EARNINGS PRESSURE AND COMPETITIVE BEHAVIOR:
EVIDENCE FROM THE U.S. ELECTRICITY INDUSTRY

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This study examines the effect of pressure felt by management to meet or beat analysts' earnings forecasts on firms' behavior in oligopolistic output competition. We argue that firms under such earnings pressure strive to increase current profits by exploiting market power opportunities and tightening output, even though these acts could encourage rival output expansion. Using data from the U.S. electricity generation industry, we found that firms facing earnings pressure tended to restrict output in markets in which market structure and competitor characteristics were favorable for the exercise of market power, but their competitors tended to increase output in those markets.

Agency theorists have traditionally interpreted the performance expectations set by capital markets as efficient mechanisms for shareholder monitoring (Jensen, 1986; Jensen & Meckling, 1976). Yet, dissenting work in strategy and finance has emerged, expressing concern about the likely effects of such capital market pressures on long-term strategy (Jensen, 2005; Porter, 1992; Stein, 1989). Managers often complain that capital market expectations shift their focus toward current earnings and away from long-term strategic commitments. For instance, Ted Turner, founder of CNN, commented: “When all companies are quarterly earnings–obsessed, the market starts punishing companies that aren’t yielding an instant return. This not only creates a big incentive for bogus accounting, but also it inhibits the kind of investment that builds economic value” (Turner, 2005: 229). In a recent worldwide survey by McKinsey & Company (2006), 42 percent of respondents (managers and board members of publicly traded firms) strongly agreed that issuing earnings guidance and trying to meet earnings expectations from equity analysts led their firms to focus more on short-term earnings. Another survey, by Graham, Harvey, and Rajgopal (2005), indicated that 80 percent of respondents (chief financial officers [CFOs] and financial executives) would decrease discretionary spending on R&D, advertising, or maintenance to meet an earnings target, and 60 percent would avoid initiating a positive net present value (NPV) project if it meant falling short of analysts’ consensual earnings forecasts.

This strong contrast between theory and practice highlights the importance of examining the impact of earnings pressure on firms’ behaviors and the types of actions firms choose to deal with such pressure. We define earnings pressure as the tension felt by management about meeting or beating analysts’ earnings forecasts (Levitt, 1998). Graham et al.’s (2005) survey suggested that CFOs viewed earnings as the most important performance measure reported to outsiders. Seventy-three percent of respondents considered analyst consensus forecasts as an important benchmark, and over 80 percent believed that meeting earnings benchmarks helped to build credibility in the capital market and to maintain or increase their firm’s stock price.

In general, a management can respond to earnings pressure in multiple ways, such as ignoring it (King, 2004), managing expectations (earnings guidance) by communicating more effectively with capital market agents (Bernhardt & Campello, 2006).
2007), engaging in “creative accounting” (such as capitalizing rather than expensing some costs, or managing discretionary accruals) (DeGeorge, Patel, & Zeckhauser, 1999), or making business decisions to accommodate the pressure (Graham et al., 2005). Researchers in accounting and finance have explored how earnings pressure may affect financial communications and accounting manipulations (Burgstahler & Eames, 2006) and have revealed dramatic stock reactions when firms miss earnings forecasts (Skinner & Sloan, 2002). Yet an important question for strategic management scholars and practitioners is whether firms make substantive changes in business actions (such as competitive behaviors, tangible or intangible investments, entry or exit into markets) in response to earnings pressure, and if so, whether these changes are beneficial or detrimental for long-term competitiveness.

This study focuses on the impact of earnings pressure on product-market competitive behavior in oligopolistic markets. Competitive behavior in oligopolistic industries involves managing trade-offs between current earnings and future competitiveness, particularly in regulating the exercise of market power when firms have powerful positions. In oligopolistic industries, firms have varying degrees of market power, depending on the market structure in which they function, their extent of dominance in the market, and the extent of their competitors’ motivation and ability to respond aggressively. In industries with differentiated products, firms with market power may increase prices, with the expectation that demand will not reduce excessively. In commodity industries, firms with market power may influence prices and current earnings by restraining the output supplied to the market (Jacquemin & Slade, 1989). However, exercising market power (by restricting output or increasing prices) may hinder future competitiveness by inciting competitive expansions by rivals or entrants that could have been preempted by more aggressive competitive behavior (Caves, Fortunato, & Ghemawat, 1984; Kamien & Schwartz, 1975). So firms with market power experience an intertemporal trade-off between generating current earnings by exercising their potential market power, and maintaining long-term competitiveness by preempting competitors’ expansions.

Earnings pressure, we argue, affects how firms regulate their competitive behavior and resolve that competitive intertemporal trade-off. Here, we examined the effect of earnings pressure on competitive behavior in the U.S. electricity generation industry. This is a commodity industry in which competition intensity is based on available output relative to demand. We argue that earnings pressure encourages dominant firms to exercise market power by restricting output so as to increase prices and current earnings, even though such behavior may encourage output expansion by competitors and undermine competitiveness. Consequently, we explore contingencies that regulate the incentives to exercise market power. We also examine how earnings pressure influences competitive interaction and the competitive behavior of rivals.

To our knowledge, this is the first study to examine the effect of earnings pressure on competitive strategy decisions. It contributes to a small but growing literature on how capital markets and financial conditions affect firms’ competitive decisions. Prior work in this stream has focused mainly on the role of financial leverage on competitive decisions (Chevalier, 1995a, 1995b; Phillips, 1995), whereby cash flow requirements to cover interest payments impose a short-term constraint on competitive decisions. Our study shifts attention from “hard” constraints imposed by capital structure, such as debt covenants, to “soft” constraints associated with the management of capital market expectations. In addition, though leverage represents a constraint on short-term cash flows, earnings pressure influences the trade-off between current and future earnings. Our study shows that pressures from capital markets may shift the emphasis toward current earnings generation, affecting the competitive behavior of firms and the competitive interactions in oligopolistic competitive environments (Porter, 1992; Stein, 1989). It adds to emerging understanding of the impact of investment analysts and capital markets on firm behavior and performance (Benner, 2007; Moreton & Zenger, 2005; Zuckerman, 1999, 2000).

THEORY AND HYPOTHESES

Earnings Pressure: Antecedents and Effects

Earnings pressure results from the complex dynamic interactions between investors, investment analysts, and managers, in a context characterized by uncertainty, asymmetric information, imperfect observability of managerial actions, and potential conflicts of interest. Given consistent operating and accounting practices, managements develop internal expectations about their firms’ future performance that are based on historical performance, comparisons with peer firms (Cyert & March, 1963; Greve, 2003), and estimates about internal and external changes (Chen, 2008; Gavetti & Levinthal, 2000). Managers experience attainment discrepancy when, for a given future or ongoing period of activity (year or quarter), the consensus of external analysts’
earnings forecasts is above the internal expectations of management about future company earnings (Wiseman & Bromiley, 1996). Earnings pressure may result from the confluence of two intertwined conditions: (1) divergence between analysts’ and management’s earnings expectations and (2) the large actual and perceived market penalties for a company missing earnings forecast consensus.

The role of investment analysts is not to provide performance targets for management, but to evaluate a number of stocks and provide buy, hold, or sell recommendations to investors. As part of the justification for their recommendations, analysts forecast future company earnings in their reports. For their forecasts, analysts do not limit themselves to using historical information or stock market information, but also use information disclosed by managers about a company’s past performance and future prospects, external information about the company and its environment, and their own research and professional judgment (Schipper, 1991).

There is evidence that analysts with greater forecast accuracy benefit from improved reputation and better career promotions (Stickel, 1992). However, despite the overarching objective of accuracy, analysts are exposed to diverse organizational and career incentives that may cause systematic biases in their forecasts. First, there is substantial evidence of optimism bias in analysts’ forecasts and recommendations (Chopra, 1998; Dreman & Berry, 1995). This optimism bias has been associated with conflicts of interests, such as the incentives to maintain underwriting relationships with a covered firm (Dechow, Hutton, & Sloan, 1999a; Dugar & Nathan, 1995; Lin & McNichols, 1998; Michaely & Womack, 1999) or to generate sales and trading commissions for the employer brokerage house (Cowen, Groysberg, & Healy, 2006). Hong and Kubik (2003) found that, controlling for relative forecast accuracy, analysts with greater optimism bias experienced superior career progressions. Second, analysts also exhibit a herding bias as a result of career and reputation concerns. Inexperienced analysts who deviate from the consensus others have arrived at are more likely to be terminated (Hong, Kubik, & Solomon, 2000). Consequently, analysts tend to release forecasts similar to those previously announced by other analysts, even when their information does not justify doing so (Trueman, 1994). Therefore, although analysts provide rich and informative individual forecasts, in aggregate these forecasts may exhibit excessive consensus toward optimistic earnings projections.

Firms’ managements can influence the formation of analysts’ forecasts by the public disclosure of internal information and objectives, or “public earnings guidance” (Cotter, Tuna, & Wysocki, 2006). Because of the perceived penalties for missing earnings forecasts, managements may use public guidance to “talk down” the analysts’ forecasts so that they are easier to meet or beat. Offering guidance, however, is costly in terms of management attention, and risky for a firm’s reputation for credibility. Chen (2004) showed that stock market reactions to negative earnings surprises were more drastic if a firm failed to meet its own guidance. As a consequence, public guidance releases tend to be infrequent and overly conservative, as firms seek to “under-promise and over-deliver” (Graham et al., 2005: 42). Cotter et al. (2006) found that firms issued guidance for only about 22 percent of reported earnings and that guidance was disproportionately used when analysts’ forecasts were perceived as overly optimistic. Most management guidance tends to be pessimistic, not only relative to analysts’ forecasts, but also relative to the earnings actually reported (Chen, 2004). In fact, CFOs tend to publicly announce targets that are below their firms’ internal expectations so as to maximize chances of a positive surprise (Graham et al., 2005: 42). Although analysts adjust their forecasts to new guidance, most analysts anticipate a conservative bias in guidance and do not fully match it in their forecasts (Cotter et al., 2006). In consequence, the interactions between analysts and management in the formation of earnings forecasts might be viewed as a negotiation process (with analysts taking an optimistic stance and management taking a more pessimistic position in public guidance), which may explain the divergence between consensual forecasts and internal management expectations.

The second factor contributing to earnings pressure is the large perceived and actual stock price decline suffered by a company that fails to meet an earnings forecast consensus. For example, Skinner and Sloan (2002) found that unexpectedly missing earnings forecasts by 1 percent could lead to a negative abnormal stock market return of 15 percent for growth stocks and 5 percent for value stocks. This stock price reduction can have a large impact on managers’ stock options compensation (Hall & Liebman, 1998). Failing to meet analysts’ earnings forecasts is also a strong predictor of CEO turnover (Puffer & Weintrop, 1991).

