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Business cycle management and firm performance

Tying the empirical knot

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Abstract

Purpose – Business cycles strongly influence corporate sales and profits, yet strategy research largely ignores the possibility that corporate management practices related to the business cycle influence profitability. This paper aims to offer initial empirical support for the view that high performance firms use a variety of business cycle management (BCM) practices that low performance firms do not.

Design/methodology/approach – This exploratory study examines the association of firm performance with business cycle management behaviors identified in the prescriptive literature and further developed from a set of case analyses. The empirical analysis uses a matched sample of 35 pairs of high vs low performers from the S&P 500.

Findings – Discriminant and conditional logit analyses provide preliminary evidence that business cycle-sensitive behaviors such as countercyclical hiring and investment associate positively with firm performance.

Research limitations/implications – Future research should use larger data sets and strictly archival data to overcome the limitations of the small sample size and data coding with some subjective elements.

Practical implications – This research suggests a variety of business cycle related practices dealing with staffing, capital investment, acquisitions and divestitures, capital financing, credit policy, pricing, and advertising may improve firm performance.

Originality/value – This is the first paper to offer evidence of the impact of business cycle related practices across a range of practices and industries.

Keywords Business cycles, Business performance, Working practices, Organizational behaviour

Paper type Research paper



The relationship between business cycle management (BCM) and firm performance represents one of the most important but arguably least developed research streams in all of management scholarship. As described in a relatively thin and highly fragmented literature, BCM involves the application of a set of typically countercyclical prescriptive behaviors that, when applied in a timely way over the course of the business cycle, is said to improve the performance of an organization relative to rivals.

Business cycles consist of periods of economic expansion and economic recession (US National Bureau of Economic Research, 2003)[1]:

[A] recession is a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial

production, and wholesale-retail sales . . . A recession begins just after the economy reaches a peak of activity and ends as the economy reaches its rough. Between trough and peak, the economy is in an expansion.

Several scholars contend that firms can take advantage of business cycles. For example, Dhalla (1980) argued that expanding advertising in a recession could take advantage of lower advertising costs and less congestion in media markets. Greer and his colleagues (Greer, 1984; Greer *et al.*, 1989; Greer and Stedham, 1989; Greer and Ireland, 1992) similarly argued that hiring during a recession allows firms to hire better workers at lower wages.

While this literature is long on such prescription, it lacks empirical studies that close the loop between the prescribed BCM behaviors and firm performance. Those few studies that do exist tend to focus on the effects of BCM in only one functional area.

For example, Greer *et al.* (2001) found that countercyclical hiring positively influences subsequent financial performance. Kypriotakis (2002), p. 2), Sorrell (2003), and Krishnamurthy (2005) found a statistical association between countercyclical advertising and sales or profitability while Srinivasan *et al.* (2005, p. 109) survey of senior marketing executives indicated that “firms that have a proactive marketing response in a recession achieve superior business performance even during the recession”. Churchill and Lewis (1984) found that some small businesses report reducing credit during recessions to minimize default risk while Lubatkin and O’Neill (1988) found that business cycles have influenced the returns firms received from acquisitions. In the area of capital expenditures, Mascarenhas and Aaker’s (1989) empirical look at a small sample of oil drilling companies similarly found that countercyclical investment during a recession can improve performance, but that few firms adopted such a strategy.

So far, work on BCM behaviors has not sparked wider and deeper BCM research efforts. This paper tests the association of firm performance with a comprehensive set of BCM behaviors across a broad range of firm activities and a broad sample of firms and industries.

Section II presents hypotheses derived from theory development, the prescriptive literature, extensive case study work over a five-year period, and a comprehensive empirical assessment of archival national data. Section III describes the data and methodology used to test the BCM hypotheses. Section IV reports the results, which provide strong preliminary support for claims in the prescriptive literature that BCM behaviors help explain observed heterogeneities in firm performance. The paper concludes with a discussion of the limitations of our analysis and possible topics for future BCM research.

Theory and hypotheses

Business cycles strongly influence corporate sales, profits, and cash flows, yet the management literature lacks empirical studies suggesting how the influence of firm behavior on performance might vary across the cycle.

What should explain differences in firm performance over the course of the business cycle? In this section, we offer an initial explanation based on a modified version of the standard behavioral theory of the firm [BTOF], Cyert and March, 1963; March and Simon, 1958). The BTOF assumes firms operate using routines that include parameters. Over time, the firm adjusts the parameters based on feedback (Herriott *et al.*, 1985; Levinthal and March, 1981). For example, a firm experiencing frequent

shortages of inventory may change its inventory routines to maintain higher inventory levels. Such incremental adaptation generally helps the organization find desirable parameters for its routines.

While these arguments apply to many corporate routines, for simplicity let us consider the firm's expectations about sales. Sales expectations underlie the bulk of corporate planning (Cyert and March, 1963; Bromiley, 1986).

Consider a simple model of adaptive expectations (see, for example, Arrow and Nerlove, 1958; Lawson, 1980) where:

$$E(\text{Sales}_t) = (E\text{Sales}_{t-1}) + b(\text{Sales}_{t-1} - E(\text{Sales}_{t-1})) + e, 0 \leq b \leq 1$$

Here, the firm adjusts its expectations from its prior expectation based on the difference between prior expectations and the actual outcome. Consequently, expected sales depend on a weighted sum of prior sales levels:

$$E(\text{Sales}_t) = \sum_{i=0}^{\infty} b(1-b)^i \text{Sales}_{t-1-i}$$

Since older sales data have lower weights, recent experience influences expectations far more than less recent experience. After several years of growth, any previous recession will have little influence on expectations.

Adaptive expectations models suggest firms will have very misleading expectations when the economy turns from expansion to recession; these models predict the firm will adapt slowly. Since the firm's expectations depend on many years of prior sales, the firm will take years to adjust its expectations to a recession.

