The Information Content of Loan Growth in Banks

Michelle Zemel*

New York University

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Abstract

I empirically evaluate the information content of a change in the size of a bank's loan portfolio. I find that the stock market reaction to loan portfolio growth in high earnings banks is positive, while the market discounts loan portfolio growth in low earnings banks. These findings are consistent with suspicion in the markets that unhealthy banks hide losses by evergreening loans. If the market reaction, in fact, conveys meaningful information about a bank's value, then loan portfolio growth should predict future performance measures of the bank. I find that loan portfolio growth, when interacted with earnings information, predicts future non-performing loans. Accordingly, portfolios formed by sorting bank stocks by loan portfolio growth and earnings generate excess returns.

1 Introduction

1.1 Motivation

Bank financial statements convey critical information to investors interested in gauging bank value and regulators tasked with assessing bank stability. An understanding of the information content of such statements facilitates a better understanding of value and stability in the financial sector as a whole. One accounting figure on a bank's financial statement often overlooked by academics is the expansion or contraction of its loan portfolio (henceforth "loan growth"). Because loans are

*Stern School of Business, New York University, 44 West Fourth Street, Suite 9-197, New York, NY 10012, mzemel@stern.nyu.edu. I would like to thank my thesis committee chair Prof. Y. Amihud, and committee members Prof. A. Saunders and Prof. K. John for their many contributions to this paper as well as their overall guidance. I also thank Stephen Ryan, Viral Acharya, and Or Shachar for their helpful insights.

a bank's main investment, this figure conveys important information about the bank's future cash flows. This paper examines that information in detail.

Previous research on non-banking firms has explored the information conveyed by current earnings about firm value. The seminal study Ball and Brown [1968] first demonstrated a positive abnormal market reaction to unexpected increases in firm earnings. This market reaction has been linked to the observation that earnings are persistent. Taken together, these two observations are consistent with the hypothesis that current earnings contain information about future income (and thus firm value). Since then, other studies have characterized the information content found in additional reported financial figures, orthogonal to the information content of current earnings. Of relevance to this study is Lamont 2000, which determined that aggregate investment growth in non-banking firms conveys information about future discount rates.

Banks, as opposed to non-banking firms, are required to report more detailed information about the state of their investments. A bank's mandatory disclosures include loan loss accounting figures such as non-performing loans, loan loss provisions (additions to the loan loss reserve), and loan charge-offs. These figures capture information regarding the existing troubled loans of a bank that are predicted to turn into future losses. Indeed, these figures have been found to convey information about a bank's value. In the presence of the abundance of reported information about a bank's investments, it might seem that loan growth itself offers no incremental information. However, while loan loss accounting figures give information about *existing loans*, growth in the size of the overall loan portfolio conveys information about *a new set of investments* made by bank. It is this information which is the focus of this paper. I claim that loan growth conveys valuable information about the bank's future performance, and moreover, that this information is distinct from that conveyed by current earnings and the loan loss accounting figures.

The main contribution of this paper is an assessment of the information content of a balance sheet item otherwise unexamined in the academic literature. The loan growth figure is of special importance to regulators in evaluating the soundness of banks. The Office of the Controller of Currency suggests that various indicators serve as "red flags" for potential future distress. One such indicator is loan portfolio growth. In its guide, Detecting Red Flags in Board Reports (2004), the regulator claims the following [OCC, 2004]:

> Rapid (loan portfolio) growth, particularly as measured against local, regional, and national economic indicators, has long been associated with subsequent credit problems.

In this paper, I empirically evaluate the validity of using loan portfolio growth as a red flag for future potential distress, and assess the information conveyed by this figure. I then characterize the information content of loan growth along two dimensions: features of the bank, and features of the loans issued. Specifically, I aim to answer the following questions: (1) *Does loan growth convey good or bad news?*; (2) *Does the nature of the information conveyed by loan growth depend on the features of the individual bank?*; and, (3) *Does the nature of the information conveyed depend on features of the loan issued?*

A priori, loan growth could convey good news or bad news. On the one hand, banks may issue new loans because they have successfully identified good investment opportunities. For these banks, loan growth conveys favorable news to the capital markets. On the other hand, banks may issue new loans in an attempt to hide losses on the current loan portfolio. This is known as *evergreening*, which occurs when a bank issues new loans to existing borrowers to enable them to maintain payments on outstanding troubled loans. In this way, the troubled loans are kept out of the various loan loss accounting categories on financial statements (non-performing loans, loan loss provisions and loan charge-offs) and the bank avoids the penalties (in shareholder valuation and capital requirements) associated with an increase in these publicly reported items. For these banks, loan growth is bad news.

