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Business Cycles and the Relation between Security Returns and Earnings

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Abstract. This paper examines business cycle variation in the earnings-returns relation. Earnings are more persistent when growth rates are high (i.e., in an expansion) than when growth rates are low (i.e., in a recession). Earnings are more persistent when production is high (i.e., in a credit crunch period) than when production is low (i.e., in a reliquification period). Relatedly, earnings response coefficients are larger in expansions (credit crunch periods) than in recessions (reliquification periods). Thus, earnings persistence and earnings response coefficients are positively associated with the rate of growth in economic activity and the level of economic activity.

Prior research documents time series instability in earnings response coefficients (ERCs). Lev (1989, 168) points out that instability in the relation between stock returns and earnings calls into question the usefulness of earnings in explaining current returns. This paper examines whether time series instability in earnings response coefficients can be at least partially explained by "normal" fluctuations in business conditions. If variation in earnings response coefficients can be attributed to changes in the economic environment facing a firm, then our belief in the usefulness of earnings is increased and our understanding of how earnings disclosures are used by the market to assess firm value is enhanced.

This research also speaks to financial statement analysis, the goal of which is the determination of the value of corporate securities by a careful examination of key value-drivers, such as earnings, risk, growth, and competitive position. This study adds to our understanding of how securities are valued by demonstrating the impact of changing business conditions on the market's evaluation of accounting information. Similar to the conclusions drawn by Lev and Thiagarajan (1993), this study supports the importance of a contextual analysis of financial statement information.

The macroeconomics literature is used to document how different stages of the business cycle—expansion, recession, credit crunch, and reliquification—reflect variation in the aggregate investing and financing opportunity set. Variation in investing and financing opportunities implies variation in how the market uses information in earnings announcements to revise expectations of future cash flows. This variation leads to predictions about intertemporal variation in earnings persistence and earnings response coefficients (ERCs) across business cycle stages.

Results from a sample of 53,324 quarterly earnings announcements by Value Line firms over the period January 1970–September 1987 indicate that earnings persistence and ERCs vary across the business cycle with changes in the aggregate investment opportunity set.

Earnings persistence and ERCs are lower in recessions (when investment opportunities are limited), than in expansions (when investment opportunities are high). Earnings persistence and ERCs also vary across the business cycle with changes in the aggregate financing opportunity set. Earnings persistence and ERCs are higher in credit crunch periods (when the high cost and limited availability of external financing magnify the benefits of internally generated funds) than in reliquification periods (when external financing is readily available and its cost is low). Investment opportunities are plentiful when economic growth rates are high, and financing opportunities are limited when the level of economic activity is high. Thus, these results imply that earnings persistence and earnings response coefficients are positively associated with both economic growth rates and the level of economic activity.[1]

The remainder of the paper is organized as follows. Characteristics of business cycles are discussed in Section 1. Hypotheses are developed in Section 2. Sample selection is described in Section 3, and the method and results are discussed in Section 4. In Section 5, a summary and conclusions are presented.

1. A Brief Introduction to Business Cycles

Macroeconomics is the study of the distribution of economic activity over time. Macroeconomists typically describe the macroeconomy in terms of an irregular pattern of expansion and contraction in economic activity around a trend growth path, where fluctuations around the trend are referred to as business cycles. Figure 1 displays the stages of the typical business cycle. The remainder of this section describes how the investment and financing opportunity set varies over time as the economy moves through the business cycle from expansion, to credit crunch, to recession, to reliquification, and on to the following expansion.[2] This discussion serves as the basis for the hypotheses developed in Section 2.

1.1. Expansion

Since the U.S. economy is characterized by continuous technological progress, positive capital accumulation and a steady increase in the working age population, the "normal" state of the economy is positive growth. Therefore, no special explanation for the expansion phase of the business cycle is required. Expansions are uniquely characterized by high growth rates, but include periods of both low and high levels of aggregate production.

1.2. Credit Crunch

Eckstein and Sinai (1986) define a credit crunch to be a period of tight money and high real interest rates. As Figure 1 shows, credit crunches occur around a cyclical peak in productive activity and span the later months of an expansion, as well as the early months of the ensuing recession. In early 1991, Federal Reserve Chairman Alan Greenspan

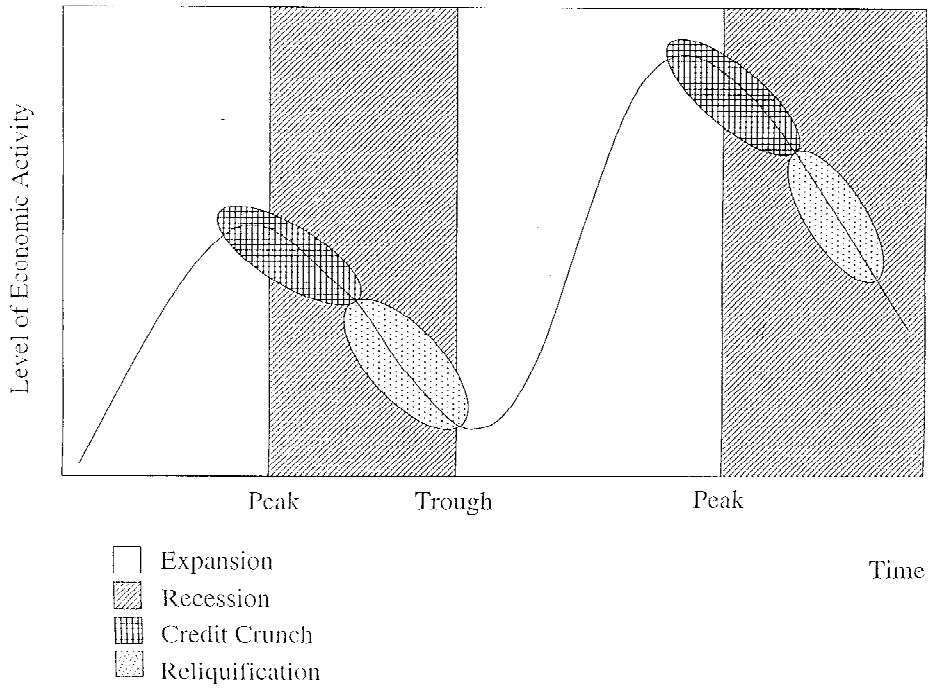

Figure 1. A typical business cycle.

pointed out the significant economic impact of credit crunches when he stated, "We currently see the credit crunch as the most critical issue confronting monetary policy" (*Business Week*, 1991). Crunches arise from a combination of loan demand pressure and reduced supply of funds (Sinai, 1976). On the demand side, firms' ability to generate funds from operations is insufficient to finance desired investment projects, resulting in curtailed investment and increased reliance on external financing. On the supply side, Federal Reserve curtailment of growth in bank reserves is often a contributing factor.