Firms following adaptive or similar expectations processes will have excessively high forecasts entering a recession, and may have excessively low forecasts exiting a recession. Managers also may over learn during a recession. Having suffered from excess spending as the economy entered the recession, managers may be "gun shy" about increasing spending during a recovery.

The US economy had only one recession between 1991 and 2007, and that recession lasted less than a year. Adaptation of routines in such an environment should lead to routines that function well in an expanding economy but may function poorly in a recession. Indeed, after a long expansion, many younger managers may never have been managers during a recession.

Expectations strongly influence many forward-looking business decisions. Sensible rules for staffing, capital investment, production levels, etc., all rely on expected sales volumes (Cyert and March, 1963). Firms that expect growth as the economy enters into a recession should make systematic errors in such decisions. However, not all firms necessarily follow this pattern. Both BTOF and non-BTOF explanations suggest some firms will behave differently.

In the BTOF, firms adapt their routines based on their experiences. For example, after the 2001 recession, Cisco had to write down the value of its inventories by more than \$2 billion. Soon after, it moved to a more business cycle-sensitive, real-time supply chain management system (Electronics Supply & Manufacturing, 2003). Changes not intended to relate to business cycles may influence how the firm responds to such cycles. For example, a move from substantial inventories to just-in-time and made-to-order systems reduces the possibility a firm will suffer from excessive

inventories during a recession. Firms may make such changes for reasons unrelated to business cycles but still benefit during recessions.

Alternatively, firms may proactively manage cycles. Within the BTOF, a firm that identified problems as related to business cycles would search for new routines that promise better cycle-related performance. A managerial view of the firm would suggest some managers simply see the need for cycle-related policies that other managers do not see. Differences in individual or group backgrounds, experiences, education, etc., might explain such differences.

Firms that adjust more quickly or even anticipate a recession should perform better than those who do not. Entering a recession, firms that expect continued growth may over invest, produce more goods than they can sell, and so forth. Firms that avoid these errors should have higher performance than firms that behave as if the economy were growing. Given this reasoning, we offer our central proposition:

- P1.* Firms that exhibit BCM behaviors in response to, or anticipation of, movements and turning points in the business cycle should outperform firms that fail to adopt such behaviors or fail to adjust as quickly.

This argument does not depend on the firm's ability to accurately forecast business cycle movements and turning points. Even if one rejects the efficacy of forecasting, a firm may nonetheless benefit by reacting more quickly and appropriately than rivals over the course of the business cycle. Accordingly, an inability to forecast business cycles does not stand as a legitimate objection to studying cycle-related management practices.

To identify BCM behaviors that may offer firms a performance advantage and develop specific hypotheses, we reviewed the prescriptive literature to identify primary processes that authors claim influence performance depending on the state of the economy in the business cycle. We supplemented this review with more than 100 case studies conducted in the preliminary stage of the research. Figure 1 summarizes the hypotheses, grouping them into supply, capital, and demand subsets.

Staffing

Given the expectation mechanism noted above, firms would retain excess staff going into a recession (since they overestimate future sales), and not re-staff when the economic revives (since they have adapted or even "over learned" to expect low sales). These behaviors result in pro-cyclical staffing.

Studies that have examined the impact of countercyclical staffing on firm performance argue that during a recession, the pool of qualified labor deepens and wage pressures diminish (Bright, 1976; Greer, 1984; Greer *et al.*, 1989, 2001; Greer and Stedham, 1989; Greer and Ireland, 1992). Therefore, countercyclical hiring lets firms hire better workers at lower wages. March and Simon (1958) argued that satisfied workers stay at their jobs and do not search for information on other employment. Consequently, firms may hire employees during recessions and then keep such employees during the recovery at wages and benefits below what the employees might command during the recovery.

Avon, the world's largest door-to-door cosmetics retailer, offers an interesting example of this BCM behavior. During the 2001 downturn, Avon revitalized an old program called Sales Leadership that taught the company's top performers how to recruit, train, and supervise their own group of representatives. With this program and

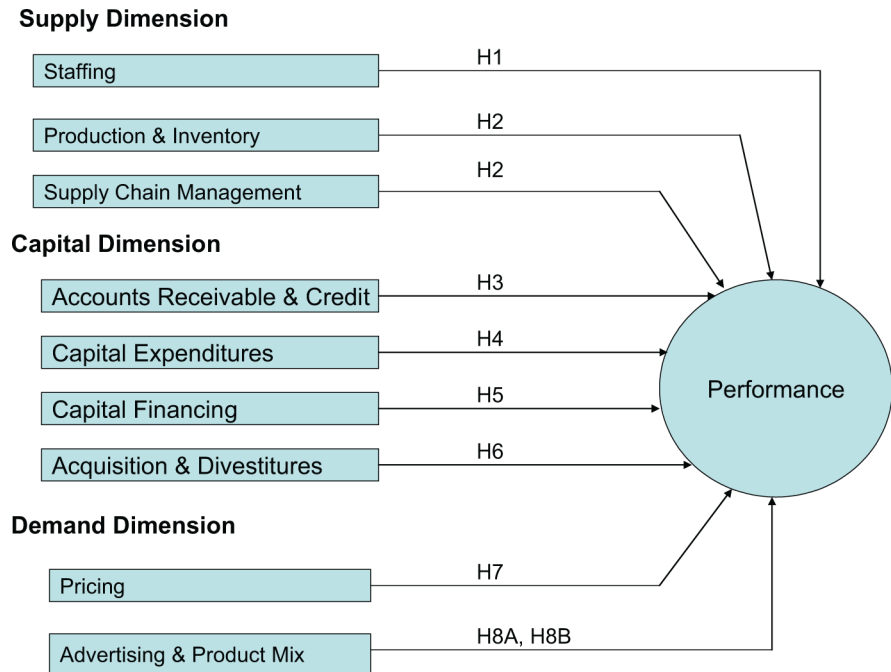


Figure 1.
The empirical research model

other initiatives, Avon expanded its workforce by almost one third – or roughly one million people. This expansion was followed by a 16 percent increase in stock price in a depressed market, net income up by 20 percent, and sales growth almost twice the historical average in 2002. In 2003, earnings increased another 25 percent and Avon’s share price increased 25 percent to an all-time high.