There are additional reasons why loan growth may convey positive or negative news. If new loans are overpriced, relative to their perceived risk level, then these loans will represent positive NPV investments and thus convey good news. Banks can gain a pricing advantage in the market for loans through enhanced screening abilities, and thus the ability to avoid 'lemons', or through increased market power. Conversely, new loans represent negative NPV investments, or bad news, when they are underpriced relative to their perceived risk level. Loans can be underpriced by banks as a result of decreased screening abilities or decreased pricing power.

Ultimately, the question of what loan growth means for an individual bank is an empirical question, and it is that question which this paper attempts to answer. One of the main contributions of this paper is the empirical finding that earnings is used by the capital markets as a criterion to distinguish between banks with "good" and "bad" loan growth. This results suggests a refinement to the regulator's claim that loan growth in *low earnings banks* be used as a red flag. An additional contribution of this paper is that it adds to our understanding of the determinants of bank value. Namely, I find that loan growth has information which is incremental to that found in current earnings as well as in the loan loss accounting figures. I claim that for a more complete picture of bank value, loan growth should be included in the assessment.

To assess the information content of this investment decision, I use the capital market reaction to financial statement announcements of bank holding companies. I find that the information content of loan growth indeed depends on several factors and generally speaking, cannot be interpreted on its own. My main finding is that loan growth conveys good news for banks reporting higher than expected earnings and bad news for banks reporting earnings that are below expectations. The abnormal announcement day return in reaction to a one standard deviation higher growth rate of loans is +68.1 basis points for banks with high unexpected earnings and -47.1 basis points for banks with low unexpected earnings. This finding is consistent with suspicion in the market that unhealthy banks are hiding losses by evergreening loans. In contrast, the market recognizes an ability to identify profitable investments in healthy banks. Thus, using earnings as a signal of bank health, the market shows confidence only in the ability of healthy banks to identify profitable investment opportunities in the loan market, while penalizing unhealthy banks for perceived losses hidden in loan portfolio growth.

Second, I find that cross-sectional bank characteristics affect the information content of loan growth. For high beta (systematic risk) banks, the market rewards loan growth in high earnings banks and discounts loan growth in low earnings banks. For low risk banks, the average abnormal return increases with the announcement of loan growth independent of the banks' earnings levels. This difference between the valuation of loan growth in high and low risk banks is consistent with the market fearing evergreening in high risk banks, thus requiring a signal of bank health in the form of current earnings. In addition, higher abnormal announcement day returns are associated with loan portfolio growth in banks that demonstrate a greater ability to monitor borrowers, as measured by the ratio of total employees to total loans. This finding is consistent with the market recognizing that these banks are better able to capitalize on their information advantage in order to make more profitable loans.

Third, I find that the type of loan issued affects market valuations of loan growth. Market valuation of growth in a bank's consumer loan portfolio is uniformly positive, whereas the valuation of growth in a bank's real estate loans and commercial loans depends on the health of the bank. This finding is consistent with banks having pricing power in the market for consumer loans, resulting in inflated prices and positive NPV investments. Commercial loans, on the other hand, are more competitively priced. Accordingly, the market does not attribute positive value to this type of loan growth across the board. Instead, conscious of the prevalence of evergreening, the market requires a signal of bank health and rewards (discounts) loan growth only in high (low) earnings banks.

Building on the insights gleaned from the announcement day returns tests, I next assess whether the market values loan growth correctly. The market reaction tests identified loan growth as an important determinant of firm value. If the market "gets it right", loan growth should predict future firm performance. Indeed, I find that loan growth, when taken in conjunction with earnings information predicts future non-performing loans, an important measure of bank performance. Specifically, loan growth in banks in the bottom earnings quartile is associated with statistically significant higher non-performing loans in the following two and three quarters.

In a final set of tests, I examine long-term market returns to nine portfolios of bank stocks formed by sorting on loan growth and earnings (3x3). I find significant negative excess returns (relative to the Four Factor Model [Carhart, 1997]) for the low earnings/high loan growth portfolio. A portfolio that is long high earnings/high loan growth bank stocks and short in low earnings/high loan growth bank stocks generates an excess monthly return of 1.16%, which is statistically significant. This result is consistent with either market inefficiency - specifically with a drift in the market reaction to the loans and earnings information - or the presence of a risk factor priced by the market but not captured in the Carhart four factor model. The distinction between these two possibilities is an interesting subject for future study.

