, L. (1981). 'On the measurement of organizational slack', *Academy of Management Review*, **6**, pp. 29–39.

Brickley, J. A., R. C. Lease and C. W. Smith (1988). 'Ownership structure and voting on anti-takeover amendments', *Journal of Financial Economics*, **20**, pp. 267–291.

Bromiley, P. (1986). 'Shareholder value and strategic management: Some caveats'. In W. D. Guth (ed.), *Handbook of Business Strategy: 1986/1987 Yearbook*, Warren, Gorham & Lamont, New York, pp. 6:1–6:6.

Bromiley, P. (1990). 'On the use of finance theory in strategic management'. In P. Shrivastava and R. Lamb (eds.), *Advances in Strategic Management*, Vol. 6. JAI Press, Greenwich, CT, pp. 71–98.

Buzzell, R. D., B. Gale and R. Sultan (1975). 'Market share: A key to profitability', *Harvard Business Review*, **53**(1), pp. 97–106.

Carlton, D. and J. Perloff (1990). *Modern Industrial Organization*. Harper-Collins, New York.

Demsetz, H. and K. Lehn (1985). 'The structure of corporate ownership: Causes and consequences', *Journal of Political Economy*, **93**(6), pp. 1155–1177.

Dial, J. (1995). 'Reverse leveraged buyouts: A study of the LBO round trip phenomenon', dissertation, Harvard Business School.

Dial, J. and K. Murphy (1995). 'Incentives, downsizing and value creation at General Dynamics', *Journal of Financial Economics*, **37**, pp. 261–314.

Easterwood, J., A. Seth and R. Singer (1989). 'The impact of leveraged buyouts on strategic direction', *California Management Review*, **32**, pp. 30–43.

Eliasson, G. (1976). *Business Economic Planning*. John Wiley, Chichester.

Fama, E. and M. Jensen (1983). 'Separation of ownership and control', *Journal of Law and Economics*, **26**, pp. 301–25.

Fortune (13 April 1998). 'Building profits the old-fashioned way', p. 179.

Fox, I. and A. Marcus (1992). 'The causes and consequences of leveraged management buyouts', *Academy of Management Review*, **17**, pp. 62–85.

Gale, B. T. (1972). 'Market share and the rate of return', *Review of Economics and Statistics*, LIV, pp. 412–423.

Gibbs, P. A. (1993). 'Determinants of corporate restructuring: The relative importance of corporate governance, takeover threat, and free cash flow', *Strategic Management Journal*, Summer Special Issue, **14**, pp. 51–68.

Harrison, J. R. (1987). 'The strategic use of corporate board committees', *California Management Review*, **30**, pp. 109–125.

Henderson, B. D. (1980). *Henderson on Corporate Strategy*. Abt Books, Cambridge, MA.

Holderness, C. and D. Sheehan (1988). 'The role of majority shareholders in publicly held corporations', *Journal of Financial Economics*, **20**, pp. 317–346.

Hoskisson, R. E. and M. A. Hitt (1988). 'Strategic control systems and relative R&D investment in large multi-product firms', *Strategic Management Journal*, **9**(6), pp. 605–621.

Hoskisson, R. E. and T. A. Turk (1990). 'Corporate restructuring: Governance and control limits of the internal capital market', *Academy of Management Review*, **15**(3), pp. 459–477.

Hoskisson, R. E., R. A. Johnson and D. D. Moesel (1994). 'Corporate divestiture intensity in restructuring firms: Effects of governance, strategy, and performance', *Academy of Management Journal*, **37**(5), pp. 1207–1251.

Hubbard, G. and P. Bromiley (1994). 'How do top managers measure and assess firm performance?', presented at Academy of Management meetings, Dallas, TX.

Investment Company Institute (1997). *1996–97 Directory of Mutual Funds and Other Investment Companies*. Investment Company Institute, Washington, DC.

Jacobson, R. (1988). 'Distinguishing among competing theories of the market share effect', *Journal of Marketing*, **49** (Fall), pp. 11–22.

Jacobson, R. (1990). 'Unobservable effects and business performance', *Marketing Science*, **9**(1), pp. 74–85.

Jacobson, R. and D. A. Aaker (1985). 'Is market share all that it is cracked up to be?', *Journal of Marketing*, **49** (Fall), pp. 11–22.

Jarrell, G. A., J. A. Brickley and J. M. Netter (1988). 'The market for corporate control: The empirical evidence since 1980', *Journal of Economic Perspectives*, **2**(1), pp. 49–68.

Jensen, M. C. (1986). 'Agency costs of free cash flow, corporate finance and takeovers', *American Economic Association Papers and proceedings*, **76**(2), pp. 323–329.

Jensen, M.C. (1988). 'Takeovers: Their causes and consequences', *Journal of Economic Perspectives*, **2**(1), pp. 21–48.

Jensen, M. C. (1989). 'Eclipse of the public corporation', *Harvard Business Review*, **67**(5), pp. 61–74.

Jensen, M. C. (1991). 'Corporate control and the politics of finance', *Journal of Applied Corporate Finance*, **2**, pp. 35–44.

Jensen, M. C. (1993). 'The modern industrial revolution, exit, and control systems', *Journal of Finance*, **XLVIII**(3), pp. 831–880.

Jensen, M. C. and W. H. Meckling (1976). 'Theory of the firm: managerial behavior, agency costs and ownership structure', *Journal of Financial Economics*, **3**, pp. 305–360.

Jensen, M. C., and R. S. Ruback (1983). 'The market for corporate control: The scientific evidence', *Journal of Financial Economics*, **11**, pp. 5–50.