H1. Higher performance firms engage in countercyclical staffing behaviors more than lower performance rivals do.

Production, inventory control, supply chain management

Given that appropriate inventory levels depend largely on expected sales levels, errors in expectations will encourage firms to hold excess inventory early in a recession, and keep inventories low, exiting from a recession.

Prescriptively, firms should balance the costs of holding inventories versus the costs of stock shortages. Larger sales volume requires larger inventories so firms should trim, not expand, inventories at the beginning of a recession. Firms that delay cutting production will increase their finished goods inventories, increasing inventories when they should decline.

Symmetrically, when a recovery comes and sales increase, firms need additional inventory to meet increasing demand. Firms that anticipate a recovery by increasing production, input purchases, and inventories can quickly stock shelves and showrooms with the latest products and styles as the economy begins its expansion. Occasionally, shortages develop at the beginning of an expansion, increasing the

advantage for firms that purchase their inputs early. Such firms may gain revenue opportunities and market share relative to rivals that act less quickly.

The contrasting examples of heavy truck manufacturers Navistar and Paccar illustrate these issues. Paccar's management team closely follows key industry indicators like freight tonnage, and in anticipation of the 2001 recession, Paccar cut factor input purchases, production and inventories thus increasing its inventory turnover ratio. In contrast, after three strong sales years in the trucking business from 1998 to 2000, in 2001 Navistar did not cut its production and inventories in the face of rising oil prices and interest rates, a growing glut of used trucks on the market, and a rapidly softening economy in 2001. While Paccar remained profitable in 2001 and 2002, Navistar did not.

- H2.* Higher performance firms cut production, inventories, and factor input purchases in anticipation of a recession and increase such purchases in anticipation of a recovery, more than lower performance rivals do.

Accounts receivable and credit management

As the economy enters a recession, customers who face cash shortages will push for longer payment terms to retain cash. However, firms that accommodate such requests entering the recession will face shortages of cash and losses from bankrupt customers. Symmetrically, having suffered problems from credit during a recession, firm routines may counterproductively change to tight control of accounts receivable and credit management during an expansion.

Bankruptcy and credit conditions vary dramatically over the business cycle. Bankruptcies rise in recessions and firms often fall behind in payments. Isberg (2004) found the probability of default or late payments on accounts receivable increases during recessions and declines during expansions.

Given increased default risk during recessions and lower risk during expansions, a BCM credit policy tightens credit during recessions and relaxes it during expansions. Churchill and Lewis's (1984) survey found some small businesses claim to do this – reduce credit during recessions and increase credit during expansions.

The contrasting cases of telecom gear maker Lucent and commercial property manager Arden Realty provide additional insight into this hypothesis. Up to the middle of the 2001 recession, Lucent continued to offer huge financing packages to high-risk, start-up companies thus increasing market share and sales revenues. When many of these dot-com enterprises declared bankruptcy, Lucent found itself with more than \$3 billion in uncollectable receivables. This bad debt – along with a debt-driven acquisition strategy – left Lucent short on cash and unable to continue the research and development responsible for its original competitive advantage.

In contrast, the executive team of Arden Realty illustrated much greater business cycle sensitivity in anticipation of the 2001 recession. As part of its credit management policy, and as noted by Christopher Hartung, an analyst with Wells Fargo Securities (Navarro, 2005):

Arden Realty did not lease to the highest bidder or the largest tenant but to the tenants with proven performance, credit quality, and long-term leasing ability. In doing so, Arden lowered its risk.

- H3. Higher performance firms tighten credit and aggressively collect accounts receivable in anticipation of a recession, and loosen credit in anticipation of an expansion, more than lower performance rivals do.

Capital expenditures

The empirical capital investment literature strongly supports a pro-cyclical pattern with excess spending in recessions (see, for instance, Bischoff, 1971). These models claim capital expenditures depend on prior output levels. If so, entering a recession, firms may continue building capacity. Henderson and Cool (2003) warned against pro-cyclically over-investing late in an expansion. If many do so, a “bandwagon effect” can lead to excess capacity.

The same process can result in firms under investing at the bottom of a recession and early in a recovery. Low sales in the previous year(s) result in low predictions of needed capacity, reducing planned investment.

The BCM literature recommends firms countercyclically increase investment during a recession. Such firms may enter the economic recovery with adequate capacity and modern equipment and therefore outperform rivals. Bromiley (1986) presented data from a firm that explicitly increased investment during recessions to have new chemical plants coming on line at the recovery. Studying oil-well drilling firms, Mascarenhas and Aaker (1989) found that countercyclical investment strategies enhance performance, but few firms practiced this strategy during recessions. Ghemawat (1993, p. 51) argued that, “at the bottom of the business cycle, companies seem to overemphasize the financial risk of investing at the expense of the competitive risk of not investing”.

The contrasting cases of Calpine versus Intel offer additional insight into this hypothesis. Intel relies on an aggressive countercyclical capital expenditures strategy to fuel product innovation. During the 2001 recession, as many of its competitors retrenched, Intel invested heavily in the development and production of two new chip technologies, opened new plants in Ireland and Malaysia, and increased production capabilities in many of its existing plants. Once the 2002-2003 recovery began, Intel quickly launched several new products with state of the art chips helping Intel increase its revenues by 13 percent over 2002 and net income by 81 percent.