1.3. Recession

A recession covers the period beginning at a business cycle peak and continuing through the interval of absolute decline in the level of physical activity. As the decline begins, businesses curtail spending commitments and adjust inventories. The size of the adjustments depends on the extent of revision in expectations during the period immediately preceding the peak and the forecast of the severity and length of the downturn. In contrast to an expansion, recessions are characterized by low growth rates. Like ex-

pansions, however, recessions include periods of both low and high levels of aggregate production.

1.4. Reliquification

Reliquification consists of the financial restructuring that occurs during a business cycle trough. A reliquification typically spans late recession and early recovery periods (Sinai, 1976), hence is characterized by a low level of economic activity. After a recession begins, firms impose hiring freezes or layoffs, defer capital expenditures, and reduce inventories. As a result, cash inflows increase and financial position improves. In effect, during a reliquification, financial factors have an impact that is the reverse of their influence during credit crunch periods. Financial assets are accumulated and liabilities are reduced. For example, the *Wall Street Journal* (1991b) describes the most recent reliquification, which occurred at the end of 1991, in the following terms:

> "The retirement of debt may set the stage for an economic rebound because it frees up cash for companies to spend and puts them in position for another round of financings which can be plowed directly into capital spending. Indeed, in a disappointing year for the economy, the balance sheet progress of corporate America is one of the few bright spots."

Finally, as monetary policy eases and the banking system's reserve position improves, interest rates fall and the stage is set for a new expansion.

1.5. Measurement of Business Cycle Stages

Since the official labeling of business cycle expansions and recessions by the National Bureau of Economic Research (NBER) occurs after the fact, NBER dates may not reflect market expectations about unfolding business conditions. As a result, the recession and expansion stages of the business cycle are operationalized using one-quarter ahead forecasts from Data Resources, Inc. (DRI), the nation's largest economic forecasting firm. Since DRI's forecasts are purchased by three-quarters of Fortune 1000 firms and are frequently used by state and federal government agencies in policy simulations, they should reflect market expectations.[3] Further, the NBER does not provide definitions of credit crunch and reliquification periods. Thus, DRI's ex-post definitions of these two stages are used.[4,5] Table 1 displays the DRI model's one-quarter ahead forecasts of expansions and recessions and the dates used by DRI to define credit crunch and reliquification stages over the period 1970–1987, the 18 years covered by the sample used in this study (see Section 3). As a comparison, NBER dating of expansions and recessions is also presented. Table 1 indicates that during the early 1970s there is a closer correspondence between DRI's forecasts and subsequent NBER dating than there is during the late 1970s and early 1980s.

Table 1. Stages of the business cycle: 1970–1987.

Panel A. DRI and NBER definitions of recession and expansion episodes.

Quarters of Occurrence			
Data Resource, Inc. Forecasts		NBER Dating	
Recession	Expansion	Recession	Expansion
1970:1–1970:3	1970:4–1973:3	1969:4–1970:4	1971:1–1973:3
1973:4–1974:1	1974:2–1978:3	1973:4–1974:4	1975:1–1980:1
1978:4–1980:4	1981:1–1981:3	1980:2–1981:2	1981:3–1982:4
1981:4–1982:1	1982:2–1982:3		
1982:4–1982:4	1983:1–1987:4		

Panel B. DRI definitions of credit crunch and reliquification episodes.

Quarters of Occurrence	
Credit Crunch	Reliquification
1970:1–1970:1	1970:2–1971:2
1973:1–1974:3	1974:4–1976:2
1978:2–1980:1	1980:2–1980:3
1981:1–1981:4	1982:1–1983:2

2. Hypothesis Development

Using the market/book ratio as a proxy for intertemporally changing investment opportunities, Collins and Kothari (1989) provide evidence that earnings persistence varies through time, but do not identify the economic factors associated with this time-variation. In this section, the description of the typical business cycle presented in Section 1 is used to develop hypotheses about the effects of changes in both the investment and financing opportunity sets on earnings persistence. Since time variation in earnings persistence implies time variation in the response of equity returns to earnings announcements, hypotheses about variation across business cycle stages in the earnings-returns relation are also developed.

The two business cycle stages that represent variation in the aggregate availability of investment opportunities can be characterized by time varying economic growth rates (high in an expansion, low in a recession), and the two business cycle stages that represent variation in the aggregate availability of financing opportunities can be characterized by time variation in the level of economic activity (high in a credit crunch, low in a reliquification). Thus, the hypotheses address how earnings persistence and ERCs vary with economic growth rates and the level of economic activity.[6]

2.1. Cyclical Variation in the Economy-Wide Investment Opportunity Set

Economic activity is more efficient when concentrated over space. For example, it is cheaper to sell cameras in midtown Manhattan than anywhere else in the country because the density

of camera buyers is so high. Buyers are dense because Manhattan is a major emporium for goods of all types and because there is a wider selection of cameras at much lower prices than anywhere else. Economic activity is also more efficient when concentrated over time. In fact, the assumption that "thick-market" efficiencies encourage the concentration of investing activity during certain time periods underlies the temporal aggregation models developed by Diamond (1982) and Rogerson (1988).

For several reasons, investing activities undertaken in an expansion are more efficient than investing activities undertaken in a recession. Inventory holding costs fall during an expansion because higher inventory turnover implies lower interest and storage costs and may also result in lower depreciation costs for semidurables and lower obsolescence costs for fad and technological goods. Selling costs are lower in expansions because a higher density of buyers makes possible higher utilization of salespeople and facilities and permits greater specialization. On the buying side, higher specialization of sellers and salespeople and lower search and transportation costs mean greater efficiency in purchasing intermediate inputs. For established purchasing relationships, expansions also imply lower transportation costs.

Although the most obvious thick-market economies apply to selling, buying, and distributing goods and services, the economies extent to actual production as well. In an expansion, components are available in much greater variety. Expansions are also characterized by more specialized workers and services. Perhaps most important, workers and facilities in expansions achieve higher utilization rates.

In a dynamic, competitive economy, investment opportunities that earn economic returns are short-lived. A recession—particularly of the magnitude of the Great Depression—can be characterized as the absence of networks that make possible the efficiencies associated with high rates of economic growth. In the absence of these networks, it will be more difficult for a firm to capitalize on investment opportunities and, consequently, when these opportunities do exist, they will be shorter-lived. Earnings provides information about a firm's ability to find profitable investment opportunities. Since it is easier to capitalize on investment opportunities in expansions, earnings will be more persistent in expansionary periods. Thus, I predict that:

Hypothesis 1A. Ceteris paribus, earnings are more persistent in expansions than in recessions.

Discounted cash flow valuation models imply that earnings response coefficients are a positive function of the extent to which information in earnings announcements results in revisions to expected future earnings. Support for a positive relation between earnings response coefficients and earnings revisions (i.e., earnings persistence) has been found by Kormendi and Lipe (1987), who estimate earnings persistence from univariate time series models and by Easton and Zmijewski (1989), who estimate persistence as the magnitude of the revision in analysts' forecasts of future earnings in response to an earnings announcement. The models in both papers allow persistence to vary across firms, but not across time. By analogy, time-variation in earnings persistence implies time-variation in earnings response coefficients. Thus, I predict that:[7]

Hypothesis 1B. Ceteris paribus, earnings response coefficients are higher in expansions than in recessions.