In principle, it is not obvious why management, rather than analysts, should be penalized when reported earnings differ from analysts’ forecasts (Dechow & Skinner, 2000). One reason for the stock market penalty is that investors use analysts’ forecasts to form their valuation of stocks and therefore update their expectations of future earnings levels and growth rates when those forecasts are not met.
Because investors have limited cognitive capability to process available information, and information search costs are high, they are willing to use analysts’ forecasts to help them infer a firm’s performance (DeGeorge et al., 1999). Recent research has shown that although some (more sophisticated) investors were aware of possible biases in certain analysts’ forecasts and tried to correct for it (Malmendier & Shanthikumar, 2007; Mikhail, Walther, & Willis, 2007), the overall market was not able to fully correct for such biases (Hayes & Levine, 2000). When a negative earnings surprise happens, investors must determine how much to update their prior beliefs about future earnings. Two sources of asymmetric information between investors and management contribute to a large negative updating of expectations. First, investors lack detailed information about the management actions and business fundamentals that impact future earnings, and they therefore rely heavily on inferences from current earnings to assess long-term value (Dechow, Hutton, & Sloan, 1999b). An earnings surprise therefore leads to a quick update of expectations about future earnings levels and growth rates (Skinner & Sloan, 2002). Second, investors lack information about the credibility of a firm’s reported earnings but are aware of management incentives to meet earnings forecasts and understand that management has some discretion to smooth or manipulate reported earnings to meet forecasts (by managing accounting accruals, deferral or capitalization of expenses, delay of investments, or other changes in business decisions). Therefore, the inability to meet earnings forecasts is perceived as a cue about more serious underlying problems (Stein, 1989). Both reasons lead investors to heavily discount a stock after a negative earnings surprise (Graham et al., 2005: 30). The intensity of the stock market response and the negative personal consequences for managers’ incomes and careers reinforce the strong incentive for managers to meet earnings expectations.

Because both analysts’ forecasts and potential earnings are updated via additional information and ongoing interactions between analysts and management, earnings pressure is a dynamic phenomenon. In this article, we focus on the effects of earnings pressure during a period of business activity. To avoid reverse causation, we examined earnings pressure at the beginning of that period. Managers had various means to manage earnings pressure during the period. One approach, as described above, is to disclose additional information during the period or prior to earnings announcements to guide analysts’ forecasts downward toward achievable levels (Bernhardt & Campello, 2007). Another approach, typically taken at the time of earnings announcement (i.e., after the closing of accounts), is to use “creative” accounting to meet earnings expectations, such as capitalizing expenditures and managing discretionary accruals (DeGeorge et al., 1999), or to use symbolic language to reduce the negative impact when reporting earnings below analysts’ consensual expectations (Pozner & Zajac, 2005). Finally, managers may change real business decisions affecting revenues or expenses during a period in order to increase current earnings (Graham et al., 2005). Our study focuses on this third mechanism.

From a strategic management perspective, a major concern is whether earnings pressure leads to changes in business decisions and whether those changes have a beneficial or detrimental effect on future performance. So far, the debate has mainly built on anecdotal evidence (Abegglen & Stalk, 1985; Porter, 1992; Useem, 1996), interviews or surveys with managers (Graham et al., 2005; McKinsey & Company, 2006), classroom experiments (Bhojraj & Libby, 2005), or indirect inference from financial statements (Roychowdhury, 2006). There is no systematic direct evidence of the consequences of earnings pressure for firms’ behavior and performance.

The effect of earnings pressure on long-term performance hinges on whether firms face a binding intertemporal trade-off between current and future earnings (i.e., whether increasing current earnings would reduce future earnings), and the nature of that trade-off. Previous research on myopic corporate behavior has tended to focus on intertemporal trade-offs due to long-term investments, particularly if those investments involve current (i.e., noncapitalized) expenses, such as discretionary R&D and marketing expenses, that reduce current earnings while creating future intangible assets that are difficult for investors to measure (Stein, 1989). In these situations, myopic firms can easily increase current earnings by reducing investment in intangible assets (e.g., Bushue, 1998; David, Hitt, & Gimeno, 2001; Hoskisson, Hitt, Johnson, & Grossman, 2002).

Another source of intertemporal trade-offs is competitive interactions. Firms’ current competitive decisions, such as pricing or output decisions, influence not only current earnings, but also future competitive reactions and long-term competitiveness. For example, firms with aggressive behavior in output competition may discourage output expansion by competitors and preempt future entry (Ghemawat, 1984; Lieberman, 1987). Firms that respond in an aggressive (rather than accommodating) way to new entry or rival expansion may build reputations for toughness that deter similar expansions in the future (Milgrom & Roberts, 1982).
Therefore, it is important to examine the impact of earnings pressure on firms’ competitive behavior in oligopolistic contexts.

**Competitive Behavior under Earnings Pressure**

We define competitive behavior as decisions or actions that improve a firm’s market position relative to its competitors (Grimm, Lee, & Smith, 2006: 22). In a general context, competitive behavior may include decisions that provide superior customer value (either by increasing the customers’ willingness to pay for the firm’s products relative to rival offerings, or by reducing the price), or that preempt market space from competitors. Two trade-offs typically determine the intensity of competitive behavior: a static trade-off between margins and volumes, which determines current earnings, and a dynamic, or intertemporal, trade-off between current and future earnings. In the static trade-off, aggressive competitive behavior (decreasing price, increasing marketing expenses, expanding output) can reduce unit margins and will only be effective if it results in sufficient volume increase to compensate for the lower unit margins. In particular, firms with market power (firms with dominant market shares in concentrated markets and with rivals that are unwilling or unable to challenge them) can expand current profits by reducing the aggressiveness of their competitive behavior (increasing prices, tightening supply), since the increase of margins over a large volume will compensate for some moderate reduction in volumes. However, the short-term exercise of market power can hamper future competitiveness and profitability, creating an intertemporal trade-off between current and future earnings (Caves et al., 1984).

In commodity industries, the main competitive decisions firms make concern capacity investments, which are difficult to adjust in the short term, and output decisions, which are limited by capacity and determine market-clearing prices (the price at which supply equals demand) and competitive intensity. Because earnings pressure takes place over a short period (a quarter or a year), we focus on its effect on determining output relative to available capacity, also known as capacity utilization. Output decisions in oligopolistic competition are highly interactive, since firms’ output decisions affect market-clearing prices and competitors’ output decisions. This mutual adjustment of output decisions, and the equilibrium outcomes, are captured in simplified form in the Cournot oligopoly model (Cournot, 1838), whereby firms make simultaneous interdependent output decisions that determine market-clearing prices and profits.

Capacity utilization is first determined by the static trade-off between volume and margin. Facing this trade-off, firms acting as price takers (e.g., firms in fragmented markets or with low market shares) generally seek capacity utilization that is as high as possible (thereby spreading fixed costs over greater volume), as they face technical and economic limitations, such as demand volatility and variation in the relative cost efficiency of their different production units. However, when firms have market power and sufficient capacity and output share to influence market-clearing prices, they recognize that increasing capacity utilization in marginal units may decrease market-clearing prices and margins for other units. Absent intertemporal trade-offs, the tension between reducing average costs by increasing utilization versus increasing prices by restricting output determines capacity utilization.\(^1\)

Intertemporal trade-offs between current and future earnings may also influence capacity utilization. Research in industrial economics has suggested that both capacity and output levels affect the development of attractive future competitive positions. Capacity and output competition represent competition in “strategic substitutes,” wherein one party’s competitive action level leads to a reduction of the other party’s action level (Fudenberg & Tirole, 1984). Building and maintaining excess capacity may provide a credible commitment to deter entry or rival expansion (Ghemawat, 1984; Lieberman, 1987; Spence, 1977). In addition, for a given level of installed capacity, greater output levels (i.e., greater capacity utilization) reduce residual demand for competitors, reduce market-clearing prices, and generally discourage output expansion by rivals and potential entrants. This behavior, known as “limit pricing” in the economics literature (Bain, 1949; Lieberman, 1987), suggests that higher output and capacity utilization by incumbents (and therefore lower prices) prevent output and capacity expansion by rivals and poten-

\[^1\] In an oligopolistic competition market, the optimal static output decision is determined by $MC(q_i) = MR(q_i) = P\left(1 - \frac{s_i}{\varepsilon}\right) < P$, where $MC$ is marginal cost, $MR$ is marginal revenue, $P$ is market price, $s_i$ is firm $i$’s market share, $\varepsilon$ is the demand elasticity, and $\theta$ is a “competitive conduct parameter” that measures how a firm’s decreased output affects total market output (including the output from competitors) (Bresnahan, 1989). Therefore, output reduction associated with exercising market power will be greater when market share is high and elasticity is low, and when competitor output expansions will not undermine a firm’s output reduction.
tial entrants and encourage the exit of marginal rivals. These mechanisms have been empirically supported in several industries (Masson & Shanan, 1986). Limit pricing represents a sacrifice of short-term profits relative to the potential profits from full exercise of pricing power, but a potential enhancement of future performance. For firms with market power, this tension constitutes an intertemporal trade-off between maximizing current earnings and maintaining strong competitive positions for the future (Caves et al., 1984).

We argue that earnings pressure shifts the balance between short-term exercise of pricing power and future competitive preemption. Companies whose management is not facing earnings pressure are more likely to sacrifice some potential earnings to preempt entry and rival expansion. Given their existing capacity, their level of capacity utilization should be higher than the level that would maximize current earnings by exploiting the available market power (Kamien & Schwartz, 1975). In contrast, firms whose managements face earnings pressure (abbreviated hereafter to “firms facing earnings pressure”) need to meet current earnings expectations and are more likely to exercise the short-term pricing power available to them, even if that encouraged rival expansion or entry (Caves et al., 1984). This logic suggests the following:

**Hypothesis 1.** Firms facing greater earnings pressure have lower capacity utilization relative to available capacity, other things being constant.

The Role of Market Structure and Competitive Environment

Hypothesis 1 is proposed as a main effect of earnings pressure on capacity utilization levels. However, our theory suggests that the presence and intensity of this effect depend on structural contingencies, and particularly the extent to which a firm has pricing power. If a firm has little or no pricing power, a reduction of capacity utilization, as proposed above, could be self-defeating, since the firm would sacrifice volume to spread fixed costs without gaining any additional margin per unit. Therefore, variables that reflect the extent of pricing power should moderate the relationship between earnings pressure and capacity utilization. Market power implies that a firm has sufficient output and capacity position to influence market-clearing prices and that its competitors are unwilling or unable to quickly expand output to make up for a shortage it creates as the dominant firm. In particular, we focus on four general dimensions: the capacity share dominance of a firm within a particular market, market concentration among the remaining incumbents, goal heterogeneity among incumbents, and competitors’ capacity constraints.2

**Dominant capacity share.** When a firm with a dominant capacity share restricts output, it creates a price “umbrella” that benefits its remaining output in the market. Therefore, the loss of volume is compensated for by the gain in margin over its remaining output. Moreover, because this firm has a dominant share of capacity, it can restrict enough of its capacity to meaningfully influence prices. In contrast, firms with lower shares of capacity have neither the ability nor the motivation to act as price makers. Given their limited capacity, restricting output may not be sufficient to generate the desired increase in market prices. Even if they can affect prices, the gain on margins will affect a smaller remaining output, and the benefit will be lower. Therefore, in general, firms with significant capacity share are more motivated to act as price makers and to restrain capacity utilization to maintain prices and margins (Chen & Hambrick, 1995; Jacquemin & Slade, 1989), even though this may result in future market share erosion (Caves et al., 1984; Ferrier, Smith, & Grimm, 1999). Firms with limited capacity share tend to act as price takers and to free-ride on the price umbrella created by the dominant firms.