The merchant electricity generator Calpine offers a counterpoint and illustrates the bandwagon effect. In the late stages of the economic expansion, Calpine signals of an impending recession and embarked on a very aggressive plan to build new power plants. As the recession took hold in 2001, Calpine began to suffer a severe reduction in cash generation while facing higher interest payments on its roughly \$14 billion of debt. As *Business Week Online* noted on the one-year anniversary of Calpine’s bold promise to “repower” North America (*Business Week Online*, 2002):

Today, Calpine is powering down fast. . . . It’s reeling from falling electricity demand caused by the recession and from the debts it racked up to fund new plants. Calpine faces uncertainty about its liquidity and expansion strategy. ‘We’re questioning its ability to stay financially viable until an economic recovery comes. . . .’

- H4. Higher performance firms reduce capital expenditures in the late stages of an economic expansion to avoid overcapacity and countercyclically invest during recessions to position themselves for the next recovery more than lower performance rivals do.

Capital financing

Firms following normal financing routines and policies will generally attempt to maintain whatever target ratios the firm established during the previous years for long-term debt, short-term debt, and liquidity. However, such consistent policies may not be desirable during a recession.

The relative costs of equity and debt differ over the cycle (Aburachis and Kish, 1999), and the spread between short and long-term interest rates changes with the business cycle. McCallum (1999) suggested firms can reduce their cost of capital by modifying the ratio of short-term to long-term debt as the relative costs of long- and short-term borrowing change. A firm may also modify its leverage to take advantage of differences in the costs of equity and debt, e.g. by buying back its stock during a recession when the firm's stock price appears "undervalued".

For example, Wachovia leveraged the short- versus long-term interest rate spread over the course of the 2001 recession. Early in the recession, as interest rates began to fall, Wachovia took advantage of low short-term rates by increasing its short-term borrowing while using product mix strategies to lower risk. In particular, Wachovia increased its total dollars in deposits and decreased the total dollars for unsecured loans. Wachovia used the increased deposit dollars to fund its mortgage products. This change in funding and lending mix allowed Wachovia to take advantage of low interest rates without an undue increase in overall risk.

- H5.* Higher performance firms actively manage their debt-to-equity and short-to-long-term debt ratios over the business cycle and the related stock market and interest rate cycles, more than lower performance rivals do.

Acquisitions and divestitures

Numerous studies have found that firms perform poorly in the years after a merger or acquisition (e.g. Sirower, 1997; Doeswijk and Hemmes, 2001). Giliberto and Varaiya (1989) found that bids for acquired firms increase with the number of competing bidders and note a "winner's curse" tendency for companies to overpay for acquisitions. Similarly, Harford (1999) found that the amount of cash a company has increases the likelihood it will overpay for an acquisition. These studies agree with an argument that implies high price-to-value for acquisitions during expansions and low price-to-value during recessions.

Firms increase their efforts to acquire firms during expansions potentially because expansions increase corporate profits, which can fund acquisitions and makes targets more attractive.

The same factors work in reverse during a recession. Firms have low or negative cash flows so they do not have as much cash available. Lower growth rates for the target make optimistic earnings forecasts difficult to sell to management. Thus, standard practice anticipates many firms have less interest in acquisitions during recessions. If many firms use pro-cyclical acquisition routines, firms that take the other side (wanting to sell during expansions and buy during recessions) may have an advantage.

The contrasting examples of telecom gear-maker Nortel Networks and chipmaker Micron illustrate this BCM behavior. As part of a BCM strategy, Micron seeks to purchase chip fabrication facilities at the bottom of the semiconductor market cycle. This eliminates rivals and increases market share while cutting costs and expanding production capabilities. For example, in April of 2002, Micron bought a Random

Access Memory operation valued at about \$2 billion from recession-battered Toshiba for only \$300 million. The purchase eliminated a key rival, and with fewer competitors, prices rose so the business became profitable. Micron's CEO noted, "This transaction clearly demonstrates Micron's commitment to further strengthen its memory business in the face of a significant industry downturn" (Navarro, 2005, p. 50)

Nortel's executive team did just the opposite. Near the top of the stock market tech bubble, Nortel executed 12 major acquisitions at premium prices in the 12 months leading up to the 2001 recession. This "buy high" strategy, in which few, if any, of these acquisitions would turn out to be accretive to earnings, helped contribute to a staggering \$75 billion loss in market capitalization and the layoff of 50,000-plus Nortel employees.

- H6.* Higher performance firms execute acquisitions during recessionary bear markets and execute divestitures during expansionary bull markets more than lower performance rivals do.

Pricing

Firms use many rules for setting prices. They often meet their competitors' prices. They often want a constant percent or absolute markup over wholesale cost. However, these rules do not generally allow for differences across the business cycle.

Economists describe the sensitivity of sales to price as price elasticity. Low elasticity means price changes have little impact on quantity demanded, and high elasticity means price changes strongly influence quantity demanded. A firm that lowers prices when elasticity is high can raise its total revenues. Examining 38 US food-manufacturing industries, Field and Pagoulatos (1997) empirically found counter-cyclical changes in price elasticities. This suggests that during recessions (when elasticity is high) price increases lower revenue, and during expansions (low elasticity) price increases raise revenue.

These findings suggest that firms that maintain constant mark-ups or even attempt to raise prices during recessions to offset falling revenues and earnings may worsen both problems. In contrast, firms with BCM pricing routines that lower prices during recessions (when high elasticity implies price reductions increase revenue) and pro-cyclically raise prices during expansions (when low elasticity implies price increases have a small impact on quantity and so raise revenues) may increase revenues and improve profitability relative to slower acting rivals.

Goodyear – the largest tire maker in the US – provides a classic case of futilely attempting to raise prices in a recession to offset falling revenues. In its 2000 Annual Report, Goodyear's executive team appeared to be business cycle sensitive as it promised to "be aggressive in increasing prices" but only "when market conditions warrant". Unfortunately, with the onset of the recession in 2001, tire demand fell in both the new vehicle and replacement tire markets, and market conditions worsened significantly. Despite these sharply deteriorating conditions, Goodyear's executive team raised prices three times in 2001. The company wound up losing more than \$200 million that year.