2.2. Cyclical Variation in the Economy-Wide Financing Opportunity Set

In perfect capital markets, economic decisions are independent of financial structure (Modigliani and Miller, 1958). Current earnings are positively correlated with expected future cash flows because current earnings signal the firm's ability to find and exploit profitable investment projects. In contrast, when market imperfections exist,[8] access to financing influences the value of the firm (Meyer and Kuh, 1957), and current earnings also signal the firm's ability to internally generate the funds necessary to finance desired investment expenditures.[9] These market imperfections create a financing hierarchy in which internal funds are less costly than debt, which, in turn, is less costly than issuing additional equity (Myers, 1984).

Consider the impact of a cost differential between internal and external funds on the cost of funding a given level of investment expenditures. When the cost of funds is constant across funding sources (i.e., there is no financing hierarchy), a change in the composition of funding sources has no impact on the total cost of financing a given level of investment expenditures. In contrast, when the marginal cost of an additional dollar of investment varies across funding sources, an increase in the pool of lower-cost internal funds allows the firm to substitute out of the higher cost sources, thereby reducing total cost.

In the former situation, the level of investment expenditures is unassociated with the funding source, while in the latter situation, there will be a positive association between the availability of internal funds and investment expenditures. More generally, the greater the cost differential between internal and external funds, the more sensitive investment expenditures will be to a change in the availability of internal funds.

The cost differential between internal and external funds is greater during a credit crunch period than during a reliquification period. Anecdotal evidence that banks tighten lending during credit crunch periods comes from the Chairman of Continental Bank who, when asked whether the 1991 credit crunch would ease if Fed policy loosened, replied:

> "I don't think lower interest rates will induce bankers to lend more . . . When a large loan, say for $300 million, comes along now, our ability to organize a global syndicate is poorer today than it was a year ago. A typical reaction of other banks is that they don't want more assets or they are now lending only in their own areas. A lot of additional filters are applied" *Wall Street Journal* (1991a).

Consistent with this evidence, Harris (1974) finds that during tight credit periods: a) compensating balance requirements are higher; b) loan maturity is shorter; and c) creditworthiness standards are higher than at other points in the business cycle.[10] Additionally, interest rate spreads between risky and safe debt widen (Gertler, Hubbard, and Kashyap, 1990). In contrast, during the reliquification period following a crunch, interest rate spreads decrease and loan terms begin to ease, implying a lower cost differential between internal and external funds.

Table 2. Sample selection criteria for the sample of Value Line earnings forecasts.

	Firm-quarters
Total	93,446
Less: missing realized earnings per share	(3,402)
Less: stock splits and dividends	(3,732)
Less: missing earnings announcement dates	(3,055)
Less: forecast date out of bounds	(8,193)
Less: missing stock price data	(4,486)
Less: trimmed observations	(1,800)
Less: firm not followed by CRSP	(5,207)
Less: missing returns data	(8,007)
Less: firms with fewer than 20 observations	(2,240)
Complete Sample	53,324

Since the cost differential between internal and external funds is higher during a credit crunch period than during a reliquification period, investment expenditures will be more sensitive to changes in the availability of internal funds. Internal funds vary positively with earnings, implying an increased sensitivity of investment to earnings during credit crunch periods. If there is a positive relation between current investment and future profits, an increased sensitivity of current earnings to investment also implies greater earnings persistence and higher ERCs. Thus, I predict that:

Hypothesis 2A. Ceteris paribus, earnings is more persistent in credit crunch periods than in reliquification periods.

Hypothesis 2B. Ceteris paribus, earnings response coefficients are larger in credit crunch periods than in reliquification periods.

3. Sample Selection

The hypotheses about earnings persistence are tested by regressing actual quarterly earnings on lagged quarterly earnings and indicator variables that allow the regression intercept and slope coefficient to vary across business cycle stages. Similarly, the hypotheses about earnings response coefficients are tested by regressing cumulative abnormal returns on unexpected earnings and indicator variables which capture shifts in the regression intercept and slope coefficient over the business cycle. Variables which control for time-varying discount rates and for cross-sectional variation in earnings response coefficients are also included in tests of the earnings response coefficient hypotheses. This section describes the procedures used in construction of the sample. These procedures are summarized in Table 2.

3.1. Definition of Unexpected Earnings

Hypothesis tests will be sensitive to error in the measurement of market expectations. Analysts' forecasts are selected because they measure market expectations with less error than do forecasts from time series models (Brown et al., 1987). Further, quarterly rather than annual data are used to avoid calendar and industry clustering. Since quarterly analyst earnings forecasts are not available in machine readable form over a time period which spans several business cycles, I hand collected Value Line forecasts for all 2,208 of the non-utility, non-financial, and non-foreign domiciled firms covered by Value Line over the period January 1970 (when Value Line first began publishing quarterly forecasts) through December 1987. The data set contains earnings forecasts for 93,446 firm-quarters. Since firms covered by Value Line comprise 96% of the NYSE and AMEX trading volume (Value Line, 1986), the sample is representative of firms on these exchanges. Additional information about sample selection criteria is discussed below and summarized in Table 2.

To ensure a proper correspondence between earnings forecasts and subsequent earnings realizations (Philbrick and Ricks, 1991), realized earnings per share were collected from the first issue of the *Value Line Investment Survey* in which the realization appeared. Realized earnings per share were unavailable for 3,402 observations. An additional 3,732 observations were deleted because there was a stock split or dividend between the earnings forecast date and the first date that the earnings realization appeared in Value Line. Earnings announcement dates were obtained from the Quarterly COMPUSTAT and Back Quarterly COMPUSTAT tapes. Missing earnings announcement dates were hand collected from the *Wall Street Journal Index*. Earnings announcement dates for 3,055 observations were unavailable from either data source.

Unexpected earnings per share (UE) are defined as the difference between the reported number (from Value Line) and Value Line's per share forecast, deflated by share price:

$$UE_{it} = (EPS_{it} - FEPS_{it})/P_{i,t-1} \tag{1}$$

where:

EPS_{it} = realized earnings per share as first reported in Value Line,

$FEPS_{it}$ = Value Line's forecast of earnings per share, and

$P_{i,t-1}$ = market value of equity per share at the end of the third month prior to the month in which earnings were announced.

For each observation, the earnings forecast closest to the earnings announcement date, but preceding it by no more than 100 calendar days, was selected. 8,193 firm-quarters were deleted because no forecasts met this screen. Forecast errors were then deflated by price (Christie, 1987), which was unavailable for 4,486 firm-quarter observations. Finally, to reduce measurement error, the 99th and 1st percentiles of the unexpected earnings distribution were truncated.