If earnings pressure puts an emphasis on current earnings generation, we would expect its negative effect on capacity utilization to be particularly prevalent among firms with dominant capacity share rather than those with limited capacity share. For firms with limited share, decreasing capacity utilization will fail to increase prices and therefore will not help the firms meet their current earnings targets (in fact, it will reduce earnings). For dominant firms, however, for a given earnings pressure, this restriction on capacity utilization will allow them to increase current earnings, albeit at the risk of encouraging rival output expansion.

**Hypothesis 2a.** The effect of earnings pressure on capacity utilization level is more negative when firms have larger capacity shares.

**Market concentration.** A firm’s ability to act as a price maker depends on the likely responses by

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2 These dimensions are linked to the general formula for marginal revenue \[ MR = P \left( 1 - \frac{s}{P} \right) \] in footnote 1 as well, since market share is a factor in the model (s), and market concentration, goal heterogeneity, and competitors’ capacity constraints are linked to the competitive conduct parameter (\( \theta \)).
other incumbents. If the firm faces a fragmented market structure with many competitors, this could reduce the short-term benefit of restraining output, since these competitors are likely to expand output accordingly. On the other hand, if the rest of the market is concentrated in a few incumbents with larger shares, these incumbents will be aware of their oligopolistic interdependence and will recognize the collective benefits of exercising market power. Under these conditions, the expected return from a short-term exercise of pricing power will be greater, since other incumbents are more likely to also maintain output discipline to benefit from higher prices. Therefore, in general, we expect a firm to be more likely to restrict capacity utilization, for a given available capacity, if it is in a concentrated market than if it is not in a concentrated market (Stigler, 1964). Earnings pressure further enhances that effect, since it shifts the inter-temporal trade-off in favor of current earnings. We therefore propose that the restriction of capacity utilization by firms facing earnings pressure will be stronger if the firms are in concentrated markets.

Hypothesis 2b. The effect of earnings pressure on capacity utilization level is more negative when firms are in more concentrated markets.

Goal heterogeneity among competitors. In some industries and markets, competitors have heterogeneous governance and strategic objectives. For example, for-profit banks compete with credit union cooperatives, for-profit insurance companies compete with mutuals, and private hospitals compete with public and not-for-profit hospitals. This heterogeneity of objectives is believed to complicate oligopolistic coordination and therefore increase competition (Newman, 1978). In the electricity industry, as in other deregulated industries, investor ownership is often complemented by other forms of asset ownership (e.g., federal or state governments, municipal authorities, cooperatives, etc.). The objectives of these non-investor-owned generators differ markedly from those of investor-owned generators, since their prime objective tends to be welfare maximization subject to a constraint of self-financing, rather than profit maximization. In particular, reducing output to increase prices is antithetical to the nature of these non-investor-owned generators. Therefore, they have vastly different objectives that lead them to act in a way that disrupts investor-owned generators’ ability to exercise pricing power. Restricting capacity utilization to increase market price is likely to be counterproductive in markets in which non-investor-owned generators hold a significant share. For companies experiencing earnings pressure, we expect to see restrictions in capacity utilization, relative to available capacity, in markets that are dominated by for-profit competitors (investor-owned generators), but we expect to see less such restriction in markets with significant penetration by not-for-profit competitors.

Hypothesis 2c. The effect of earnings pressure on capacity utilization level is more negative when firms are in markets with more for-profit competitors.

Competitors’ capacity constraints. A firm’s ability to exercise market power is limited if its competitors can easily and quickly expand capacity utilization to take advantage of the resulting residual demand. A dominant firm’s restriction of capacity utilization, given its available capacity, increases the residual demand available to rivals. If these rivals have excess capacity in relatively efficient plants, they can meet the increased residual demand while incurring only the marginal costs of the marginal plant in operation. In that situation, a reduction of output by the focal firm simply shifts output to its competitors, without necessarily increasing market prices. However, when competitors are capacity constrained, they are unable to meet the increased residual demand. A reduction of capacity utilization by a focal firm will more likely result in increased prices and margins. Therefore, firms facing earnings pressure can exercise market power more effectively if competitors are capacity constrained. Accordingly, we argue that:

Hypothesis 2d. The effect of earnings pressure on capacity utilization level is more negative when firms face competitors with tighter capacity constraints.

Competitive Interactions by Firms Facing Earnings Pressure

The previous hypotheses suggest that dominant firms facing earnings pressure seek to increase current earnings by restricting capacity utilization, given their available capacity. However, the performance consequences of earnings pressure critically depend on the nature of competitive interactions with rivals. Since output decisions in oligopolistic competition are interdependent, we expect earnings pressure by dominant firms to affect not only the competitive behavior of these firms, but also the competitive behavior of their competitors. In particular, we argue that firms intensify their competitive behavior when their dominant competitors face earnings pressure. These cross-rival effects partially undermine the intended performance ben-
firms of output restrictions, since rivals benefit by expanding their output.

Output and capacity utilization decisions are part of the common repertoire of competitive actions in output-based industries, and therefore the likelihood of competitive interaction is high (Chen, Smith, & Grimm, 1992). As represented in the Cournot model, output decisions by oligopolistic competitors are “strategic substitutes” (Fudenberg & Tirole, 1984): lower output by one competitor motivates higher output by its rivals, and vice versa. In our context, dominant competitors facing earnings pressure will lower capacity utilization (as stated in the previous hypotheses). Other things being constant, this output reduction causes an increase in market-clearing prices and encourages higher capacity utilization by other firms in the market. A higher price umbrella will allow firms to increase utilization of marginal plants with lower productivity or higher unit costs.

Theoretically, the cross-rival effect of earnings pressure may occur through two causal processes. The first, and most likely, is an indirect causal path: dominant competitors facing earnings pressure reduce their capacity utilization, and this reduction triggers greater capacity utilization by rivals. In that path, firms do not need to be aware of the earnings pressure on their rivals, but they react to their rivals’ realized competitive behaviors. Another possible, but far less likely, causal path is a direct one: firms recognize their dominant competitors are suffering from earnings pressure and act aggressively in anticipation of a soft, accommodating response. However, this path would require common knowledge about earnings pressure on rivals, which may be a limiting assumption in many contexts.

Empirically, capacity utilization decisions among competitors in commodity industries do not occur discretely and in sequence but happen interactively over time. For example, electricity generators adjust output for daily and hourly intervals of demand. In those cases, competitors’ capacity utilization levels are mutually interdependent, as each firm adapts its output to the actual or expected output of competitors. When dominant firms in a market face earnings pressure, the mutual adjustment would shift toward lower capacity utilization by the dominant firms and consequently greater capacity utilization by their competitors. Therefore, we propose:

**Hypothesis 3.** Firms have higher capacity utilization relative to available capacity when their dominant competitors face higher earnings pressure.

In summary, we propose that firms experiencing earnings pressure shift their focus toward generating current earnings by exercising market power (trying to increase prices by restricting output), the more so when structural conditions favor this effort. Yet earnings pressure may also affect competitive interactions, since it may encourage expansion by competitors. Our hypotheses provide a model of how earnings pressure interacts with competitive context in determining competitive behavior.

**DATA AND METHODS**

**Data and Sample**

Since competitive interaction patterns vary across industries, depending on economic and institutional conditions, it was helpful to focus on a single industry in hypothesis testing. After considering several contexts, we selected the U.S. electricity generation industry, as its characteristics made it a suitable setting in which to test the effect of earnings pressure on competitive behavior in commodity markets. Electricity is the quintessential homogeneous product: electricity produced by one generator is indistinguishable from that produced by another. Typically, generators supply output for different daily and hourly periods, and the total output supplied in the market and the demand during those periods determine the price of that electricity. Economic researchers have found the Cournot model of output competition to be a good approximation of the competitive interactions in this industry (Borenstein & Bushnell, 1999). The passage of the Energy Policy Act in 1992 opened the wholesale electricity market (for transactions between generators and distributors) to competition by eligible generators, even before the opening of the retail market. For the purposes of wholesale electricity competition, the United States was divided into 12 wholesale markets, or North American Electric Reliability Council (NERC) regions, as described in Appendix A. This feature provided heterogeneity of competitive structures in different markets.

Despite the deregulation of the wholesale market, there is concern as well as evidence that these markets have developed oligopolistic structures in which a few large generators dominate. The aggregate demand for electricity is very inelastic, which further enables incumbents to exercise pricing power. Economic research on deregulated electricity markets has shown that dominant firms in concentrated electricity markets perform “strategic withholding” of output at periods of peak demand to manipulate spot prices (Fabra & Toro, 2005; Joskow & Kahn, 2002; Sweeting, 2007). In particular, strategic output withholding was extensively studied and debated after the California electricity crisis in 2000.
During that period, it emerged that electricity generators used artificial power plant outages to create supply shortages in order to raise market prices and increase their profit (McLean & Elkind, 2003).

The COMPUSTAT database listed about 124 publicly traded firms for which electricity generation and distribution was the principal business (under SIC codes 4911 and 4931), and analysts constantly followed 70–80 of them (Besanko, D’Souza, & Thiragarajan, 2001). Consistently with our previous discussion, investors tended to react sensitively to earnings forecasts and earnings surprises. For example, when American Electric Power missed analysts’ consensus of $1.44 by only a penny on October 23, 2001, its stock price fell from $44.19 to $42.24 within the following week (Dow Jones News Service, 2001).

Data were obtained from several sources. First, the U.S. Department of Energy’s Electricity Information Administration (EIA) provided the EIA-860 database, a census of generating units (i.e., turbines) in power plants owned and operated by electricity generators. From there, we obtained the total capacity that a firm held in operation or standby (still in operation but out of service for more than three months) in each wholesale region (market) in each year, as well as the share of capacity in the market. Second, the EIA-906 and EIA-920 databases provided annual data on electricity generation at the power plant level. From there, we calculated the total output produced by the generator in each market and year, as well as its average capacity utilization rate over the year. Finally, earnings forecasts and historical company earnings were obtained from the Institutional Broker Estimates System (I/B/E/S) database offered by Thomson Financial/First Call. Our sample period was from 1993, right after the deregulation, to 2005, when the latest data were published. For all firms with more than 1 percent capacity share in any studied market-year, we combined I/B/E/S earnings data and EIA capacity and output data by matching the generator names and their I/B/E/S “tickers” and cross-checked this information by referring to industry and company historical profiles. We created a panel data set of 62 generation companies, 14 among them present in more than one market, followed over 13 years. Despite the geographical expansion of generators, multimarket contact was negligible, with only 2 companies meeting in two or more markets.