- H7.* Higher performance firms pro-cyclically price more than lower performance rivals do.

Advertising

The amount firms allocate to advertising often reflects rules of thumb routines related to profits or sales (Joseph and Richardson, 2002). A firm that sets expenditures as a fraction of sales or profits will adapt advertising budgets pro-cyclically – increasing advertising during expansions (when sales and profits rise) and decreasing advertising during recessions (when sales and profits fall). Picard (2001) found firms reduce advertising spending 5 percent for every 1 percent decline in GDP.

In contrast, countercyclical spending on advertising may benefit firms. For example, Dhalla (1980) argued that during recessions there is less “congestion” or noise in the marketplace and that advertising rates (prices) tend to be lower. Advertising in a recession may not only help firms by directly increasing sales, but also those sales may also help a firm trim its inventories (Navarro, 2004).

Kypriotakis (2002, p. 2) reported “cutting advertising appropriations in times of economic downturns can result in both immediate and long-term negative effects on sales and profit levels”. He noted in a study by McGraw-Hill that firms that increased their advertising expenditures in recessions “averaged significantly higher sales growth” relative to those that “eliminated or decreased advertising”. Srinivasan *et al.* (2005, p. 109) survey of senior marketing executives indicated that some firms “adopt proactive marketing during recessions”. They also found that “firms that have a proactive marketing response in a recession achieve superior business performance even during the recession”.

For example, during the 1990-1991 recession, Dell was a young, upstart company fighting to gain a foothold against more established brands like Digital and IBM. During this recessionary period, advertising in the entire computer hardware industry fell by an average of almost 20 percent. In countercyclical contrast, Dell increased its marketing dollars by over 300 percent. With less clutter in the advertising space, the company was able to establish its brand and position itself for what would become a decade of profitability.

H8A. Higher performance firms countercyclically increase advertising during recessions more than lower performance rivals do.

Both Cundiff (1975) and Shama (1981) noted that consumer sentiment changes over the course of the business cycle. This observation agrees with economic indicators like “consumer confidence”, reported by the US Conference Board. When consumer confidence falls, consumers become more cautious and risk averse. They put more emphasis on value than style (Cundiff, 1975; Shama, 1981). In contrast, during expansions, consumers’ high confidence makes them less risk averse and more open to style-oriented marketing and products.

Such changes in consumer confidence and preferences suggest two prescriptive BCM behaviors. During recessions, firms can benefit emphasizing value and function in their advertising rather than style, and the opposite in an expansion. In addition to presentation, firms may vary the product offerings. To cater to risk-averse, value-oriented consumers, Shama (1978) advised firms to shift their product mix to emphasize products with fewer expensive options and more value during recessions. Symmetrically, firms should offer more expensive, exciting options during expansions to take advantage of higher consumer confidence.

For example, to cope with the extreme cyclicity and regional volatility of the homebuilding market, Centex’s executive team deploys a “decentralized” forecasting

strategy that divides the company into 55 divisions in five regions. Each division has several staff members who track local trends and numerous economic indicators such as jobs, housing starts, and building permits. At the first sign of any cooling in the national market or a regional market, Centex typically changes its product mix by increasing the proportion of lower cost homes it builds. This is because historically, the low-end portion of the housing market has been much more insulated from cyclical variations and much more resilient during recessions.

H8B. Higher performance firms adapt their advertising messages and product mix to changing consumer sentiment over the business cycle, more than lower performance rivals do.

Data and methods

Our analysis uses data on a matched sample of 70 firms in 35 sub-industries from the S&P 500 Index (see Table I for the firms). We sampled from the population of firms in the S&P 500 Index because these firms meet the most stringent reporting requirements and have extensive press coverage, making detailed data available.

We constructed a matched sample using the method of “polar extremes” (e.g. Hair *et al.*, 1987). In each sub-industry, we selected the firms with the highest and lowest total shareholder’s return (stock price appreciation plus dividend payouts) over the sampling period subject to the two being direct competitors of similar size, having substantially different stock returns, not having engaged in significant merger activity (not exceeding 50 percent of book value), and not experiencing exogenous or regulatory shocks to distort stock price performance. Matching firms’ controls partially for the possibility that cycles influence all companies in a particular industry in roughly the same manner.

The matched sample design resembles both those used in epidemiology (e.g. Holford, 2002) and strategy (e.g. Harris and Bromiley, 2005). Using highest and lowest performers provides the strongest possible contrast in performance between rival firms and allows for a smaller sample size.

The data extended from two years prior to the onset of the 2001 recession (February 1999) and extends two years past the official end of that recession (to December 2003). Given its length and specific years, this period allows observation of firm performance and BCM behaviors across all business cycle phases.

For each firm in the sample, research assistants constructed a substantial dossier that included data from the Compustat and Mergent databases (industry and company financial data); Investext (company and industry reports); Hoover’s Pro Online and Yahoo! Finance (supplementary company data and identification of rivals); annual and quarterly reports of each company; a Lexis-Nexis search of company documents, analysis, and executive statements; a Google search; and company web sites.