3.2. Definition of Abnormal Returns

Abnormal returns for firm i at time t (AR_{it}) were calculated as:

$$AR_{it} = R_{it} - a_{it} - b_{it}R_{mt} \tag{2}$$

where:

R_{it} = dividend adjusted return for firm i on day t,

R_{mt} = equal-weighted market index on day t, and

a_{it} and b_{it} = the market model parameters obtained from a regression of R_{it} on R_{mt} over the 100-trading day period ending 60 days prior to the earnings announcement date.

Missing returns data reduced the sample by 13,214 firm-quarters.

For two reasons, tests are conducted by cumulating daily abnormal returns over a two-day period ending on the day that earnings are announced. First, Bernard (1987) documents that the use of daily data reduces bias in standard errors resulting from cross-sectional correlation in returns data. Second, the use of shorter event windows reduces noise, thus increasing the power of hypothesis tests (Brown and Warner, 1985). In particular, the four hypotheses examine how the relation between earnings and returns varies, conditioned upon the market's perception that the economy is in a particular stage of the business cycle. Using a long window introduces noise resulting from changes in the market's expectations about the current or expected future level of economic activity.

3.3. Cross-sectional Earnings Response Coefficient Control Variables

Failure to control for factors that cause cross-sectional variation in earnings response coefficients results in misspecification of the earnings-returns relation. Accounting researchers have identified three factors that are associated with cross-sectional variation in ERCs. These factors are summarized by Lipe (1990), who presents a discounted cash flow model in which earnings response coefficients are positively associated with earnings persistence and earnings predictability and negatively associated with the discount rate (which varies cross-sectionally with firm-specific risk). Each of these factors is defined below.

Following Easton and Zmijewski (1989), earnings persistence is defined as the revision in expected future cash flows in response to an earnings announcement and is measured as α_1, the slope coefficient from a firm-level regression of revisions in analysts' forecasts on (undeflated) unexpected earnings:

$$FEPS_{i,t+1|t} - FEPS_{i,t+1|t-1} = \alpha_{0,i} + \alpha^*_{1,i}(EPS_{i,t} - FEPS_{i,t|t-1}) \tag{3}$$

where:

$EPS_{i,t}$ = firm i's time t earnings per share realization, and

$FEPS_{i,t|t-1}$ = forecast of firm i's time t EPS released by the analyst at time $t-1$.

Thus, α_1 captures variation across firms in earnings persistence, but does not capture the variation through time in a given firm's earnings persistence that underlies all of the four hypotheses. Second, earnings predictability for firm i is measured as the variance in firm i's (unscaled) unexpected earnings. The higher the error variance, the lower the predictive power of past earnings with respect to future earnings. The larger the forecast error variance, the less predictable the firm's earnings. Thus, the predictability measure is negatively associated with earnings response coefficients. Third, variation in discount rates which results from differences across firms in the degree of firm-specific risk is measured as the slope coefficient (β_{it}) from the market model regression described above. Firms with fewer than 20 observations to measure persistence or predictability were deleted from the sample, resulting in a loss of 2,240 firm-quarters and a final sample size of 53,324 firm-quarters.

3.4. Time-Varying Components of the Discount Rate

In addition to varying cross-sectionally, discount rates also vary across time. Previous research has identified four time-varying discount rate components. Fama (1990) and Fama and French (1989) document that expected returns vary through time with variation in the term premium, the default premium, and the dividend yield. Collins and Kothari (1989) show that ERCs are negatively associated with the risk-free rate of interest. Consistent with Fama and French and Collins and Kothari, the contribution of each of the four components to expected returns in the earnings announcement month is defined as follows:

T-Bill[11] = one-month Treasury bill returns, a proxy for the risk-free rate,

DivYield = the dividend yield on the equal-weighted NYSE portfolio, computed by summing monthly dividends on the portfolio for the preceding 12 months and dividing by the value of the portfolio at the end of month t, if dividends are never reinvested,

Term = the term spread, defined as the difference between the month t yield on the Aaa (Moody's rating) corporate bond portfolio and the one-month Treasury bill rate, and

Default = the default spread, defined as the difference between the month t yield on a portfolio of 100 corporate bonds, sampled to approximate an equal-weighted portfolio of all corporate bonds, and the month t yield on a portfolio of Aaa bonds.

Standard discounted cash flow valuation models imply that the magnitude of the stock market reaction to an earnings announcement equals the revision in expected future cash flows induced by the earnings announcement, *discounted* at expected future rates of return. Since the hypotheses predict time variation in the magnitude of the stock market's revision to expected future cash flows, at first glance it would appear that hypotheses tests should

control for the effects of the components of time varying-returns defined above. However, Fama (1990), Fama and French (1989), and Chen, Roll, and Ross (1986) show that the time varying components of discount rates are correlated with business conditions, and Fama (1990) identifies three sources of time-variation: a) shocks to expected cash flows; b) time-varying expected returns;[12] and c) shocks to expected returns.[13] Thus, inclusion of the time-varying components as control variables could eliminate the phenomenon of interest. To the extent that their variation is driven by changes in the aggregate investing and financing opportunity set, controlling for them is synonymous with controlling for the very factors underlying the hypotheses. Consequently, the hypotheses will be tested both with and without these "controls."

3.5. Descriptive Statistics

Table 3 presents sample means by decile for key variables used in the analysis. Consistent with findings by other authors (e.g., O'Brien, 1988), the unexpected earnings distribution is skewed toward negative forecast errors (i.e., mean realized earnings per share are less than the corresponding forecast). The mean persistence coefficient is 0.38, implying that unexpected earnings of $1.00 results, on average, in a $0.38 revision in the following quarter's earnings forecast. The mean predictability estimate, i.e., the mean variance in (unscaled) UE, is 0.07. As is expected from a sample which includes the majority of NYSE firms, the mean estimate of systematic risk, 1.11, is close to one. The Dividend Yield exhibits less variation than do the other three components of the discount rate.

Stages of the business cycle are measured using forecasts from the DRI model and DRI's ex-post definitions of credit crunch and reliquification periods, as discussed in Section 2. Table 4 presents sample means for key variables (except the three cross-sectional determinants of ERCs, which are intertemporal constants) across these four stages of the business cycle. Mean earnings forecast errors (UE) are negative in all four states and are smallest in recession and reliquification periods, suggesting that, in aggregate, analysts' forecast errors are not independent of the business cycle. Variation across the business cycle in cumulative abnormal returns mirrors variation in UE. All four discount rate components vary with the business cycle, but the variation in the Dividend Yield is slight. The one-month T-Bill return is largest in recession and crunch states, the default premium is largest in recession and reliquification states, and the term premium is largest in expansion and reliquification stages.

4. Method and Results

4.1. Tests of Hypotheses 1A and 2A: Time-Variation in Earnings Persistence across Business Cycle Stages

In Hypothesis 1A it is argued that, ceteris paribus, cyclical variation in the aggregate investment opportunity set implies that earnings will be more persistent in economic expan-

Table 3. Sample means by decile.