Methods

We used panel data methods, with the unit of analysis being the firm-market-year. Our focus was on understanding the determinants of capacity utilization, given available capacity, which constrains output. Moreover, because of the seasonality, cyclical, and volatility of electricity demand, generators often maintain sufficient available capacity to serve peak demand, and average capacity utilization rates are generally low (about 52 percent in our sample). Increasing capacity utilization is not easy, however. Firms typically develop diverse portfolios of plants with different technologies and different cost structures. Plants serving peak demand tend to have higher variable costs. Capacity utilization rates may not be easily comparable across generators, since utilization depends on firms’ plant portfolio choices on such matters as scale and technology. We constructed a model of capacity utilization ($q_{imt}/K_{imt}$) that allowed it to be influenced by a firm’s available capacity ($K_{imt}$) in a given market, other independent ($X_{imt}$) and con-

---

3 The EIA data are reported at the level of the “utility code” representing a single operational unit. We aggregated total capacity and output at the parent firm level, excluding those of “captive plants” held by vertically integrated industrial users (e.g., metal or chemical producers). We started with 738 utility codes with more than 1 percent of capacity share in any market-year. Among those, 205 were privately held, 125 were public utilities (either government-owned or cooperatives), and 356 were associated with 89 publicly traded companies in COMPUSTAT and matched to 76 I/B/E/S tickers. For the remaining 52 utility codes, we couldn’t identify ownership; we assumed them to be privately held, but the results were robust to alternative classifications.

4 The NERC region excluded is Alaska, which had only one publicly traded electric utility in the market. For the regression analysis we excluded firm-market-years that had less than a 1 percent market share in a year, and we required firm-markets to have at least five yearly observations during the sample period. We also dropped firm-years when fewer than three analysts provided earnings forecasts. Our sample of publicly traded utilities covered by analysts showed that these firms were larger and had higher capacity utilization than the other, nonpublicly traded (not-for-profit, state, or private), utilities ($p < .001$ for Kolmogorov-Smirnov tests). The analyst-covered firms were also larger and had higher capacity utilization than other publicly traded firms listed in COMPUSTAT but not covered by analysts ($p < .001$). These results suggested that ownership types and analyst coverage were not random. Since we defined our target population as publicly traded utilities with analyst coverage, we did not interpret these differences as representing a bias in our sample, but as reflecting differences between populations.
trol variables \(Z_{int}\), and some unobserved heterogeneity, as follows:

\[
q_{int}/K_{int} = \phi \times \log(K_{int}) + \beta \times X_{int} + \gamma \times Z_{int} + \alpha_{int} + \tau_i + \varepsilon_{int}.
\]

The model included fixed effects for firm-market combinations \((\alpha_{int})\), since firms’ positions and capacity portfolios across markets are highly heterogeneous.\(^5\) In addition, we included fixed effects for each year \((\tau_i)\), as longitudinal trends in demand and input costs (e.g., economic growth, oil prices) can influence capacity utilization. The results of a Hausman test \((p < .01)\) comparing the model to a random-effects specification supported use of fixed effects to model firm-market heterogeneity.

Since the hypotheses involve the evaluation of interaction effects between earnings pressure and market structure variables, we centered the components of these interactions around their sample means prior to calculating the interactions (Aiken, West, & Reno, 1991). These changes allow the interpretation of main effects as the effects of a variable at the mean level of the moderator variable. We estimated models using Stata 10.

**Dependent Variable**

*Capacity utilization.* The capacity utilization rate of a firm in a certain market and year was calculated as the ratio of its net annual output in the market (in megawatt hours [MWh]), divided by the number of hours per year \((365 \times 24 = 8,760)\) and the total summer capacity (in megawatts). Net generation output equaled gross output minus internal electricity use and pumping energy. This measure represents average capacity utilization over the year, although output decisions are made continuously.

**Independent Variables**

*Earnings pressure.* The key independent variable was *earnings pressure*. Because we were interested in its effect on competitive decisions, we measured earnings pressure at the beginning of each period of activity, before the competitive decisions took place. Theoretically, earnings pressure represents the gap between the consensus of analysts’ earnings forecasts and management expectations about potential company earnings under steady management and accounting practices.

Despite the popularity of the term “earnings pressure” in the news media, few studies have attempted to operationally define this construct. This lack of a measure is partly a consequence of the difficulty of developing an independent estimate of management expectations of potential company earnings.\(^6\) Management public guidance is not feasible because of its low frequency and pessimistic bias, as discussed in the theory section. Forecasts of potential earnings based on historical time series of earnings have some predictive power (Lobo & Nair, 1991), but they do not take into account new information available to management that may affect future earnings. Management expectations are likely to be shaped by past performance, but also by new information and by the performance of industry peers.

In this study, we adopted a method developed by Matsumoto (2002) to measure “estimated forecasts,” or the earnings that a firm can realize, a metric now well accepted in the accounting literature (e.g., Burgstahler & Eames, 2006) as a way to calculate a firm’s potential earnings. Since the calculation is technical, we present additional details in Appendix B. The method combines information about the trends in a firm’s historical performance with information about recent stock market returns (which convey information about earnings-relevant news that would not be reflected in historical earnings, such as industry changes and social performance expectations). We calibrated the predictive effect of these two performance indicators on potential earnings using regression parameters from a sample of other industry peers, excluding the focal firm.

\(^5\) The use of fixed effects implies modeling longitudinal covariation (over years) between levels of independent and dependent variables for a given firm-market combination. The model controlled cross-sectional heterogeneity in firm-market combinations.

\(^6\) Previous research in finance and accounting had used the gap between earnings forecast consensus and the premanaged earnings—where premanaged earnings were calculated as the reported earnings minus discretionary accruals—to measure the pressure to meet earnings forecast consensus (Jones, 1991; Payne & Kobb, 2000). Although this measure may be appropriate to identify accounting manipulations to meet earnings consensus, it was not appropriate for our application. Our focus was to measure earnings pressure at the beginning of a period of activity (i.e., ex ante), but this measure could only be calculated after earnings were announced (i.e., ex post). Moreover, since exercise of market power and managing accounting accruals are alternative ways to meet earnings pressure, and these mechanisms take place at different points in the period, the Jones measure would capture earnings pressure that could not be met through changes in competitive actions.
Specifically, the earnings pressure experienced by firm \( i \) during year \( t \) was defined as the difference between the analysts’ earnings per share (EPS) forecast consensus for year \( t \), measured at the beginning of the year, minus the potential EPS (the Matsumoto’s measure at the beginning of the year), standardized by the firm’s stock price at the beginning of year \( t \) (e.g., Skinner & Sloan, 2002):\(^7\)

\[
\text{Earnings pressure}_it = \frac{(\text{analyst forecast consensus}_it - \text{potential EPS}_it)}{\text{share price}_i}.
\]

To avoid excessive reliance on a single analyst’s forecast, we selected firms that received forecasts from at least three different analysts. However, the results didn’t change if we included consensus provided by at least one analyst or by at least five analysts. Because this measure was novel, we checked its validity in two ways. First, we compared the accuracy of the potential earnings measure with that of the analyst forecast consensus in predicting reported earnings for a given year. As Table 1A shows, the mean difference between the Matsumoto potential earnings estimate and reported earnings was significantly smaller than the mean difference between analyst forecast consensus and reported earnings (paired t-test: \( p < 0.1 \)).

The distribution of analyst forecast consensus at the beginning of the year was skewed toward overestimating reported earnings (with a mean difference significantly above 0), as is consistent with prior findings that analysts’ forecasts are optimistically biased. In comparison, the mean difference between Matsumoto’s potential earnings estimates and reported earnings was not significantly different from 0 (i.e., the measure is unbiased). On the other hand, the difference between analyst forecast consensus and reported earnings had a lower standard deviation, suggesting that the rich information used by analysts allowed them to avoid large forecast errors. Thus, analyst forecasts are valuable, even if they appear to be biased.

Second, we also tested whether the earnings pressure measure at the beginning of a year was associated with other means that managers may use to meet earnings pressure during the year. Bernhardt and Campello (2007) found that managers facing earnings pressure tried to “talk down” analysts’ forecasts so that they would be easier to meet. Although we could not find consistent information about public earnings guidance (which tends to be infrequent), we could trace the evolution of analysts’ earnings forecasts during a year for firms with positive earnings pressure at the beginning of the year, which can be viewed as partly the result of managers’ talking down analyst forecasts. Results, presented in Table 1B, showed that positive earnings pressure was positively correlated with both the incidence and magnitude of downward revision of analysts’ forecast consensus. At the individual analyst level, positive earnings pressure was also positively correlated with the frequency of downward revisions of analysts’ forecasts, and negatively correlated with the ratio of upward to downward revisions. All these results suggested that the Matsumoto’s (2002) method was a promising means for estimating management expectations of potential earnings based on historical and social performance references as well as estimates of future changes, and it therefore provided an objective benchmark to compare with analysts’ forecasts.

**Other Independent Variables**

**Market structure and competitive environment variables.** To reduce concerns about endogeneity and reverse causality, we calculated the market structure variables on the basis of capacity levels rather than output levels, and lagged rather than current levels. To test Hypothesis 2a, we defined lagged capacity share as a generator’s share, in its NERC regional market, of summer capacity in a prior year. To test Hypothesis 2b, we created a Herfindahl market concentration index based on the summer capacity of all other rivals (for-profit and not-for-profit utilities) in the wholesale market in the prior year (lagged rival Herfindahl), excluding a focal firm. Excluding the focal firm reduced the collinearity between its dominant share and market concentration and was helpful for distinguishing firm-specific from structural market power (Cool, Dierickx, & Jemison, 1989). However, the results using the common Herfindahl index, including the focal firm’s share, were not qualitatively different. For Hypothesis 2c, we measured the market presence of for-profit competitors by the total capacity share in the market of all other for-profit firms (publicly traded or privately owned) in the prior year, excluding the focal firm (lagged for-profit rival share). Finally, to test Hypothesis 2d, we measured competitors’ capacity constraints by the average capacity utilization level of all other

---

\(^7\) To limit the impact of observations with extreme values, we capped earnings pressure to be positive or negative 0.1 if the difference between the analysts’ EPS forecast consensus and the potential EPS estimate was more than 10 percent of the stock price. The results remained qualitatively the same if we excluded those 14 observations from the analyses.
firms in the market (including for-profit and not-for-profit) in the prior year, excluding the focal firm (lagged rival capacity utilization).

**Dominant rivals’ earnings pressure.** Hypothesis 3 states that, because of oligopoly in electricity markets, the earnings pressure experienced by dominant competitors influences firms’ competitive behavior. To examine this cross-rival effect, we calculated dominant rivals’ earnings pressure for each firm in each market, as the average of the earnings pressure measures of the publicly traded rivals in the focal market (excluding the focal firm), weighted by their respective capacity shares.