Data coding followed a technique used by Bryson and Bromiley (1993). For each firm, a large amount of quantitative and qualitative data was provided to either an MBA student or group of students. The student coders read the material on a given firm and responded to a set of questions about the firm. We used five-point Likert differential scales, where the lowest point in the scale represented a severe infringement of the particular BCM behavior while the highest represented a substantial embracement. To test the data collection process, we also calculated a coder

Industry	Pairs (high vs low performer)
1 Advertising	Omnicom Group – Interpublic Group
2 Aerospace and defense	Northrop Grumman Corp. – Raytheon Co.
3 Airlines	Southwest Airlines – Delta Air Lines
4 Apparel retail	TJX Companies, Inc. – Gap (The)
5 Auto parts and equipment	Johnson Controls - Dana Corp.
6 Building products	American Standard – Masco Corp.
7 Computer hardware	International Business Machines – Gateway Inc.
8 Computer storage and peripherals	Network Appliance – EMC Corp.
9 Construction, farm machinery and heavy trucks	PACCAR Inc. – Navistar International Corp.
10 Consumer finance	Capital One Financial – Provident Financial Corp.
11 Data processing and outsourced services	Affiliated Computer – Electronic Data Systems
12 Drug retail	Walgreen's Co. – CVS Corp.
13 Electronic equipment and manufacturers	Tektronic Inc. – Agilent Technologies
14 Electronic manufacturing services	Jabil Circuit – Solectron
15 Food retail	Supervalu Inc. – Winn Dixie
16 Home improvement retail	Lowe's Cos. – Home Depot
17 Household appliances	Whirlpool Corp. – Maytag Corp.
18 Housewares and specialties	Fortune Brands, Inc. – Newell Rubbermaid Co.
19 Insurance brokers	Marsh & McLennan – AON Corp.
20 Investment banking and brokerage	Lehman Bros. – Goldman Sachs Group
21 Life and health insurance	MetLife Inc. – Unum Provident Corp.
22 Managed health care	United Health Group Inc. – Aetna Inc.
23 Movies and entertainment	Viacom, Inc. – Time Warner, Inc.
24 Oil & gas equipment and service	BJ Services – Halliburton Co.
25 Other diversified financial services	Citigroup Inc. – J.P. Morgan Chase & Co.
26 Paper products	MeadWestvaco Corporation – Georgia Pacific Group
27 Personal products	Alberto Culver – Gillette Co.
28 Pharmaceuticals	Forest Laboratories – Schering Plough
29 Property and casualty insurance	Progressive Corp. – Allstate Corp.
30 Restaurants	Wendy's International – McDonald's Corp.
31 Tires and rubber	Cooper Tires & Rubber - Goodyear Tire & Rubber
32 Diversified chemicals	Dow Chemical – Du Pont (E.I.)
33 Health care distributors	McKesson Corp. – AmerisourceBergen Corp.
34 Computer and electronics retail	Best Buy Co., Inc. – Circuit City Group
35 Railroads	Union Pacific – Norfolk Southern Corp.

Table I.
Industries and firms in
sample

reliability statistic finding only two of nine Spearman correlations under 0.60 (values of 0.47 and 0.57) and only two of nine Kendall's Tau-b under 0.60 (values of 0.43 and 0.53).

Prior to completing the questionnaire, each student coder was extensively pre-trained. Each already had:

- participated in class work regarding business cycle-sensitive management behaviors;
- conducted a case analysis of a particular company and received instructor feedback; and
- received additional training in the coding system.

Staffing	Did the firm engage in countercyclical hiring during the recession? Did the firm begin to layoff workers in anticipation of the 2001 recession?
Production and inventory	Did the firm cut production and/or trim inventories in anticipation of the 2001 recession? Did the firm increase production and/or build inventories in anticipation of the recession recovery?
Supply chain management	Did the firm trim input purchases in anticipation of the 2001 recession? Did the firm build input inventories in anticipation of the recovery?
Capital expenditures	Did the firm cut its capital expenditures in anticipation of the 2001 recession? Did the firm countercyclically invest during the recession in anticipation of the recovery?
Capital financing	Did the firm change its debt-to-equity ratio over the course of the business cycle, and related stock market and interest rate cycles, to lower its capital costs? Did the firm change its ratio of short-term to long-term debt over the course of the business cycle, and related stock market and interest rate cycles, to lower its capital costs?
Acquisitions and divestitures	Did the firm appear to favorably “time” its acquisition and divestiture strategies to movements in the stock market and related interest rate cycle, e.g. is there evidence of “buy low and/or sell high” behavior?
Accounts receivable and credit	Did the firm tighten credit and/or more aggressively collect its accounts receivable in anticipation of the 2001 recession? Did the firm loosen credit and/or less aggressively collect its accounts receivable in anticipation of the recovery?
Pricing the cycle	Was the firm’s pricing strategy sensitive to the phase of the business cycle?
Advertising and product mix	Did the firm engage in countercyclical advertising during the 2001 recession? Did the firm change the “mood” of its advertising messages over the course of the business cycle to match consumer tastes for value versus style in recessionary versus expansionary periods? Did the firm change its product mix during the recessionary and expansionary phases of the business cycle?

Table II.
Coding questions

The companies were not identified to the student coders *ex ante* as high or low performers in terms of stock return, and the same questionnaire was used for all firms. In all cases, student coders needed to corroborate their assessment by providing supportive references. Table II presents the coding sheet. Where multiple groups coded the same firm, we averaged their responses. Likewise, we averaged the across the items within each construct.

Data analysis

We used two statistically similar but interpretatively different analytical techniques to test the statistical significance of the association of performance and BCM behaviors

for the sample of 70 companies matched in 35 pairs – discriminant analysis and conditional logit analysis.

Discriminant analysis derives linear combinations of two or more independent variables that discriminate between appropriately defined groups (Hair *et al.*, 1987). Discriminant analysis starts with groups and then seeks combinations of the independent variables that predict which observations fall into which group, thus identifying factors that discriminate between the groups.

While the theory argues that BCM behaviors improve performance, the hypotheses offer the weaker proposition that BCM behaviors associate with performance. The cross-sectional sample, limited sample size, and related technical issues prevent complex modeling and controls needed to test causal arguments. However, discriminant analysis offers the appropriate test of the simpler argument that performance groups (high and low) differ in BCM practices.

Given strategy researchers' greater experience with logit than discriminant analysis, we also used conditional logit. Conditional logit is appropriate for matched samples with discrete outcome variables because it handles the discrete outcomes correctly and includes fixed effects for each matched pair. Here, the fixed effects for each pair control for industry effects. The analysis includes controls for the firm's average return on assets between 1995 and 1999 (before the observation period), and for three forms of slack (Cyert and March, 1963).