	UE	CAR	Beta	Persistence	Predictability	T-Bill	Term	Default	Div Yield
Decile Means									
1	−.0360	−.0756	0.25	0.00	0.005	.0032	−.0075	.0006	.0013
2	−.0095	−.0341	0.54	0.13	0.011	.0040	.0056	.0018	.0016
3	−.0045	−.0200	0.71	0.20	0.016	.0045	.0164	.0023	.0018
4	−.0020	−.0107	0.85	0.26	0.024	.0049	.0235	.0036	.0019
5	−.0005	−.0032	0.98	0.32	0.033	.0053	.0287	.0046	.0021
6	.0002	.0034	1.12	0.39	0.044	.0061	.0325	.0058	.0023
7	.0003	.0112	1.27	0.45	0.059	.0069	.0356	.0071	.0026
8	.0030	.0214	1.45	0.54	0.082	.0075	.0383	.0088	.0030
9	.0064	.0364	1.70	0.65	0.118	.0086	.0405	.0106	.0035
10	.0102	.0797	2.25	0.89	0.311	.0114	.0487	.0126	.0042
Sample Mean									
	−.0002	.0009	1.11	0.38	0.070	.0062	.0262	.0058	.0024
Sample Median									
	−.0000	.0003	1.05	0.35	0.038	.0056	.0302	.0050	.0022
Sample Standard Deviation									
	.0160	.0428	0.57	0.26	0.127	.0024	.0166	.0038	.0009

Note: CAR = abnormal returns cumulated over the two-day period ending on the earnings announcement date.
UE = unexpected earnings per share, deflated by share price at the end of the third month preceding the month in which earnings were announced.
Beta = slope coefficient from a regression of firm i's dividend-adjusted return on the equal-weighted market index over the 100-day period ending 60 days prior to the earnings announcement date.
Persistence = slope coefficient from a regression of Value Line's revision in firm i's quarter $t+1$ forecast on firm i's quarter t unexpected earnings.
Predictability = variance of firm i's unexpected earnings.
T-Bill = one-month Treasury Bill return.
Term = the difference between the month t yield on the Aaa corporate bond portfolio and the 1-month Treasury bill rate.
Default = the difference between the month t yield on a portfolio of corporate bonds and the month t yield on a portfolio of Aaa bonds.
Div Yield = the dividend yield on the equal-weighted NYSE portfolio.

sions (when economic growth rates are high) than in recessions (when economic growth rates are low). In Hypothesis 2A it is argued that, ceteris paribus, cyclical variation in the financing opportunity set implies that earnings will be more persistent during a credit crunch (when the level of economic activity is high) than during a period of reliquification (when the level of economic activity is low). As Table 1 and Figure 1 indicate, the four stages of the business cycle on which the two hypotheses are based overlap. Thus, the hypotheses are tested together via a pooled time-series, cross-sectional regression in which actual quarterly earnings per share in period t, EPS_t, is regressed on actual quarterly earnings per share lagged four quarters, EPS_{t-4}, and indicator variables that allow the regression intercept and slope coefficient to vary across the four stages of the

Table 4. Sample means by stage of the business cycle. (Standard deviations in parentheses.)

Variables[b]	State of the Economy[a]				
	Expansion	Recession	Crunch	Reliquification	All States
CAR					
	0.0014*	−0.0009***	0.0026****	−0.0007***	0.0009
	(0.0422)	(0.0452)	(0.0432)	(0.0461)	(0.0428)
UE					
	−0.0018***	−0.0036****	−0.0006****	−0.0035****	−0.0022
	(0.0152)	(0.0192)	(0.0155)	(0.0189)	(0.0160)
T-Bill					
	0.0060****	0.0076****	0.0078****	0.0061****	0.0063
	(0.0060)	(0.0025)	(0.0023)	(0.0025)	(0.0024)
Term					
	0.0281****	0.0185****	0.0064****	0.0326****	0.0262
	(0.0157)	(0.0177)	(0.0128)	(0.0105)	(0.0166)
Default					
	0.0053****	0.0076****	0.0049****	0.0073****	0.0058
	(0.0039)	(0.0029)	(0.0039)	(0.0030)	(0.0038)
Div Yield					
	0.0023****	0.0029****	0.0027****	0.0025****	0.0024
	(0.0008)	(0.0009)	(0.0009)	(0.0009)	(0.0009)

Note:
[a]Recession, expansion, crunch, and reliquification as defined by Data Resources, Inc. (see Table 1).
[b]See Table 3 for variable definitions.
**** = Mean is significantly different from the mean across all states at the 0.0001 level.
*** = Mean is significantly different from the mean across all states at the 0.001 level.
** = Mean is significantly different from the mean across all states at the 0.01 level.
* = Mean is significantly different from the mean across all states at the 0.1 level.

business cycle:

$$EPS_t = \alpha_0 + \alpha_1^* EPS_{t-4} + \alpha_2^* EPS_{t-4}^* EXP_t + \alpha_3^* EPS_{t-4}^* CRUNCH_t + \alpha_4^* EPS_{t-4}^* RELIQ_t + \alpha_5^* EXP_t + \alpha_6^* CRUNCH_t + \alpha_7^* RELIQ_t + \varepsilon_t, \quad (4)$$

EPS_t = actual earnings per share in quarter t, as initially reported in the Value Line Investment Survey,

EXP_t = a dummy variable equal to 1.0 if earnings are announced during a period predicted to be an expansion by one-quarter ahead forecasts from the DRI model,

$CRUNCH_t$ = a dummy variable equal to 1.0 if earnings are announced during a period labeled by DRI as a credit crunch, and

$RELIQ_t$ = a dummy variable equal to 1.0 if earnings are announced during a period labeled by DRI as a reliquification.

Table 5. Tests of hypotheses 1A and 2A: regression analysis of variation in earnings persistence across business cycle stages.

$$(4)\quad EPS_t = \alpha_0 + \alpha_1^* EPS_{t-4} + \alpha_2^* EPS_{t-4}^* EXP_t + \alpha_3^* EPS_{t-4}^* CRUNCH_t + \alpha_4^* EPS_{t-4}^* RELIQ_t + \alpha_5^* EXP_t + \alpha_6^* CRUNCH_t + \alpha_7^* RELIQ_t + \varepsilon_t.$$

Explanatory Variables	Coefficients (p-values) Model 1	Model 2
EPS_{t-4}	0.808	0.771
	(.0001)	(.0001)
$EPS_{t-4}^* EXP$		0.032
		(.0001)
$EPS_{t-4}^* CRUNCH$		0.034
		(.0001)
$EPS_{t-4}^* RELIQ$		−0.004
		(.0001)
Constant	0.109	0.082
	(.0001)	(.0001)
EXP		0.021
		(.0004)
CRUNCH		0.025
		(.0001)
RELIQ		0.011
		(.0274)
Adj. $R2$	0.586	0.587

F-test of the Hypothesis that $EPS_{t-4}^* CRUNCH = EPS_{t-4}^* RELIQ$

Difference in Coefficients	0.038
F-Statistic	30.201
p-value	(.0001)

The coefficients α_2, α_3, and α_4 allow the earnings persistence coefficient to shift across stages of the business cycle, and the coefficients α_5, α_6, and α_7 allow the intercept to shift across stages of the business cycle. Since each quarterly earnings occurs during either a recession or an expansion, only two of the three variables EPS_{t-4}, $EPS_{t-4}^* REC$, and $EPS_{t-4}^* EXP$ can be included in the same equation without redundancy. The selection of EPS_{t-4} and $EPS_{t-4}^* EXP$ for inclusion implies $\alpha_2 > 0$ as a test of Hypothesis 1A. In contrast, the credit crunch and reliquification stages do not span all earnings announcement dates, implying that $EPS_{t-4}^* CRUNCH$ and $EPS_{t-4}^* RELIQ$ should be entered into the equation along with EPS_{t-4}. Thus, Hypothesis 2A implies that $\alpha_3 > \alpha_4$.