**Control Variables**

**Total capacity.** Differences in the magnitude of a firm’s available generation capacity in a region can also affect capacity utilization (Gilbert & Lieberman, 1987; Lieberman, 1987). Hence, we controlled for the logarithm of total summer capacity that a firm had available in a wholesale region in the current year. The logarithmic transformation reduced the skewness of the distribution.

**Technology-adjusted utilization benchmark.** Choices about generating technologies can influence capacity utilization. For example, nuclear plants tend to have high capacity utilization for both technological and economic reasons, and wind turbines have low utilization. Thus, a firm’s technological portfolio strongly influenced its capacity utilization. To control for this effect, we created the measure technology-adjusted utilization benchmark for each generator. We first calculated a benchmark capacity utilization level for each plant-year by taking the average capacity utilization level of all the plants in the United States (except a focal plant) using the same technology in

<table>
<thead>
<tr>
<th>TABLE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Validation of the Earnings Pressure Measure</strong></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Variables</th>
<th>Deviation 1, for Potential Earnings Estimate</th>
<th>Deviation 2, for Analyst Forecast Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distribution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st percentile</td>
<td>−0.11</td>
<td>−0.04</td>
</tr>
<tr>
<td>25th percentile</td>
<td>−0.01</td>
<td>−0.004</td>
</tr>
<tr>
<td>Median</td>
<td>−0.0002</td>
<td>0.0003</td>
</tr>
<tr>
<td>75th percentile</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>99th percentile</td>
<td>0.12</td>
<td>0.18</td>
</tr>
<tr>
<td>s.d.</td>
<td>0.34</td>
<td>0.21</td>
</tr>
</tbody>
</table>

**Hypotheses tested**

- $H_0$: Mean (Deviation 1) = 0
- $H_0$: Mean (Deviation 2) = 0
- $H_0$: Mean (Deviation 1) = Mean (Deviation 2)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>s.e.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
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<td>0.02</td>
</tr>
<tr>
<td>s.e.</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>t</td>
<td>−0.18</td>
<td>1.94*</td>
</tr>
</tbody>
</table>

* Both deviations 1 and 2 were the focal estimate minus reported earnings divided by stock price. $n = 633$ (firm-years).
* $p < .10$
* $p < .05$
One-sided tests.

<table>
<thead>
<tr>
<th>Table 1B. Correlations with measures of other means to meet earnings pressure*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variables</td>
</tr>
<tr>
<td>1. Earnings pressure (magnitude)</td>
</tr>
<tr>
<td>2. Earnings pressure (dummy)</td>
</tr>
<tr>
<td>3. Consensus decrease (dummy)</td>
</tr>
<tr>
<td>4. Consensus change (magnitude)</td>
</tr>
<tr>
<td>5. Ratio of downward revision of consensus</td>
</tr>
<tr>
<td>6. Ratio of upward revision of consensus</td>
</tr>
</tbody>
</table>

* Correlations in italics are within-group correlations by firm. This sample is based on 633 firm-years.
that year. We then calculated the technology-adjusted utilization benchmark for each firm-market-year as the capacity-weighted average of benchmark capacity utilization levels for the firm’s plants in that market and year. This variable is strongly correlated with capacity utilization, suggesting that the composition of the portfolio of power plants is a strong but exogenous determinant of capacity utilization.

We also controlled for factors that have been found in previous research to influence capacity utilization (e.g., Lieberman, 1989).

Growth of demand. Demand for electricity is closely related to the economic activities in a region. We used gross domestic product (GDP) growth rate in the states composing a focal wholesale region as our proxy for demand growth. Data on regional GDP were obtained from the U.S. Bureau of Economic Analysis.

Lumpiness. Lumpiness in capacity has been shown to affect capacity utilization negatively, since firms cannot easily match capacity increases to smooth changes in demand (Lieberman, 1989). Following Lieberman (1987), we used the inverse of the number of generating units that a firm had in a market in a prior year as our proxy (lagged lumpiness).

Financial constraint and profitability. Financial conditions, such as financial constraints or low historical performance, might also affect competitive behavior (Borenstein & Rose, 1995; Busse, 2002; Chevalier, 1995a, 1995b; Phillips, 1995). We controlled for a firm’s financial ability to cover interest payments with the measure lagged interest coverage, defined as operating income before depreciation and amortization divided by the interest expense. To empirically distinguish earnings pressure from low historical performance, we controlled for past performance, measuring it as a company’s return on total assets in a prior year (lagged ROA).

RESULTS

Descriptive Statistics

The final sample included 814 observations representing 62 electric generators in 11 wholesale markets (NERC regions), 81 firm-market combinations in total, over 13 years from 1993 to 2005. Overall, electricity generation accounted for an average 74 percent of revenue for the sample firms. The total capacity of the firms for which earnings pressure could be measured accounted for 92 percent of total capacity of the for-profit electric generators (publicly traded or privately held), and 69 percent of the capacity of all the electric generators during the period.

Table 2 presents descriptive statistics and correlations. The mean capacity utilization in the sample was about 52 percent. Capacity utilization had a strong correlation with the technology-adjusted utilization benchmark ($r = .77$), highlighting the importance of controlling for differences in firms’ generation technologies. Capacity utilization was weakly, negatively correlated to earnings pressure ($r = - .05$) and weakly, positively correlated to dominant rivals’ earnings pressure ($r = .06$). Earnings pressure was also negatively correlated with both interest coverage ($r = - .30$) and past performance ($r = - .46$), highlighting the importance of controlling for these financial conditions. However, the correlations between earnings pressure and the market structure and competitive environment variables were weak (all below .11), which facilitated the independent identification of effects for these variables and their interactions.

Regression Analysis Results

The results for the main hypotheses are presented hierarchically in Table 3. Model 1 reports the results of the regression with the control variables only, which showed that the addition of the technology-adjusted utilization benchmark had a positive and significant effect on both capacity utilization level and the goodness of fit of the model (with $R^2$, adjusted $R^2$, and within $R^2$ increased by .06, .08, and .29, respectively). The inclusion of this control variable substantially reduced the coefficient magnitude and significance of other control variables, suggesting that this was a critical control variable. The results were robust to an alternative specification, wherein the dependent variable was measured as capacity utilization relative to the technology-adjusted benchmark.

Main effect of earnings pressure. Hypothesis 1 proposes that earnings pressure on a focal firm has a negative impact on capacity utilization. Model 2 in Table 3 does not support this hypothesis: the effect of earnings pressure at the beginning of a year on the capacity utilization level during the year was not significantly different from zero. However, this finding reflected the average effect among the diverse firm-markets in the sample, many of which lacked the ability to exercise market power. We explored contingent effects next.

Market structure and competitive environment contingencies. Hypotheses 2a–2d state that the effect of earnings pressure on capacity utilization is more negative for firms with more dominant capacity shares in their market, higher market concentration, larger for-profit rivals’ shares, and larger capacity constraints by competitors. Despite the lack of significance of the main effect of earnings pressure, the results of models 3–5 in Table 3 showed significant, negative coefficients for three of the interac-
<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>s.d.</th>
<th>Minimum</th>
<th>Maximum</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Capacity utilization</td>
<td>0.52</td>
<td>0.16</td>
<td>0.08</td>
<td>0.98</td>
<td>.65</td>
<td>-.004</td>
<td>.06</td>
<td>-.24</td>
<td>.05</td>
<td>.20</td>
<td>.11</td>
<td>.04</td>
<td>-.36</td>
<td>.08</td>
<td>.09</td>
<td>.06</td>
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<tr>
<td>2. Technology-adjusted utilization benchmark</td>
<td>0.52</td>
<td>0.14</td>
<td>0.19</td>
<td>0.91</td>
<td>.77</td>
<td>-.002</td>
<td>.04</td>
<td>-.16</td>
<td>.04</td>
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<td>.07</td>
<td>.03</td>
<td>-.23</td>
<td>.05</td>
<td>.06</td>
<td>.04</td>
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<td>3. Earnings pressure</td>
<td>0.003</td>
<td>0.02</td>
<td>-.10</td>
<td>0.10</td>
<td>-.05</td>
<td>-.03</td>
<td>-.01</td>
<td>-.01</td>
<td>-.13</td>
<td>.05</td>
<td>-.07</td>
<td>.06</td>
<td>-.02</td>
<td>-.29</td>
<td>-.44</td>
<td></td>
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<td>4. Dominant rivals' earnings pressure</td>
<td>0.002</td>
<td>0.01</td>
<td>-.03</td>
<td>0.04</td>
<td>.06</td>
<td>.04</td>
<td>-.05</td>
<td>.08</td>
<td>-.08</td>
<td>.17</td>
<td>-.15</td>
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<td>.02</td>
<td>.07</td>
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<tr>
<td>5. Lagged capacity share</td>
<td>0.10</td>
<td>0.09</td>
<td>0.01</td>
<td>0.45</td>
<td>.01</td>
<td>.04</td>
<td>-.05</td>
<td>-.01</td>
<td>.17</td>
<td>-.44</td>
<td>.16</td>
<td>.14</td>
<td>.60</td>
<td>-.22</td>
<td>.12</td>
<td>.09</td>
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<tr>
<td>6. Lagged rival Herfindahl</td>
<td>0.10</td>
<td>0.06</td>
<td>0.03</td>
<td>0.34</td>
<td>.01</td>
<td>.03</td>
<td>-.04</td>
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<td>.11</td>
<td>.27</td>
<td>.23</td>
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<tr>
<td>7. Lagged for-profit rival share</td>
<td>0.68</td>
<td>0.17</td>
<td>0.12</td>
<td>0.95</td>
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<td>.16</td>
<td>.17</td>
<td>.21</td>
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<tr>
<td>8. Lagged rival capacity utilization</td>
<td>0.51</td>
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<td>0.40</td>
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<td>.17</td>
<td>.32</td>
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<td>.02</td>
<td>.13</td>
<td>.09</td>
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<td>9. Demand growth</td>
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<td>-.02</td>
<td>0.09</td>
<td>.06</td>
<td>.01</td>
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<td>-.05</td>
<td>.08</td>
<td>.26</td>
<td>.12</td>
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<td>10. Total summer capacity</td>
<td>7,101</td>
<td>6,737</td>
<td>47</td>
<td>42,152</td>
<td>.12</td>
<td>.18</td>
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<td>-.05</td>
<td>.71</td>
<td>-.09</td>
<td>-.27</td>
<td>.16</td>
<td>.05</td>
<td>-.15</td>
<td>.03</td>
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<td>11. Lagged lumpiness</td>
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<td>0.06</td>
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<td>.05</td>
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<td>.00</td>
<td>-.33</td>
<td>-.01</td>
<td>.03</td>
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</tr>
<tr>
<td>12. Lagged interest coverage</td>
<td>4.10</td>
<td>1.49</td>
<td>-.74</td>
<td>8.83</td>
<td>.10</td>
<td>.15</td>
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<td>.22</td>
<td>.12</td>
<td>-.10</td>
<td>.68</td>
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<tr>
<td>13. Lagged ROA</td>
<td>0.03</td>
<td>0.02</td>
<td>-.19</td>
<td>0.11</td>
<td>.08</td>
<td>.12</td>
<td>-.46</td>
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<td>-.06</td>
<td>.71</td>
<td></td>
</tr>
</tbody>
</table>