Results

The discriminant analysis

Following Hair *et al.* (1987), the discriminant analysis uses three tests addressing differences between the two groups and a fourth test of the predictive accuracy of the discriminant analysis. Each test represents an important step in the validation process. First, the Box Test does not reject the hypothesis that the high and low performance groups have the same covariance structure ($F = 0.92$, $p = 0.62$), justifying the use of subsequent tests.

The second test examines the equality of group means. All of the behavioral variables have statistically significant differences between the groups (at $p < 0.10$ or above), and eight of the nine at $p < 0.05$. Thus, BCM measures differ between high and low performers.

Next, we estimated the canonical discriminant function finding one function with eigenvalue of 0.60 and a canonical correlation of 0.61. The likelihood ratio and associated F -statistic results indicate statistical significance ($F(9,60)$ of 3.99, $p < 0.001$). This indicates that a discriminant function of BCM measures significantly predicted whether a firm fell into the high or low performance group. The ANOVA results indicate all BCM variables associate with the canonical function at $p < 0.05$ except Advertising and product mix ($p = 0.08$) and Accounts receivable and credit ($p = 0.12$).

The model correctly classifies 28 of the 35 low performers and 28 of the 35 high performers. The corresponding hit ratio is 80 percent, which is well beyond chance (50 percent).

Table III presents the canonical structure and ANOVA results. We follow a rule-of-thumb from Hair *et al.* (1987) of considering structural coefficients over significant.

The structure coefficient of -0.52 for Staffing supports *H1*; high performance firms engage in countercyclical staffing behavior across the business cycle more than low

Table III.
Linear discriminant
analysis – canonical
structure coefficients and
anova results

	Canonical structure coefficients	ANOVA R^2	F	Probability > F
Staffing	-0.52	0.12	11.17	0.0014
Production and inventory	-0.46	0.09	8.62	0.0045
Supply chain management	-0.34	0.05	4.84	0.0312
Accounts receivable and credit	-0.25	0.01	2.50	0.1186
Capital expenditures	-0.44	0.06	8.01	0.0061
Capital financing	-0.35	0.05	4.93	0.0298
Acquisitions and divestitures	-0.43	0.14	7.59	0.0075
Pricing	-0.65	0.16	17.40	0.0001
Advertising and product mix	-0.28	0.03	3.13	0.0816

Note: $n = 70$

performance rivals. The results support $H2$; the structure coefficient of -0.46 for Production and inventory and the coefficient of -0.34 for Supply chain management indicate that high performance firms countercyclically cut production and trim inventories in anticipation of a recession and increase production and build inventories in anticipation of a recovery more than rivals.

The structure coefficient for Accounts receivable and credit (-0.25) falls below the 0.3 rule of thumb thus not supporting $H3$. Capital Expenditures has a structure coefficient of -0.44 . This supports for $H4$; high performance firms reduce capital expenditures in anticipation of a recession and then invest in new capacity and product development during recessions more than low performance rivals do.

The structure coefficient for Capital financing (-0.35) supports $H5$; high performance firms actively manage their ratios of debt-to-equity and short-to-long-term debt over the course of the business cycle and related stock market and interest rate cycles more than low performance ones. The structure coefficient for Acquisitions and divestitures (-0.43) supports $H6$ that high performance firms countercyclically execute acquisitions and divestitures more than low performance ones.

The coefficient for Pricing (-0.65) supports Hypothesis 8A, that high performance firms adjust pricing more than low. Advertising and product mix's structure coefficient (-0.28) does not exceed the 0.3 rule-of-thumb.

In sum, the discriminant analysis results support six of the eight hypotheses, and one hypothesis has mixed support. The most influential variables in rank order of importance are Pricing, Staffing, and Production and inventory. These results indicate high and low performing firms exhibit different BCM behaviors.

The logit analysis

The conditional logit used appropriately models a dichotomous dependent variable with fixed effects for each of the industry pairs, thus controlling for industry. These estimates also include controls for the firms' average return on assets between 1994 and 1999, potential slack (total assets to stockholder equity), available slack (liquidity – current assets divided by current liabilities), and absorbed slack (SG&A to Sales) s , all prior to the period used for data coding. Using a conditional logit with effects for

	<i>n</i>	Standard errors
Staffing	1.263 *	0.609
Production and inventory	0.845	0.722
Supply chain management	- 0.845	0.923
Accounts receivable and credit	0.524	0.616
Capital expenditures	1.083 +	0.561
Capital financing	0.411	0.623
Acquisitions and divestitures	0.405	0.484
Pricing	0.0709	0.793
Advertising and product mix	2.296 *	0.996
Debt to equity	- 0.0329	0.0741
Liquidity	1.261 +	0.699
SGandA to sales	- 4.226	4.658
Return on assets	-52.26	37.69
Constant	- 0.136	1.184
Observations	70	

Table IV.
Logit estimates: high
versus low performance

each pair, the estimates indicated the conditional estimator was unnecessary so we report a conventional logit (Table IV).

Of the nine variables, only Staffing, Capital expenditures, and Advertising and product mix have statistically significant coefficients. All are in the expected positive direction. We suspected the lack of results reflected the large number of variables relative to observations so we used factor analysis to reduce the data dimensionality.

A principal components exploratory factor analysis with orthogonal (varimax) rotation found three factors with eigenvalues greater than 1.0. Examination of the scree graph also indicated three factors. The three retained factors account for 58 percent of the variance of the data. Table V displays the results. The three factors appear to represent supply, capital, and demand related items and appear to agree with the structure used in Figure 1 to group the hypotheses.