Results from the estimation of this equation are reported as Model 2 in Table 5. (Model 1 is a benchmark model that excludes business cycle effects.) In support of Hypothesis 1A, the slope coefficient on $EPS_{t-4}^* EXP_t$, α_2, is positive (0.032) and significant ($p = 0.0001$). Thus, consistent with the prediction that earnings persistence is positively associated with the rate of economic growth, earnings are more persistent in economic expansions than in recessions. In support of Hypothesis 2A, the slope coefficient on $EPS_{t-4}^* CRUNCH_t$, α_3, is

estimated to be 0.034 and is significantly larger than the slope coefficient on $EPS^*_{t-4}RELIQ_t$, α_4, which is estimated to be -0.004. Consistent with the prediction that earnings persistence is positively associated with the level of economic activity, earnings are more persistent during the credit crunch periods that occur around business cycle peaks than during the reliquification periods that occur around business cycle troughs.

4.2. Tests of Hypotheses 1B and 2B: Time-Variation in Earnings Response Coefficients across Business Cycle Stages

Since earnings persistence is positively related to both economic growth rates and the level of economic activity, the response of equity returns to quarterly earnings announcements is also expected to be positively related to economic growth rates (Hypothesis 1B) and the level of economic activity (Hypothesis 2B). To examine variation in earnings response coefficients across business cycle stages, I estimate a regression equation in which cumulative abnormal returns are expressed as a function of unexpected earnings and indicator variables that allow the regression intercept and slope coefficient to vary across business cycle stages:

$$\begin{aligned} CAR_{it} &= \alpha_0 + \alpha_1^* EXP_t + \alpha_2^* CRUNCH_t + \alpha_3^* RELIQ_t + \alpha_4^* UE_{it} \\ &\quad + \alpha_5^* UE_{it}^* EXP_t + \alpha_6^* UE_i^* CRUNCH_t + \alpha_7^* UE_{it}^* RELIQ_t + \varepsilon_{it} \end{aligned} \tag{5}$$

where:

CAR_{it} = abnormal returns for firm i at time t, cumulated over a two-day window ending on the earnings announcement date,

UE_{it} = unexpected earnings for firm i at time t, scaled by price at time $t-1$, and other variables are as defined above.

Pearson correlation coefficients between key variables to be used in the regression analysis are displayed in Table 6. Cumulative abnormal returns are positively correlated with earnings forecast errors ($\rho = 0.22$), while earnings persistence is negatively correlated with earnings predictability ($\rho = -0.27$). With the exception of correlations among the discount rate proxies, other pair-wise correlations are small. Correlations among the discount rate proxies parallel those reported by Fama and French (1989). Although not reported in Table 6, correlations among the variables do not vary across the four stages of the business cycle.

The primary tests of Hypotheses 1B and 2B are reported as Model 2 of Table 7. (As before, Model 1 is a benchmark model that omits business cycle effects.) Results from this test strongly support both hypotheses. The coefficient on UE^*EXP, 0.105, is greater than zero at the $p = 0.0002$ level. Thus, consistent with an increase in the aggregate availability of investment opportunities, earnings response coefficients are larger in expansions than in recessions (Hypothesis 1B). An F-test rejects the hypothesis that the coefficient on $UE^*CRUNCH$, 0.181, equals the coefficient on UE^*RELIQ, 0.076, at the $p = 0.0005$ level.

Table 6. Pearson correlation coefficients. (Two-tailed p-values in parentheses.)

Variables	UE	Beta	Persistence	Predictability	T-Bill	Term	Default	Div Yield
CAR	.22	.01	.01	−.01	−.01	−.01	−.02	−.02
	(.00)	(.17)	(.00)	(.01)	(.00)	(.00)	(.00)	(.01)
UE		−.02	.05	−.04	.00	−.05	−.04	−.05
		(.00)	(.00)	(.00)	(.73)	(.00)	(.00)	(.00)
Beta			.03	−.02	−.00	.03	.01	.04
			(.00)	(.00)	(.97)	(.00)	(.01)	(.00)
Persistence				−.27	.02	.02	.04	−.03
				(.00)	(.00)	(.00)	(.00)	(.00)
Predictability					−.01	−.00	−.02	−.04
					(.02)	(.85)	(.00)	(.00)
T-Bill						−.44	.44	.29
						(.00)	(.00)	(.00)
Term							.05	−.28
							(.00)	(.00)
Default								.10
								(.00)

Thus, consistent with a decrease in the aggregate availability of financing opportunities in credit crunch periods, earnings response coefficients are larger than in reliquification periods, when financing is more readily available (Hypothesis 2B). These results parallel those from the earnings persistence tests. Like earnings persistence coefficients, earnings response coefficients vary positively with the rate of economic growth and the level of economic activity.

In Table 8, I examine the sensitivity of the results reported in Table 7 to the inclusion of controls for other known determinants of earnings response coefficients. These ERC determinants include cross-sectional variation in firm characteristics that influence the magnitude of the response of equity returns to earnings announcements (i.e., firm-level earnings persistence and firm-level earnings predictability), time varying components of the discount rate (i.e., the T-Bill rate, the term premium, the default premium, and the dividend yield), and time variation in each firm's equity beta. When interaction terms that allow the slope coefficient on unexpected earnings to vary with these controls are added to Equation 5, the model becomes:

$$\begin{aligned} CAR_{it} \;=\; & \alpha_0 + \alpha_1^* UE_{it} + \alpha_2^* UE_{it}^* EXP_t + \alpha_3^* UE_{it}^* CRUNCH_t \\ & + \alpha_4^* UE_{it}^* RELIQ_t + \alpha_5^* UE_{it}^* Persistence_i + \alpha_6^* UE_{it}^* Predictability_i \\ & + \alpha_7^* UE_{it}^* T\text{–}Bill_t + \alpha_8^* UE_{it}^* Term_t \\ & + \alpha_9^* UE_t^* Default_t + \alpha_{10}^* UE_t^* DivYield_t + \alpha_{11}^* UE_{it}^* BETA_{it} \\ & + \alpha_{12}^* EXP_t + \alpha_{13}^* CRUNCH_t + \alpha_{14}^* RELIQ_t + \varepsilon_t \end{aligned} \tag{6}$$

Table 7. Tests of hypotheses 1B and 2B: regression analysis of the relation between cumulative abnormal returns and unexpected earnings per share across business cycle stages.