*a Correlations in italics are within-group correlations by firm. This sample is based on 814 firm-market-years.*

*b Capacity is in MWs.*
## TABLE 3
Results of Fixed-Effects Regression Analysis for Capacity Utilization*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
<th>Model 7</th>
<th>Model 8</th>
<th>Model 9</th>
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<tr>
<td>Earnings pressure</td>
<td>−0.04 (0.15)</td>
<td>−0.29** (0.17)</td>
<td>−0.28* (0.17)</td>
<td>−0.04 (0.15)</td>
<td>−0.05 (0.16)</td>
<td>−0.31* (0.19)</td>
<td>0.03 (0.16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earnings pressure × lagged capacity share</td>
<td>−7.15*** (2.41)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Earnings pressure × lagged rival Herfindahl</td>
<td></td>
<td>−9.44*** (3.25)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Earnings pressure × lagged for-profit rival share</td>
<td></td>
<td>−3.61*** (0.89)</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Earnings pressure × lagged rival capacity utilization</td>
<td></td>
<td>−0.45 (3.02)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Dominant rivals’ earnings pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.72** (0.43)</td>
<td>0.74** (0.44)</td>
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<tr>
<td>Technology-adjusted utilization benchmark</td>
<td>0.82*** (0.04)</td>
<td>0.82*** (0.04)</td>
<td>0.81*** (0.04)</td>
<td>0.82*** (0.04)</td>
<td>0.82*** (0.04)</td>
<td>0.82*** (0.04)</td>
<td>0.82*** (0.04)</td>
<td>0.82*** (0.04)</td>
<td>0.82*** (0.04)</td>
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<tr>
<td>Lagged capacity share</td>
<td>0.06 (0.14)</td>
<td>0.06 (0.14)</td>
<td>0.07 (0.14)</td>
<td>0.07 (0.14)</td>
<td>0.08 (0.14)</td>
<td>0.08 (0.14)</td>
<td>0.08 (0.14)</td>
<td>0.03 (0.14)</td>
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<tr>
<td>Lagged rival Herfindahl</td>
<td>0.19 (0.13)</td>
<td>0.20 (0.13)</td>
<td>0.20 (0.13)</td>
<td>0.17 (0.13)</td>
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<td>Lagged for-profit rival share</td>
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<td>0.36*** (0.10)</td>
<td>0.36*** (0.10)</td>
<td>0.36*** (0.10)</td>
<td>0.38*** (0.10)</td>
<td>0.36*** (0.10)</td>
<td>0.37*** (0.10)</td>
<td>0.38*** (0.10)</td>
<td>0.38*** (0.10)</td>
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<tr>
<td>Lagged rival capacity utilization</td>
<td>0.07 (0.12)</td>
<td>0.07 (0.12)</td>
<td>0.07 (0.12)</td>
<td>0.02 (0.12)</td>
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<td>0.07 (0.12)</td>
<td>0.07 (0.12)</td>
<td>0.04 (0.12)</td>
<td>0.11 (0.12)</td>
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<tr>
<td>Demand growth</td>
<td>0.04 (0.17)</td>
<td>0.04 (0.17)</td>
<td>0.05 (0.17)</td>
<td>0.03 (0.17)</td>
<td>0.04 (0.17)</td>
<td>0.04 (0.17)</td>
<td>0.04 (0.17)</td>
<td>0.06 (0.17)</td>
<td>0.06 (0.17)</td>
</tr>
<tr>
<td>Total summer capacity (log)</td>
<td>−0.02 (0.01)</td>
<td>−0.02 (0.01)</td>
<td>−0.02 (0.01)</td>
<td>−0.02 (0.01)</td>
<td>−0.02 (0.01)</td>
<td>−0.02 (0.01)</td>
<td>−0.02 (0.01)</td>
<td>−0.02* (0.01)</td>
<td>−0.02 (0.01)</td>
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<tr>
<td>Lagged lumpiness</td>
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<td>−0.01 (0.07)</td>
<td>−0.01 (0.07)</td>
<td>−0.02 (0.01)</td>
<td>−0.02 (0.01)</td>
<td>−0.004 (0.07)</td>
<td>−0.01 (0.07)</td>
<td>−0.002 (0.07)</td>
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<td>Lagged interest coverage</td>
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<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
<td>0.000 (0.00)</td>
</tr>
<tr>
<td>Lagged ROA</td>
<td>−0.03 (0.16)</td>
<td>−0.05 (0.17)</td>
<td>0.001 (0.17)</td>
<td>−0.06 (0.17)</td>
<td>−0.06 (0.17)</td>
<td>−0.05 (0.17)</td>
<td>−0.03 (0.17)</td>
<td>−0.04 (0.16)</td>
<td>−0.03 (0.17)</td>
</tr>
<tr>
<td>Constant</td>
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<td>0.24*** (0.10)</td>
<td>0.25*** (0.10)</td>
<td>0.24*** (0.10)</td>
<td>0.24*** (0.10)</td>
<td>0.25** (0.10)</td>
<td>0.25** (0.10)</td>
<td>0.21*** (0.10)</td>
<td>0.21** (0.10)</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>Year fixed effects (81 levels)</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>R²</td>
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<td>0.88</td>
<td>0.88</td>
<td>0.88</td>
<td>0.89</td>
<td>0.89</td>
<td>0.89</td>
<td>0.88</td>
<td>0.88</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
<td>0.87</td>
</tr>
<tr>
<td>Within R²</td>
<td>0.47</td>
<td>0.47</td>
<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>0.47</td>
<td>0.49</td>
<td>0.47</td>
<td>0.47</td>
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<tr>
<td>Model df</td>
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<td>104</td>
<td>104</td>
<td>104</td>
<td>107</td>
<td>103</td>
<td>104</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>0.06</td>
<td>8.80***</td>
<td>8.45***</td>
<td>16.61***</td>
<td>0.03</td>
<td>6.10***</td>
<td>2.89*</td>
<td>2.82*</td>
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<tr>
<td>Relative to model</td>
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<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td></td>
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<tr>
<td>Test df</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<td>1</td>
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</tr>
</tbody>
</table>

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*a n = 814. Standard errors are in parentheses.

* p < .10
** p < .05
*** p < .01

Two-sided tests.
† p < .10
‡‡ p < .05
‡‡‡ p < .01

One-sided tests.
tions between earnings pressure and contingencies: capacity share ($b = -7.15, p < 0.01$), market concentration ($b = -9.44, p < 0.01$), and for-profit rivals’ capacity share ($b = -3.60, p < 0.01$). The interaction of earnings pressure and rivals’ capacity constraints was not significantly different from zero (model 6). Because some of the contingency variables were correlated, we also tested the interaction effects jointly in model 7. The results showed that the interaction coefficients remained negative and significant, suggesting that the contingencies captured noncollinear effects.

Figure 1 presents graphs of the interaction effects following the method described by Aiken et al. (1991). Specifically, for firms with a high capacity share (one standard deviation above the mean), one standard deviation greater earnings pressure (a gap between forecast and potential earnings equivalent to 1.84 percent of stock price) was associated with 3.2 percent lower capacity utilization. For firms with low capacity share (one standard deviation below the mean), the same change in earnings pressure was associated with 1.2 percent higher capacity utilization. The effect on capacity utilization of a one standard deviation increase in earnings pressure was –2.8 percent when market concentration was high, but 0.9 percent when concentration was low (one standard deviation above and below the mean, respectively). Finally, earnings pressure reduced the capacity utilization level by 2.0 percent when for-profit rivals’ capacity share was high, but increased it by 2.2 percent when it was low. The results reported in Table 3 indicate that effect of earnings pressure on capacity utilization become negative and statistically significant at the .05 level when capacity share is higher than 9.65 percent, when rivals’ market concentration is higher than 0.10, or when for-profit rivals’ capacity share is higher than 73.80 percent.8

**Dominant rivals’ earnings pressure.** Hypothesis 3 states that a firm has higher capacity utilization when its dominant competitors face higher earnings pressure. Model 8 in Table 3 shows that earnings pressure by dominant competitors (weighted by their capacity share) at the beginning of a year had a positive and significant effect on a focal

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8 A sizable number of observations were above these thresholds. Respectively, there were 37.1, 28.1, and 44.4 percent of observations above the capacity share, rivals’ market concentration, and for-profit rivals’ capacity share thresholds.
firm’s capacity utilization level during that year ($b = 0.72, p < .05$). This significance still held when we added a focal firm’s earnings pressure in model 9 ($b = 0.74, p < .05$). The results indicate that one standard deviation higher earnings pressure by dominant rivals (0.69 percent of stock price) is associated with 0.49 percent higher capacity utilization by a focal firm.

**Robustness Checks**

To examine the robustness of our findings in more detail, we conducted several post hoc checks to determine whether (1) common market-level shocks that affected both analysts’ forecasts and firm output decisions drove the results for earnings pressure; (2) the results were a consequence of low performance rather than high expectations; and (3) the results were symmetric to positive and negative earnings pressure.

The first potential concern was related to the possibility of an omitted variable bias: that some omitted market-level factor (e.g., demand and capacity cycles, deregulation, competitive entry) could affect both earnings pressure at the beginning of a year (through an effect on analysts’ forecasts) and capacity utilization decisions during the year. The use of the Matsumoto measure of potential earnings limited that concern, since earnings pressure would only be affected by omitted factors that were anticipated by analysts but not by the stock market. Since analysts’ forecasts were public information, this condition was not easily met. The finding that earnings pressure had opposite effects on a focal firm and its competitors also reduced concerns that the effect was due to correlation with market-wide omitted variables. Finally, we conducted a post hoc test using market-year fixed effects instead of year fixed effects to capture any unobserved effects varying by market and year. Despite the large loss of degrees of freedom, the results did not substantially change in direction or significance. Hence, we feel confident that our results were not caused by omitted market-level shocks.

The second concern was related to the interpretation of the earnings pressure effect. Although our theory suggested that a gap between forecasted and potential earnings drove our effects, the individual components of earnings pressure (high analyst forecasts, low potential earnings) could also have affected competitive behavior. Behavioral theory models suggest that firms facing low performance may make risky behavioral responses (Cyert & March, 1963; Kahneman & Tversky, 1979), although it is not clear that a behavioral model would predict a reduction of capacity utilization. Controlling for both components simultaneously was statistically impossible, since earnings pressure was a linear combination of these components and would result in perfect collinearity. Alternatively, we developed models in which one of the components (analyst forecasts or potential earnings) was included, together with interactions with the relevant contingency variables. The results showed that the interactions between earnings pressure and the contingency variables presented earlier remained significant after the inclusion of these other controls. Thus, the results are not due to high analysts’ forecasts alone, or to low potential earnings alone, but to the gap between these two components.