	Factor 1 Supply	Factor 2 Capital	Factor 3 Demand
Supply chain management	0.80	- 0.05	0.30
Production and inventory	0.74	- 0.09	0.23
Staffing	0.69	0.19	- 0.04
Acquisitions and divestitures	- 0.13	0.76	0.10
Capital expenditures	0.09	0.56	0.00
Capital finance	0.59	0.53	0.00
Accounts receivable and credit	0.40	0.48	0.11
Advertising and product mix	0.23	- 0.14	0.81
Pricing	0.07	0.38	0.76
Eigenvalues	2.85	1.37	1.03
% of variance	31.6	15.2	11.5

Table V.
Factor analysis results
and factor loadings

Factor 1 reflects supply. With an eigenvalue of 2.85 and accounting for 31.6 percent of the variance, this factor includes three variables with a value of 0.4 or higher

- Supply chain management (0.80);
- Production and inventory (0.74); and
- Staffing (0.69).

Capital finance loaded approximately equally heavily on Factor 1 and 2 (0.59 and 0.53 respectively). We discuss it with Factor 2 because of a better fit, recognizing that it loads roughly equally on each factor. Factor 2 reflects capital. With an eigenvalue of 1.37 and accounting for 15.2 percent of the variance, this factor includes:

- Acquisitions and divestitures (loading of 0.76);
- Capital expenditures (0.56);
- Capital finance (0.53); and
- Accounts receivables and credit (0.48).

Factor 3 reflects demand. With an eigenvalue of 1.03 and accounting for 11.5 percent of the variance, the third factor labeled “Demand” includes Advertising and product mix (0.81) and Pricing (0.76). Estimating the conditional logit with factor scores and four control variables produces the results in Table VI.

All three of the factor scores have statistically significant, positive parameter estimates in the logit model. In addition, liquidity has the same positive coefficient it had in the full model, and ROA has the same negative coefficient it had in the full model. The negative coefficient on ROA may appear surprising, but the dependent variable is based on stockholder returns. Firms with low ROA before the coding period have more room for drastic increases in performance during the observation period.

The factor analysis

Further scrutiny of the factor analysis results leads to a very interesting observation consistent with the literature on the difficulties of knowledge transfer within organizations (e.g. Szulanski, 2000). In particular, the results suggest that firms that use BCM behaviors in one dimension such as demand or supply do not generally use them in other dimensions. Indeed, if firms adopted BCM across the full range of

Variables	Parameter	Standard error
Supply factor score	1.045 **	0.373
Capital factor score	1.368 **	0.478
Demand factor score	0.905 *	0.356
Equity to debt	-0.0584	0.0589
Liquidity	0.992 +	0.571
SG&A to sales	-2.543	4.109
Return on assets	-60.01 +	34.71
Constant	0.150	1.025
Observations	70	

Table VI.

Logit of performance group on factor scores

Notes: * $p < 0.05$, ** $p < 0.01$; *** $p < 0.001$; + $p < 0.1$. Dependent variable: 1 = High performance group; 0 = low performance group

activities, we would have expected factor analysis to yield just one, not three BCM factors. Instead, the empirical results finding three BCM factors suggest that firms do not have comprehensive BCM strategies. The nine BCM variables have median correlations of 0.23 (average of 0.22) and range from -0.09 to 0.58 suggesting that doing BCM in one area is not highly correlated with doing BCM in other areas.

Operationally, this means that just because a firm's marketing or finance department may exhibit BCM behaviors, such behavior may not necessarily transfer over to, say, the staffing or operations management departments. Such differences in BCM behaviors fit a pattern of localized learning described in Cyert and March (1963). In particular, firms respond to problems identified in a particular area by searching for solutions in that area. For example, low sales may trigger search in the marketing and sales area, potentially finding BCM practices for that area.

Conclusions, limitations, and future research

This study offers the first empirical test of the association of firm performance with a comprehensive set of BCM behaviors across a broad range of firm activities and a broad sample of firms and industries. The results provide preliminary support for claims in the prescriptive literature that business cycle-sensitive management behaviors help explain observed heterogeneities in firm performance.

This initial study suffers from several limitations. The relatively small sample of large US firms over a single recessionary interval limits generalizing its conclusions. This study addressed nine types of BCM behaviors; additional BCM behaviors may positively associate with performance. The extensive pre-training of our MBA team coders notwithstanding, the data also came from a Likert scale scoring process that introduces questions of judgment and subjectivity. The empirics focused narrowly on the association of BCM behaviors with performance without attempting to estimate a model that would more directly test causal relations. The coding relied on public information and so did not explore in-depth the operation of BCM and standard routines.

Directly from these limitations come numerous topics for future research:

- identify and explore additional kinds and details of BCM activities;
- test the impact of BCM behaviors on performance using larger samples and historical data over multiple turning points of the business cycle; and
- examine the tradeoffs involved in BCM, e.g. extremely high sensitivity to potential recessions may cause the firm to make changes for anticipated recessions that do not occur while extremely low sensitivity causes the firm to ignore recessions and thereby cause the difficulties noted in this paper.

From a practitioner perspective, this research also offers empirical support for BCM prescriptions that firms appear to have largely ignored in the absence of strong empirical support for those prescriptive measures. Altogether, we fully recognize the limitations of this preliminary study. However, we do hope strong empirical association we have found between BCM behaviors and performance will nonetheless open the door to future work in what is arguably one of the most underdeveloped research streams in management – how firms should and do react to movements in the business cycle.

Overall, this paper offers the first analysis of the association of BCM with differences in firm performance that considers a range of functional behaviors. The results offer encouragement for future research and application in this exciting area.

Note

1. The term “business cycle” describes the variation in the level of economic activity over time. While numerous indicators reflect the level of economic activity, economists rely most on the growth rate of real Gross Domestic Product (GDP), a nation’s economic output adjusted for inflation, to chart movements in the business cycle. Those movements entail periods of expansion or rapid and positive economy growth, and those of contraction or recession with a stagnant or negative economic growth.

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