(5) $$CAR_t = \alpha_0 + \alpha_1^* UE_t + \alpha_2^* UE_t^* EXP_t + \alpha_3^* UE_t^* CRUNCH_t + \alpha_4^* UE_t^* RELIQ_t + \alpha_5^* EXP_t + \alpha_6^* CRUNCH_t + \alpha_7^* RELIQ_t + \varepsilon_t.$$

Explanatory Variables	Coefficients (p-values) Model 1	Model 2
UE	0.579	0.424
	(0.0001)	(0.0001)
*UE*EXP*		0.105
		(0.0002)
*UE*CRUNCH*		0.181
		(0.0001)
*UE*RELIQ*		0.076
		(0.0153)
Constant	0.002	0.001
	(0.0001)	(0.1740)
EXP		0.001
		(0.0139)
CRUNCH		0.001
		(0.0129)
RELIQ		−0.000
		(0.5899)
Adj. $R2$	0.047	0.048

F-test of the Hypothesis that $UE^*CRUNCH = UE^*RELIQ$

Difference in Coefficients	0.105
F-Statistic	11.99
p-value	(0.0005)

where:

Beta = slope coefficient from a regression of firm i's dividend adjusted return on the equal-weighted market index over the 100-day period ending 60 days prior to the earnings announcement date,

Persistence = slope coefficient from a regression of Value Line's revision in firm i's quarter $t + 1$ forecast on firm i's quarter t unexpected earnings,

Predict = variance of firm i's unexpected earnings,

T-Bill = one-month Treasury bill return,

Term = the difference between the month t yield on the Aaa corporate bond portfolio and the one-month Treasury bill rate,

Default = the difference between the month t yield on a portfolio of corporate bonds and the month t yield on a portfolio of Aaa bonds, and

Div Yield = the dividend yield on the equal-weighted NYSE portfolio.

Results from a baseline regression that excludes business cycle effects are reported as Model 1 in Table 8. Each of the six ERC determinants is of the predicted sign, and all but equity beta are significant. Consistent with the argument that the present value of revisions in future cash flows implied by the forecast error is negatively associated with the discount rate, earnings response coefficients are negatively associated with the three discount rate components. Additionally, ERCs are increasing (decreasing) in firm-level measures of earnings persistence (earnings predictability).

Model 2 examines whether Hypothesis 1B and Hypothesis 2B continue to hold after controlling for cross-sectional determinants of ERCs and time-series variation in ERCs attributable to time-varying discount rates. The coefficient on $UE^{*}EXP$, 0.049, is significantly larger than zero ($p = 0.0654$). While the coefficient on $UE^{*}CRUNCH$, 0.172, is larger than the coefficient on $UE^{*}RELIQ$, 0.115, the difference is not significant ($p = 0.2089$). Sensitivity analyses not reported in Table 8 indicate that the loss of significance is attributable to the discount rate variables, as opposed to earnings persistence, earnings predictability, or equity beta. When the latter three variables are included without controls for the discount rate components, inferences are qualitatively similar to those reported in Table 7. Since time-variation in the four discount rate components captures variation in the aggregate investment and financing opportunity set underlying the two hypotheses, the time varying components of the discount rate can be viewed as an alternative operationalization of the two hypotheses. Thus, the lack of support for one of the two hypotheses is not surprising, particularly in light of the fact that the business cycle dummy variables are dichotomous, while the time-varying interest rate components provide a continuous measure of changing business conditions.

5. Summary and Conclusions

Intertemporal instability in earnings response coefficients has led some to question the usefulness of accounting earnings in explaining current returns (Lev, 1989). This paper extends prior research on the determinants of earnings response coefficients by using macroeconomic theory to predict how changes in the aggregate investing and financing opportunity sets affect earnings persistence and, in turn, the earnings-returns relation. The study is also relevant to students of financial statement analysis, who are concerned about documenting contextual regularities in the market's interpretation of earnings announcements.

Results from a sample of 53,324 quarterly earnings announcements by Value Line firms over the period 1970–87 support the hypothesis that earnings persistence varies with business conditions. Consistent with an increase in the availability of investment opportunities during expansionary periods, earnings persistence is significantly greater during expansions than during recessions. Consistent with a decrease in the aggregate availability of external financing when credit is tight, earnings persistence is significantly greater during credit crunch periods than during reliquification periods. Greater earnings persistence implies larger earnings response coefficients. Accordingly, earnings response coefficients are larger in expansions (credit crunch periods) than in recessions (reliquification periods).

Table 8. Tests of hypotheses 1B and 2B: regression analysis of the relation between cumulative abnormal returns, unexpected earnings per share, forecast error-ERC determinant interactions, and forecast error-discount rate determinant interactions across business cycle stages.

(6) $$CAR_t = \alpha_0 + \alpha_1^* UE_t + \alpha_2^* UE_t^* EXP_t + \alpha_3^* UE_t^* CRUNCH_t + \alpha_4^* UE_t^* RELIQ_t + \alpha_5^* EXP_t + \alpha_6^* CRUNCH_t + \alpha_7^* RELIQ_t + \Sigma\alpha_j^* UE_t^* ERC\ Determinants + \Sigma\alpha_k^* UE_t^* Rate\ Determinants + \alpha_l^* UE_t^* Equity\ Beta + \varepsilon_t.$$

Explanatory Variables	Coefficients (p-values) Model 1	Model 2
UE	1.044	0.894
	(0.0001)	(0.0001)
*UE*EXP*		0.049
		(0.0654)
*UE*CRUNCH*		0.172
		(0.0001)
*UE*RELIQ*		0.115
		(0.0002)
*UE*Persistence*	0.480	0.478
	(0.0001)	(0.0001)
*UE*Predictability*	−0.543	−.544
	(0.0001)	(0.0001)
*UE*T*-Bill	−10.048	−13.353
	(0.0948)	(0.0172)
*UE*Term*	−4.543	−2.879
	(0.0001)	(0.0034)
*UE*Default*	−15.858	−15.462
	(0.0001)	(0.0001)
*UE*DivYield*	−91.471	−94.077
	(0.0001)	(0.0001)
*UE*Beta*	−0.007	−0.002
	(0.3509)	(0.4463)
Constant	0.0021	0.001
	(0.0001)	(0.1092)
EXP		0.001
		(0.0298)
CRUNCH		0.001
		(0.0330)
RELIQ		−0.000
		(0.5344)
Adj. $R2$	0.052	0.053

F-test of the hypothesis that $UE^*CRUNCH = UE^*RELIQ$

Difference in Coefficients	0.057
F-Statistic	1.488
p-value	(0.2089)

Thus, earnings persistence and earnings response coefficients are positively related to both the level of economic growth and the level of economic activity. Earnings response coefficients also vary across the business cycle with time-variation in the discount rate. While time-varying discount rates subsume variation in ERCs with variation in the financing opportunity set, the variation in ERCs associated with variation in the investment opportunity set is not fully captured by time-variation in discount rates.