Finally, we checked whether positive and negative earnings pressure had symmetric effects on competitive behavior. The theory proposed suggests some output restraint when earnings pressure becomes more positive (analyst forecasts are above potential earnings), but not necessarily an output expansion when earnings pressure becomes more negative (analyst forecasts are below potential earnings). To test this intuition, we created a spline transformation of earnings pressure into two subvariables: positive pressure (positive earnings pressure values, or zero otherwise) and negative pressure (negative earnings pressure values, or zero otherwise). Positive earnings pressure was present in 56.5 percent of the observations. The main effects of the two submeasures were not significantly different from zero, similarly to the main effect of earnings pressure in the base model. However, the interactions of market structure and competitive environment variables with positive earnings pressure were negative and significant (as expected), and the interactions with negative pressure were mostly not significantly different from zero. These results implied that restrictions of capacity utilization took place when dominant firms faced positive earnings pressure only. Negative earnings pressure did not lead to modifications of capacity utilization. This pattern of findings was consistent with our interpretation that attempts to raise current earnings to meet analysts’ forecast consensus caused capacity utilization reductions by dominant firms.

**Auxiliary Analyses**

Our results showed that earnings pressure could result in reductions in capacity utilization for dominant firms and increases in capacity utilization for their competitors. However, to better understand the performance consequences of these changes in
capacity utilization, we performed auxiliary analyses to explore the consequences of capacity utilization for market-level pricing and future capacity expansion.

Our theory implied that restricting capacity utilization would help dominant electricity generators increase the wholesale price and therefore obtain greater margins for their remaining output. To evaluate whether dominant firms could benefit from restricting capacity utilization, we assessed the effect of capacity utilization by dominant firms (firms with the leading capacity share in a market) on the market’s average wholesale electricity price. Table 4 presents a fixed-effects regression analysis of average wholesale electricity price in a market (price information is not available at the firm level) and year. The power of this regression was limited, since there were only 119 firm-market-year observations, and we controlled for firm-market and year fixed effects, as well as for lagged wholesale price and demand (GDP) growth. However, model 2 of Table 4 shows that capacity utilization by dominant firms in a market had a negative and significant effect ($b = -3.52, p < 0.05$) on the average wholesale price in the market-year. Specifically, 1 percent of capacity utilization restriction by the leading firm boosts wholesale price by 0.035 cents (which was 0.85 percent of the average wholesale price in the sample). Since the relationship between capacity utilization and price may be reciprocal (a demand shock that would increase prices would also increase capacity utilization), we also performed an instrumental variable panel regression using the prediction from model 8 of Table 3 as the instrument for capacity utilization. The evidence, which is consistent across models, suggests that lower capacity utilization by the dominant firms in a market had a tangible effect on market-clearing prices, even though they may have simultaneously triggered higher utilization levels by other competitors.

Changes in capacity utilization may also have long-term performance consequences if they affect future capacity expansion. To evaluate this possibility, we evaluated the effect of capacity utilization on a firm’s net capacity change in a following year. Net capacity change was calculated as the percentage change in operational and planned capacity relative to the prior year. Planned capacity was obtained from the “proposed new generators” file in the EIA-860 database. Model 2 in Table 5 shows that capacity utilization had a positive effect on the net capacity change ($b = 0.38, p < .001$). Specifically, 1 percent of capacity utilization by a sample firm would lead to a 0.38 percent increase in the net change of its capacity. This effect persisted when we controlled for market-wide factors that might impact a firm’s net capacity change, such as lagged market total capacity (model 3), net capacity change by the rest of the market (model 4), and both of them (model 5). This evidence suggests that short-term consequences of earnings pressure in terms of lower capacity utilization by dominant firms and higher capacity utilization by competi-

<table>
<thead>
<tr>
<th>Average Market Price</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity utilization</td>
<td>$-3.53^{**}$ (1.62)</td>
<td>$-4.63^{**}$ (2.07)</td>
<td></td>
</tr>
<tr>
<td>Capacity utilization (instrumented)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagged average market price</td>
<td>0.08 (0.11)</td>
<td>0.07 (0.10)</td>
<td>0.07 (0.10)</td>
</tr>
<tr>
<td>Demand growth</td>
<td>1.58 (8.27)</td>
<td>3.10 (8.12)</td>
<td>3.57 (8.17)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.27*** (0.54)</td>
<td>5.05*** (0.98)</td>
<td>5.61*** (1.17)</td>
</tr>
<tr>
<td>Firm-market fixed effects (18 levels)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Year fixed effects (13 levels)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.68</td>
<td>0.70</td>
<td>0.70</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
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<td>0.59</td>
<td>0.58</td>
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<tr>
<td>Within $R^2$</td>
<td>0.55</td>
<td>0.57</td>
<td>0.57</td>
</tr>
<tr>
<td>Model $df$</td>
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<td>32</td>
<td>33</td>
</tr>
<tr>
<td>$F$</td>
<td>4.80***</td>
<td>2.13</td>
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</tr>
<tr>
<td>Relative to model</td>
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<td>1</td>
<td></td>
</tr>
<tr>
<td>Test $df$</td>
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<td>2</td>
<td></td>
</tr>
</tbody>
</table>

* $n = 119$. Capacity utilization was instrumented using the predicted capacity utilization from model 7 in Table 3. Standard errors are in parentheses.

** $p < .01$

*** $p < .001$

Two-sided test.

$^{**} p < .05$

One-sided test.
tors may result in medium-term effects in capacity expansion patterns.

**DISCUSSION AND CONCLUSION**

Our results showed that, in the U.S. electricity generation industry, firms with market power potential (large capacity share, concentration among competitors, few not-for-profit competitors) restricted capacity utilization when they faced earnings pressure. These results were consistent across different regression models, and their effects were significant in both a statistical and an economic sense. Although reductions in capacity utilization likely helped dominant firms boost current prices in a market, the results indicated that dominant firms did not capture the full value created by their output scarcity, since rivals also benefited by expanding their own capacity utilization rate. Therefore, even within the time frame of a given current year, these actions generated competitive reactions that partly undermined the intended benefit.

**Contributions and Implications**

The findings provide the first systematic empirical evidence that, beyond financial disclosures and accounting manipulations (the focus of finance and accounting research), earnings pressure affects firms’ competitive behavior: dominant firms facing earnings pressure exercised their available market power to generate current earnings. Interestingly, when earnings pressure was not present, we found no significant evidence of firms exercising market power (restricting capacity utilization), even when they had the potential to do so. The finding suggests that earnings pressure regulates the dynamic tension between building and exploiting market position. Although our study analyzed firms’ market power conditions as being exogenous, in reality a company’s current dominant market position is often the result of prior aggressive competitive decisions. Therefore, firms with a given potential for market power must determine whether to continue building market position by acting aggressively vis-

### TABLE 5

**Effect of Capacity Utilization on Net Capacity Change**

<table>
<thead>
<tr>
<th>Net Capacity Change</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagged capacity utilization</td>
<td>0.37*** (0.09)</td>
<td>0.38*** (0.09)</td>
<td>0.37*** (0.09)</td>
<td>0.38*** (0.09)</td>
<td>0.38*** (0.09)</td>
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<tr>
<td>Lagged market total capacity</td>
<td>0.12 (0.17)</td>
<td>0.12 (0.17)</td>
<td>0.12 (0.17)</td>
<td>-0.05 (0.05)</td>
<td>0.11 (0.17)</td>
</tr>
<tr>
<td>Capital share by the rest of market</td>
<td>0.28 (0.40)</td>
<td>0.49 (0.40)</td>
<td>0.60 (0.42)</td>
<td>0.50 (0.40)</td>
<td>0.59 (0.42)</td>
</tr>
<tr>
<td>Lagged rival Herfindahl</td>
<td>0.17 (0.36)</td>
<td>0.08 (0.36)</td>
<td>0.17 (0.38)</td>
<td>0.08 (0.36)</td>
<td>0.16 (0.38)</td>
</tr>
<tr>
<td>Lagged for-profit rival share</td>
<td>0.01 (0.28)</td>
<td>-0.14 (0.28)</td>
<td>-0.13 (0.28)</td>
<td>-0.14 (0.28)</td>
<td>-0.13 (0.28)</td>
</tr>
<tr>
<td>Lagged rival capacity utilization</td>
<td>0.43 (0.33)</td>
<td>0.44 (0.33)</td>
<td>0.49 (0.34)</td>
<td>0.41 (0.33)</td>
<td>0.46 (0.34)</td>
</tr>
<tr>
<td>Demand growth</td>
<td>0.08 (0.45)</td>
<td>0.13 (0.45)</td>
<td>0.13 (0.45)</td>
<td>0.15 (0.45)</td>
<td>0.15 (0.45)</td>
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<tr>
<td>Capacity (log)</td>
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<td>-0.14*** (0.04)</td>
<td>-0.14*** (0.04)</td>
<td>-0.13*** (0.04)</td>
<td>-0.14*** (0.04)</td>
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<td>Lagged lumpiness</td>
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<td>0.67 (0.51)</td>
<td>0.67 (0.51)</td>
<td>0.64 (0.51)</td>
<td>0.64 (0.51)</td>
</tr>
<tr>
<td>Lagged interest coverage</td>
<td>-0.02** (0.01)</td>
<td>-0.02** (0.01)</td>
<td>-0.02** (0.01)</td>
<td>-0.02** (0.01)</td>
<td>-0.02** (0.01)</td>
</tr>
<tr>
<td>Lagged ROA</td>
<td>0.55 (0.45)</td>
<td>0.66 (0.44)</td>
<td>0.65 (0.44)</td>
<td>0.66 (0.44)</td>
<td>0.66 (0.44)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.04*** (0.34)</td>
<td>1.97*** (0.34)</td>
<td>0.61 (1.85)</td>
<td>2.01*** (0.34)</td>
<td>0.77 (1.86)</td>
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<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
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<td>Year fixed effects (12 levels)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.18</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
<td>0.20</td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.05</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Within $R^2$</td>
<td>0.08</td>
<td>0.10</td>
<td>0.10</td>
<td>0.11</td>
<td>0.11</td>
</tr>
<tr>
<td>Model df</td>
<td>100</td>
<td>101</td>
<td>102</td>
<td>102</td>
<td>103</td>
</tr>
<tr>
<td>$F$</td>
<td>17.62***</td>
<td>0.28</td>
<td>0.93</td>
<td>0.46</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- $n = 730$. Standard errors are in parentheses.
- * $p < .10$
- ** $p < .05$
- *** $p < .01$
- Two-sided test.
- +++ $p < .001$
- One-sided test.

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à-milk the position by exploiting market power. The findings suggest that earnings pressure tips the balance toward milking market position and could contribute to the decline of dominant firms (Caves et al., 1984). Such an interpretation paints a grim picture of the consequences of earnings pressure for long-term value.