The paper is organized as follows. The remainder of this section discusses related literature. Section 2 describes the theoretical considerations and develops the hypotheses tested. Section 3 describes the methodology and data used for the empirical tests. Section 4 presents the empirical findings. Section 5 presents the of additional robustness tests. The final section summarizes my results and concludes the paper.

1.2 Literature Review

This paper is related to three strands of literature. The first strand is a large literature evaluating the information content of bank accounting figures, most notably, of the loan loss allowance (or the provision for loan losses). Wahlen [1994], use quarterly (and annual) financial announcements to evaluate the effect of the growth of provisions for loan losses on the bank's equity return. The paper finds evidence that the market responds positively to an increase in the discretionary component of loan loss provisions. This is consistent with bank managers using this provision to signal their current health, setting aside a larger (discretionary) provision when current profits are high. Grammatikos and Saunders [1990] investigate the same question, but take a different approach, using the market's reaction to public announcements of changes in loan-loss reserves by Citicorp (and subsequently other large banks) in response to the weakening quality of LDC debt in 1987. The authors find that the average effect on bank stock return portfolios was weak; however, the effect on individual bank returns was heterogeneous. This study follows a methodology adapted from this literature to evaluate the information content of loan portfolio growth.

The second strand of literature relates to the evergreening of loans by banks. Evergreening is defined as loan provision by banks to firms in order to enable these firms to make interest payments on outstanding delinquent loans, and thus to avoid, or at least delay, bankruptcy. Rajan [1994] provides a theory for the occurence of loan evergreening based on bank managers giving some weight to current stock price in their objective functions. The theory is developed further to explain the observed empirical phenomenon that bank lending standards become looser (more evergreening) in good business cycle states and tighter in the bad business cycle states. The business cycle component of the Rajan [1994] theory is based on banks' strategic herding motives, with banks suffering a greater punishment for revealing losses in good times (and thus herding through evergreening) than in bad times in the equilibrium outcome. Strong empirical evidence for the occurence of evergreening is presented in Peek and Rosengren [2005] which investigates this misallocation of credit by Japan's banking industry during the Japanese credit crisis of the 1990's. Peek and Rosengren [2005] presents compelling empirical evidence that Japanese banks engaged in loan evergreening during the crisis. In this study, I attempt to evaluate whether the market suspects American banks of evergreening.

Finally, there is a small literature examining the information content of individual loan announcements. Megginson et al. [1995] examines the market reaction to announcements of syndicated loans. Through the examination of individual loan announcements, Megginson et al. [1995] highlights several motives for positive and negative valuations of new loans, some of which I consider in this paper. However, while Megginson et al. [1995] examines the information content of individual loan announcements, this study examines loan growth at the portfolio level. The results of Megginson et al. [1995] are specific to syndicated loans of a certain type (mostly LDC debt and loans for LBO takeovers) during a specific regulatory and political climate (1966-1989), and are thus hard to aggregate to make bank level inferences. In addition, this study examines how characteristics of the issuing bank (and not just of the loans issued) affect the information content of loan growth in banks. I claim that examining loan growth at the portfolio level is important in assessing the regulator's claim that rapid loan portfolio growth serve as a red flag.

2 Hypothesis Development

To evaluate the information content of loan growth, I use stock price reactions around banks' quarterly earnings announcements. Changes in stock price around these announcements reflect changes in the valuation of the bank. More specifically the price changes reflect readjustments of the value of predicted future cash flows of the bank. If newly originated loans are viewed by the market as positive (negative) NPV investments, they will increase (decrease) the market valuation of the bank. The null hypothesis in this analysis is that new loans carry no information about bank value. No market reaction to the announcement of loan growth could occur because either this piece of information conveys no information beyond that contained in other information released simultaneously (earnings, loan loss accounting, etc.), regardless of the NPV of the new loans or because the information in loan growth is new, but the new loans constitute zero NPV investments. The detection of a non-zero reaction is evidence that the information in loan growth is new and that the loan growth constitutes non-zero NPV investments. The following section describes several motives leading to the over and under valuation of new loans (non-zero NPV). Following this discussion, testable hypotheses are developed by considering these motives and how they might change with cross-sectional features of the banks and the loans issued.

2.1 Theories for non-zero shareholder valuation effects

The following hypotheses are consistent with non-zero valuation effects of loan growth.