Four general conclusions follow from these results. First, the results imply that intertemporal variation in ERCs is not completely driven by random noise and/or measurement error. A significant portion, in fact, can be attributed to changing business conditions. Thus, these results enhance our belief in the usefulness of earnings in firm valuation. Second, these results imply that earnings provide information about both a firm's ability to find/exploit profitable investment opportunities *and* its ability to finance existing projects. Thus, these results further our understanding of how the market uses earnings information to value firms. Third, these results have implications for the design of future information content studies. The finding that ERCs vary over time as a function of time-varying expected returns suggests that interest rates should be included in models whenever there is intertemporal pooling of observations or whenever inferences about changes in ERCs across time due to non-interest rate factors (e.g., a change in accounting method) are hypothesized. Finally, although these results indicate that a firm's investment and financing opportunity sets are significant explanators of cross-sectional variation in ERCs, the addition of business cycle variables to earnings-returns regressions does not result in a significant increase in model R^2s.

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Notes

1. Recent evidence presented by Miron (1990) and Barsky and Miron (1989) suggests that business cycles and seasonal cycles are generated by similar types of exogenous shocks, are characterized by similar stylized facts, and share similar propagation mechanisms. Thus, these hypotheses parallel those developed by Salamon and Stober (1994), who demonstrate that earnings response coefficients are positively associated with seasonalities in the level of quarterly earnings.
2. See also Moore and Klein (1985), Zarnowitz (1985), Zarnowitz and Moore (1984), Moore (1983), Burns (1969), Hultgren (1965), Mitchell (1951), and Burns and Mitchell (1946) for a more detailed discussion.
3. DRI's model has been criticized for its Keynesian assumptions. Further, Nelson (1972) documents that forecasts from simple time series models are as accurate as forecasts from large econometric models. Consequently,

hypotheses were also tested using one-quarter ahead forecasts from the six-equation vector autoregression detailed in Webb (1991). In all cases, qualitatively similar results were obtained.

4. DRI does not forecast credit crunch and reliquification periods. To (ex-post) define the credit crunch and reliquification stages, DRI uses seven measures of credit market conditions. These seven ratios include: a) aggregate commercial loans outstanding/demand and time deposits; b) aggregate debt/total equity of nonfinancial companies; c) short-term loans/total debt of nonfinancial companies; d) interest charges on debt/cash flow of nonfinancial companies; e) current assets/current liabilities of nonfinancial companies; f) household assets/household liabilities; and g) mortgage repayments by households/household disposable income. They parallel those used by other researchers to measure credit market conditions (e.g., Srini Vasan, 1986; Dubofsky, 1985; Sealey, 1979).
5. Empirical evidence on the importance of the financial stages of the business cycle (i.e., the credit crunch and reliquification) has also been provided by: a) Mishkin (1978) and Bernanke (1983), who show that financial factors were important determinants of the Great Depression's depth and persistence; and b) Sims (1980) and Litterman and Weiss (1985) who suggest that financial variables other than the money supply have significant explanatory power for output. Theoretical models have been developed by: a) Scheinkman and Weiss (1986), who show how borrowing constraints increase the variability of consumption, output and employment; b) Farmer (1985), who shows that information asymmetries magnify the impact of interest rates on output; and c) Bernanke and Gertler (1989), who show that procyclical movements in net worth magnify investment and output fluctuations. See Gertler (1988) for a review of these and other related papers.
6. The ERC predictions are analogous to those of Salamon and Stober (1994), who examine variation in the earnings-returns relation associated with seasonal variation in the level of firm production. Barsky and Miron (1989) and Miron (1990) present evidence that business cycles are similar to seasonal cycles in that they display similar stylized facts (i.e., the co-movement of output across sectors, the absence of production smoothing, the co-movement of nominal money and real output, and the procyclicality of labor input). The similarity of these stylized facts suggests that similar propagation mechanisms are at work. Similarities in the causes and consequences of seasonal and business cycles suggest similarities in the impact on earnings response coefficients.
7. The hypotheses developed in this paper predict variation in earnings response coefficients across business cycle stages as a result of time-variation in the magnitude of revisions to expected future earnings in response to an earnings shock. Of course, earnings response coefficients also vary inversely with the discount rate (Collins and Kothari, 1989) and discount rates vary across business cycle stages (Fama, 1990; Fama and French, 1989). Consequently, subsequent tests of the ERC hypotheses include controls for time-variation in discount rates.
8. Three types of imperfections characterize the equity markets. First, transactions costs are high (Smith (1977)). Second, there is a tax advantage to internal retention. Third, information asymmetries create a "market for lemons" problem (Myers and Majluf, 1984; Greenwald, Stiglitz, and Weiss, 1984). Three types of imperfections also characterize debt markets. First, as a result of financial distress costs, the marginal cost of debt increases with leverage. Second, managers may act counter to the interests of creditors, creating agency costs. Third, "lemons" distortions exist (Stiglitz and Weiss, 1981; Calomaris and Hubbard, 1990).
9. Empirical evidence on the sensitivity of investment activity to financial liquidity is provided by Fazzari and Athey (1987), who document that firm-level investment expenditures are considerably more sensitive to a firm's ability to internally generate funds than a frictionless neoclassical model of investment would predict.
10. In the late 1990s, borrowing by U.S. companies has shifted from banks to the capital markets. Recent evidence suggests that this shift has increased the severity of credit crunches. (See, e.g., *Wall Street Journal*, 1998).
11. T-Bill was obtained from Ibbotson and Sinquefield (1990). The components of DivYield, Default and Term were obtained from Ibbotson Associates through John Kling.
12. Time-varying discount rates do not contradict the idea of rational pricing by an efficient market. For example, Balvers, Cosimano, and McDonald (1990) present a dynamic general equilibrium model which gives rise to predictable stock returns due to serial correlation in aggregate output. Investors are assumed to desire a constant level of consumption over time. When aggregate output (i.e., wealth) is high, consumption is low relative to wealth, and even low expected rates of return induce high savings. In contrast, when aggregate wealth is low, consumption is high relative to wealth and only high expected returns will induce savings. Variation in expected returns associated with variation in business conditions will not be eliminated by arbitrage. Arbitrage, for example, investing when returns are high (and wealth is low), can only occur by increasing the variance of consumption, thus lowering utility.

13. Relatedly, Board and Walker (1990) demonstrate that ERCs vary intertemporally with unanticipated inflation. The analysis in this paper does not attempt to control for time-variation in ERCs arising from shocks to expected returns. Since the analysis uses a short, two-day event window, shocks to expected returns are less apt to be a problem than would be the case if a longer event window had been selected.

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