A different interpretation of the results, one that is consistent with the views of agency theory advocates (Jensen, 1986), could be that earnings pressure curtails managers’ “empire-building” tendencies. Agency theorists have argued that managers may have “an excessive taste for running large companies, as opposed to simply profitable ones” (Stein, 2003: 121), and this may lead companies to excessive investment and excessive focus on revenues and market share. Without capital market monitoring, managers may be willing to sacrifice current earnings in pursuit of dominant market positions of questionable future value. In this view, earnings pressure disciplines managers to generate current earnings by de-escalating the pursuit of market position. Therefore, our finding that dominant firms facing earnings pressure reduced capacity utilization is also consistent with this agency-theoretic view. The normative interpretation of that view, however, would be more favorable about the long-term effect of earnings pressure.

In both interpretations, dominant firms facing earnings pressure would increase current earnings at the risk of reducing future market position. The main point of disagreement is their divergent assumptions about the rate of return of intertemporal investments in market position. Those concerned about negative long-term effects of earnings pressure assume that the return on those competitive investments is higher than the cost of capital and therefore that shareholder value is destroyed when firms exploit market position to generate current earnings. Yet this assumption would be incorrect in an environment in which the future value of market position was low, or if managers had a systematic tendency to overinvest. For example, it might be optimal to exploit market power aggressively, at the risk of milking market positions, in situations in which the position itself was unsustainable or of limited future value owing to market decline or technological substitution. Although this is a theoretical possibility, we doubt that it applies in the context of the electricity generation industry, which is a mature (but not declining) industry with relatively stable technologies and market structure. In this context, future market positions should be strategically and financially valuable.

Earnings pressure may also be good for long-term shareholder value if empire-building managers have a systematic tendency to overinvest in market position when not facing earnings pressure. Post hoc analysis of the asymmetric effect of positive and negative earnings pressure provided some relevant evidence on this point. If earnings pressure represented a discipline against empire-building behavior, then firms would increasingly exploit market power when pressure was positive, but they would opportunistically pursue market position by increasing capacity utilization when earnings pressure was negative. On the other hand, if earnings pressure represented a short-term distraction from a long-term strategic pursuit, then we would expect a change in behavior only when earnings pressure was positive, but no deviations when it was negative. The post hoc analysis indicated that capacity utilization decreased with positive levels of earnings pressure, but it did not increase when earnings pressure was negative. In our view, the evidence is more consistent with the interpretation that earnings pressure represents a distraction from long-term strategic pursuits. However, further evidence is needed to clarify this point.

Our findings suggest important implications for managers, investors, and policy makers. For managers faced with earnings pressure, it is important to anticipate how competitive decisions intended to increase current earnings may be counterproductive in the long term. First, competitive reactions may make these benefits short-lived and even undermine long-term competitiveness. Second, meeting analysts’ expectations may encourage even higher earnings expectations in the future (what managers often refer to as the “earnings treadmill”) and make a situation untenable. Therefore, competitive actions such as restricting capacity utilization, even if effective in generating current earnings, postpone but do not solve the underlying problem. It is impossible for firms to continuously meet earnings expectations by exploiting market power. Managers can help reduce the negative impact of earnings pressure by effectively developing and communicating multidimensional performance scorecards that reflect the long-term value of intangible assets such as market positions, R&D capabilities, brand equity, and so forth (Palter & Rehm, 2009). Such leading indicator measures will help investors assess whether performance improvements are generated by improved efficiency or by reductions in intangible investments and would align investor expectations with long-term strategy. Yet this mechanism will be costly when increased investor disclosure may encourage competitive imitation. For investors, the study highlights the difficulty of providing effective capital market moni-
Monitoring in the context of publicly traded firms and also highlights the risk that, given high information asymmetry between managers and investors, a capital market focus on earnings targets may paradoxically result in long-term value destruction. Investors aware of this problem may seek alternative governance approaches (e.g., block holding, private ownership) that provide medium- and long-term monitoring and control. But taking firms private may not be enough. Corporate strategy research has shown that firms relying on internal financial controls of business units tend to commit less to strategic investments (e.g., R&D investments) than those using strategic controls (Hitt, Hoskisson, Johnson, & Moesel, 1996). Therefore, resolving problems of “short-termism” may require more subtle changes in control systems. Finally, for policy makers, the study encourages the development of corporate governance structures that are conducive to long-term value creation. In the current context of accounting and corporate governance reform, investor and accounting regulatory bodies should consider the unintended consequences of regulations on managerial behavior, strategy, and performance. For example, if earnings pressure remains high, but accounting standards become increasingly stringent, there is a risk that managers seeking to fulfill earnings expectations may increasingly turn from accounting manipulations toward more substantive and potentially damaging changes in strategic decisions (Cohen, Dey, & Lys, 2008; Oswald & Zarowin, 2005; Roychowdhury, 2006).

**Limitations and Extensions**

Since the data used in this study were limited to a single industry, the generalizability of the results should be examined in other contexts. Several features of the electricity wholesale market made it an ideal context for this study, such as the nearly perfect commodity nature of the product, the existence of different regional markets with different structures, the diversity of ownership forms, and the availability of rigorous data on capacity, output, and price. Yet other features may limit generalizability. For example, whereas competition in wholesale electricity markets was fully deregulated, other parts of the electricity value chain (e.g., retail competition) remained regulated for most of the period under study. Since our theory does not rely on industry-specific factors, we believe that the theoretical predictions should be generalizable to other output-based commodity industries in which competitive decisions are strategic substitutes and market concentration and dominance are substantial.

Several extensions appear worth exploring in future research. First, it would be interesting to study the effects of earnings pressure in a context in which competitive behaviors are “strategic complements” (e.g., price competition among differentiated offers), since in those situations earnings pressure may have strategically beneficial effects for a firm and its industry by reducing the intensity of rivalry (by encouraging accommodating rather than aggressive responses among rivals). Moreover, future research could analyze other types of competitive actions beyond output and pricing decisions, to provide broader insights into which types of competitive behaviors are affected by earnings pressure. Second, future studies could use more sophisticated structural methods to estimate the effect of earnings pressure on competitive interactions. Our study used a reduced-form approach to estimate the effects of earnings pressure on a focal firm and its competitors, but future research could use the structural methods of the “new empirical industrial organization” (Bresnahan, 1989) to provide stronger causal inference. Third, future research could examine the medium- and long-term competitive responses and performance consequences of market power exploitation resulting from earnings pressure. Our study showed that competitive reactions occurred within single years: when dominant firms experienced earnings pressure at the beginning of a year, their rivals ended up increasing capacity utilization during that year. Thus, in a relatively brief window, competitive output expansions already partially undermined the scarcity value created when earnings-pressured dominant firms tightened supply. Yet we found suggestive evidence that reductions in capacity utilization can send price signals to competitors and potential entrants that lead to rival capacity expansion over the medium and the long term and undermine market dominance. Fourth, future research could explore the process by which capital market pressures, typically observed by CEOs and CFOs, are diffused in organizations to the business-unit managers who formulate and implement competitive actions.

Earnings pressure has received much attention in the business press and in academic theoretical debates, but there is little systematic empirical evidence on its consequences for firms’ strategic behavior. Our study was a first step showing a link between earnings pressure and changes in competitive behaviors intended to increase current earnings by exercising market power. More research is needed to explore other strategic consequences of earnings pressure, particularly those that might
generate delayed negative effects on future performance. Moreover, research is needed to evaluate alternative approaches for companies’ management of earnings pressure. Should companies provide better guidance, so that analysts can measure and properly value leading indicators of competitiveness? Or should they withdraw earnings guidance completely, as some large companies have done in recent years? Does “going private” help solve the problem? These interactions between capital market pressures and competitive and strategic decisions provide a rich pasture for future research.

REFERENCES


David, P., Hitt, M. A., & Gimeno, J. 2001. The influence of


**APPENDIX A**

**U.S. Electricity Wholesale Market**

The 1992 Energy Policy Act divided the U.S. electricity wholesale market into 12 wholesale markets, or NERC regions. Three major interconnection networks helped to balance the supply and demand across the regions (EIA, 2000). However, almost all wholesale trade was initially within NERC regions, although utilities are expanding wholesale trade beyond those traditional boundaries (EIA, 2008). Figure A1 shows these NERC regions and interconnections, and detailed information about market structure appears in Table A1.

**APPENDIX B**

**Calculation of Potential Earnings Variable**

Matsumoto (2002) developed a measure to estimate the expected portion of analysts’ forecasts, or “estimated forecasts,” to compare analysts’ forecast consensus with the earnings per share (EPS) that a firm can realize. Estimated forecasts is calculated as the sum of expected changes in EPS and EPS from the same quarter in the prior year:

$$E[F_{ijtq}] = EPS_{ijtq} - 4 + E[\Delta EPS_{ijtq}].$$

Expected change in EPS, $E[\Delta EPS_{ijtq}]$, is calculated by:

$$E[\Delta EPS_{ijtq}] = [\hat{a}_{\mu} - \hat{\beta}_{1\mu} (\Delta EPS_{ijtq-4} - I/P_{ijtq-4}) + \hat{\beta}_{2\mu} CRET_{ijtq}] \times P_{ijtq-4},$$

The parameter estimates are obtained from the regression of all the other firms in the prior firm-year, as in:

$$\Delta EPS_{ijtq}/P_{ijtq-4} = \alpha_{\mu} + \beta_{1\mu} (\Delta EPS_{ijtq-4}/P_{ijtq-4}) + \beta_{2\mu} CRET_{ijtq} + e_{ijtq},$$

where $\Delta EPS_{ijtq}$ is earnings per share for firm $i$ in four-digit SIC code $j$ in quarter $q$ of year $t$, less EPS for the

**FIGURE A1**

NERC Regions and Interconnection Networks

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**Notes:**

* Source: EIA(2000). White space in the figure delimits the three major interconnection networks.
same firm four quarters prior, $P_{ijtq}$ is price per share for firm $i$ in four-digit SIC code $j$ at the end of quarter $q$ of year $t$, and $CRET_{ijtq}$ is the cumulative daily excess return for firm $i$ in four-digit SIC code $j$ in quarter $q$ of year $t$ obtained from CRSP. Returns are cumulated from 3 days after the quarter $t – 4$ earnings announcement to 20 days before the quarter $t$ earnings announcement.

We adopted this method to estimate the potential earnings per share a firm can realize in the context of the electricity utility industry. Specifically, we used the following formula to estimate changes in EPS for firm $i$ in year $t$ ($j$ was omitted since there was only one industry):

$$
\Delta EPS_{it}/P_{it-1} = \alpha_i + \beta_1(\Delta EPS_{it-1}/P_{it-2}) + \beta_2 CRET_{it} + \epsilon_{it}.
$$

Then we used the parameter estimates from the prior firm-year to calculate the expected changes in EPS, potential EPS, and earnings pressure at the beginning of year $t$ by:

$$
E[\Delta EPS_{it}] = [\hat{\alpha}_i + \hat{\beta}_1(\Delta EPS_{it-1}/P_{it-2}) + \hat{\beta}_2 CRET_{it}] \times P_{it-1}.
$$

$$
POTENTIAL EPS_{it} = E[F_{it}] = EPS_{it-1} + E[\Delta EPS_{it}].
$$

$$
Earnings pressure = (F_{it} – E[F_{it}])/stock price_{it-1}.
$$

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