1. Mispricing: A bank's ability to accurately price its loans depends on its ability to assess its borrowers. Banks that perform their screening function better will be able to better identify good loans. In a pooling equilibrium, this enhanced ability to identify good loans will lead to above average screening ability banks over-pricing loans and below average screening ability banks under-pricing their loans.

2. Market Power: Competitive forces should ensure that loans are priced such that they are zero NPV investments. However, in the absence of perfect competition, banks may be able to overprice their loans. Banks can gain market power in the event that their borrowers are willing to pay a premium for liquidity, and are unable to secure that liquidity elsewhere.

3. Growth Opportunities: Loan portfolio growth could provide information about the future growth opportunities in the bank's lending market. Loan growth may signal to the market that the bank is able to seek out new profitable markets, thus leading to a positive readjustment of predicted future cash flows, and thus bank value.

4. Loss Hiding: Regulatory and reputational pressures could lead banks to evergreen loans in an attempt to hide losses on current loans. Evergreening in banks occurs when new loans are issued to existing borrowers in order to make principal and interest payments on these borrowers' existing loans. Presumably, these borrowers are in distress and cannot make these payments. The issuance of the new loans keeps the existing loans out of the various troubled loan categories on the financial statement. Banks are required to report non-performing loans (loans for which interest and principal payments are 90 days past due), loan loss provisions (additions/subtractions from the loan loss allowance), and loan charge-offs (non-accrual loans that are removed from the balance sheet and written off as losses). In order to avoid these disclosures, and perhaps the implications for capital requirements, the bank has incentive to issue new loans. These new loans constitute negative NPV investments, as they are made to hide losses, and as such elicit negative market reactions.

Thus, positive market reactions to loan portfolio growth will be consistent with overpricing due to high screening ability and/or the bank's increased market power, as well as with loan growth representing new positive NPV investment opportunities. A negative market reaction will be consistent with underpricing due to low screening ability and/or the hiding of losses by evergreening.

2.2 Loan Growth and Features of the Bank

The information conveyed by loan portfolio growth may vary with features of the bank. Specifically, any features which make the bank more likely to evergreen loans would lead loan growth to convey more negative news. Similarly, any features which make the bank more likely to be able to identify new growth opportunities would lead loan growth to convey positive news. Using earnings as a signal for the health of the bank, I hypothesize that loan growth in healthy banks conveys good news and loan growth in unhealthy banks conveys bad news.

In addition, banks with riskier loan portfolios are more likely to evergreen loans. As such, I hypothesize that loan growth in risky banks could convey bad news for unhealthy banks. This is in contrast to less risky banks, for which evergreening is less of a concern, and thus loan growth in these banks would convey the same information for both healthy and unhealthy banks.

Finally, the information conveyed by loan growth may vary with the screening level of the bank. I hypothesize that loan growth conveys more favorable news for banks with better screening abilities.

2.3 Loan Growth and Features of the Loans Issued

The information conveyed by loan growth may also vary with the type of loan issued. Specifically, any features of the loan which lead to the bank having increased market power will result in positive market valuations of that type of loan growth. Features of the loan which make it a more likely candidate for evergreening will result in the market valuation of that loan growth being dependent on the health of the bank. I hypothesize that growth in consumer loans, where the bank has significant market power [Ausubel, 1991], will convey good news for all banks. Loan growth in commercial loans, on the other hand, where loan pricing is more competitive [De Graeve et al., 2007] and the propensity to hide losses by evergreening is higher, will convey good news only for healthy banks.

3 Data and Methodology

To assess the information content of loan growth in banks, I examine a panel of quarterly financial statements of bank holding companies over the sample period, 1986 Q3 to 2008 Q4. The first set of tests examines the announcement day stock market reactions of individual bank holding companies to the release of the financial statements, and specifically to the loan portfolio growth figure. This test assesses the information content directly by examining the market reaction at the time of its release. The second set of tests investigates the ability of this variable to predict future bank performance. Finally, the third set of tests looks at long-term returns to bank stock portfolios formed by sorting banks by their loan growth.