Johnson, R., R. Hoskisson and M. Hitt (1993). 'Board of director involvement in restructuring: The effects of board versus managerial controls and characteristics', *Strategic Management Journal*, Summer Special Issue, **14**, pp. 33–50.

Judge, W. and C. Zeithaml (1992). 'Institutional and strategic choice perspectives on board involvement in the strategic decision process', *Academy of Management Journal*, **35**, pp. 766–794.

Kaplan, R. S. and D. P. Norton (1992). 'The balanced scorecard', *Harvard Business Review*, **70**(1), pp. 71–79.

Kaplan, R. S. and D. P. Norton (1993). 'Putting the balanced scorecard to work,' *Harvard Business Review*, **71**(5), pp. 134–137.

Kaplan, R. S. and D. P. Norton (1996). 'Using the balanced scorecard as a strategic management system', *Harvard Business Review*, **74**(1), pp. 75–85.

Kaplan, S. (1989). 'The effects of management buyouts on operations and value', *Journal of Financial Economics*, **24**, pp. 217–254.

Kennedy, P. (1985). *A Guide to Econometrics*, 2nd edn. MIT Press, Cambridge, MA.

Kesner, I. and R. Johnson (1990). 'An investigation of the relationship between board composition and stockholder suit', *Strategic Management Journal*, **11**(4), pp. 327–336.

Kosnik, R. (1990). 'Effects of board demography and directors' incentives on corporate greenmail decisions', *Academy of Management Journal*, **33**, pp. 129–150.

Lang, L. H. P., R. M. Stulz and R. A. Walkling (1991). 'A test of the free cash flow hypothesis: The case of bidder returns', *Journal of Financial Economics*, **29**, pp. 315–335.

Lehn, K. and A. Poulsen (1989). 'Free cash flow and stockholder gains in going private transactions', *Journal of Finance*, **XLIV**, July, pp. 771–787.

Lieberman, M. and D. Montgomery (1988). 'First-mover advantages', *Strategic Management Journal*, Summer Special Issue, **9**, pp. 41–58.

Liebeskind, J., M. Wiersema, and G. Hansen, (1992), 'LBOs, corporate restructuring, and the incentive intensity hypothesis', *Financial Management*, **21**, Spring 1992, pp. 73–88.

Mancke, R. B. (1974). 'Causes of inter-firm profitability differences: A new interpretation of the evidence', *Quarterly Journal of Economics*, **LXXXVIII**(2), pp. 181–193.

Marris, R. L. (1964). *The Economic Theory of Managerial Capitalism*. Free Press, Glencoe, NY.

Marris, R. and A. Wood (eds.) (1971). *The Corporate Economy – Growth, Competition and Innovative Potential*. Harvard University Press, Cambridge, MA.

Montgomery, C. and B. Wernerfelt (1991). 'Sources of superior performance: Market share versus industry effects in the U.S. brewing industry', *Management Science*, **13**(8), pp. 954–959.

Murphy, K. J. (1985). 'Corporate performance and managerial remuneration: An empirical analysis', *Journal of Accounting and Economics*, **7**, pp. 11–42.

O'Reilly, C., B. Main and G. Crystal, (1988). 'CEO compensation as tournament and social comparison: A tale of two theories.' *Administrative Science Quarterly*, **33**, pp. 257–274.

Perfect, S. B. and K. W. Wiles (1994). 'Alternative constructions of Tobin's q: An empirical comparison', *Journal of Empirical Finance*, **1**, pp. 313–341.

Rediker, K. and A. Seth, (1995). 'Boards of directors and substitution effects of alternative governance mechanisms', *Strategic Management Journal*, **16**(2), pp. 85–99.

Rumelt, R. P. and R. Wensley (1981). 'In search of the market share effect', *Academy of Management Proceedings*, Academy of Management, pp. 2–6.

SAS (1993). *SAS/ETS User's Guide, Version 6* (2nd edn.) SAS Institute Inc., Cary, NC.

Schmalensee, R. (1985). 'Do markets differ much?', *American Economic Review*, **75**(3), pp. 341–351.

Shleifer, A. and R. Vishny (1986). 'Large shareholders and corporate control', *Journal of Political Economy*, **94** (3), pp. 461–488.

Shleifer, A. and R. Vishny (1991). 'Takeovers in the '60s and the '80s: Evidence and Implications', *Strategic Management Journal*, Winter Special Issue, **12**, pp. 51–59.

Singh, H. and F. Harianto (1989). 'Management-board relationships, takeover risk and the adoption of golden parachutes', *Academy of Management Journal*, **32**, pp. 7–24.

Smith, A. (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations*. W. Strahan and T. Cadell, London.

Tobin, J. and W. Brainard (1968). 'Pitfalls in financial model building', *American Economic Review*, **58**, pp. 99–122.

Tosi, H. and L. Gomez-Mejia (1989). 'The decoupling of CEO pay and performance: An agency theory perspective', *Administrative Science Quarterly*, **34**, pp. 169–189.

Venkatraman, N. and J.E. Prescott (1990). 'The market share-profitability relationship: Testing temporal stability across business cycles', *Journal of Management*, **16**(4), pp. 783–805.

Walkling, R. A. and M. S. Long (1984). 'Agency theory, managerial welfare, and takeover bid resistance', *Rand Journal of Economics*, **15**, pp. 54–68.

Woo, C. (1987). 'Path analysis of the relationship between market share, business-level conduct, and risk', *Strategic Management Journal*, **8**(2) pp. 149–168.

Zahra, S. A. and J. A. Pearce, II (1989). 'Boards of directors and corporate financial performance: A review and integrative model', *Journal of Management*, **15**, pp. 291–334.