3.1 Abnormal Announcement Day Stock Returns

The basic multivariate regression used to assess announcement day returns takes the following form:

$$CAR_{j,t} = b_0 + b_1 \Delta Loans_{j,t} + b_2 UE_{j,t} + b_3 \Delta Loans_{j,t} \times UE_{j,t} +$$

$$b_4 \Delta NPL_{j,t} + b_5 \Delta LLP_{j,t} + b_6 Size_{j,t-1} + \alpha_j + \tau_t + \epsilon_{j,t}$$

where

$CAR_{j,t}$ = the abnormal announcement day stock return to bank j for the release of quarter t financial information

$\Delta Loans_{j,t}$ = the change in the size of bank j's loan portfolio between quarters t-4 and t

$UE_{j,t}$ = the unexpected earnings announced for bank j, quarter t

$\Delta NPL_{j,t}$ = the change in the the non-performing loans of bank j between quarters t-4 and t

$\Delta LLP_{j,t}$ = the change in the the loan loss provision of bank j between quarters t-4 and t

$Size_{j,t-1}$ = the log of the market value of bank j, in quarter t-1

α_j = firm fixed effect for bank j

τ_t = time fixed effect for quarter t

This model allows us to explore the information content of the various balance sheet and income statement items, and to condition the information content of loan growth on these other items. In this context, I can examine the market reaction to a change in the size of the loan portfolio by examining the coefficients b_1 and b_3. Note that if the market uses earnings as a signal of the health of the bank, then b_3, the coefficient on the loans $\times$ earnings interaction term, will capture the differential impact of loan growth for healthy and unhealthy banks.

T o better understand the interpretation of the loan growth main and interaction effects (coefficients b_1 and b_3 respectively), it may be helpful to consider the overall effect of loan growth on market valuation as $(\beta + \gamma UE)\, \Delta Loans$. Notice that β and γ correspond to the coefficients b_1 and b_3 respectively. The β coefficient represents an average effect of loan growth, not considering the earnings signal of the bank. To this effect, we must add γUE to differentiate the effect of loan growth for high and low earning banks. The interpretation of a value of 0 for γ is that the information content of loan growth is independent of the health of the bank (as measured by earnings). Conversely, a positive value for γ would be interpreted as the value of loan portfolios being inflated for high earning banks and lowered for low earnings banks. A positive value for γ (or b_3) is evidence for the evergreening of loans as the loan growth in low earnings banks is met with a negative market response.

To examine cross sectional differences in the market response to loan portfolio growth, the basic model is estimated separately for varying levels of the cross sectional determinant of interest. The estimated coefficients, b_1 and b_3 are then compared across the levels of the cross sectional characteristic. These cross sectional characteristics include the risk and screening level of the bank.

The hypotheses relating to the information content by type of loan issued are tested by breaking down loan growth into growth by each of the main types of loans (commercial/Industrial, Loans to Individuals, Loans backed by Real Estate, and Other Loans). Using this breakdown, the following multivariate regression model is estimated:

$$CAR_{j,t} = b_0 + \sum_k b_{k,1}\Delta Loans_{k,j,t} + b_2 UE_{j,t} + \sum_k b_{k,3}\Delta Loans_{k,j,t} \times UE_{j,t} +$$
$$b_4 \Delta NPL_{j,t} + b_5 \Delta LLP_{j,t} + b_6 Size_{j,t-1} + \alpha_j + \tau_t + \epsilon_{j,t}$$

where

$\Delta Loans_{k,j,t}$= the change in the size of the portfolio of loans of type k of bank j between quarters t and t-4.

T he information content of real estate loan growth, commercial loan growth, and consumer loan growth is examined.

3.2 Predictive Regressions

The basic multivariate regression used to assess the predictive ability of loan growth takes the following form:

$$Y_{j,t+k} = b_0 + b_1 \Delta Loans_{j,t} + b_2 \Delta NI_{j,t} + b_3 \Delta Loans_{j,t} \times UE_{j,t} +$$
$$b_4 \Delta NPL_{j,t} + b_5 \Delta LLP_{j,t} + b_6 Size_{j,t} + \alpha_j + \tau_t + \epsilon_{j,t}$$

where

$Y_{j,t+k}$ = an outcome variable representing firm performance for bank j over the period quarter t to quarter t+k

$\Delta NI_{j,t}$ = the change in net income of bank j between quarters t-4 and t

Note the following important distinctions between this model and the above model used to evaluate announcement day returns. First, the dependent variable is no longer a market reaction, but a measure of actual firm performance. Second, the timing in this model differs from that of the market reaction regression model. In this analysis, time t variables are used to predict time t+k performance. Finally, announcement day *surprises* are replaced by the *actual changes* in accounting figures, which are the relevant measures for the predictive model.

3.3 Long-Term Portfolio Returns

The final set of tests assesses information content through the return on stock portfolios formed by sorting by our variables of interest. Specifically, I sort stocks into terciles each quarter by loan growth ($\Delta Loans_{j,t}$) and change in net income ($\Delta NI_{j,t}$). Note that the two sorts are performed independently as these variables are found to be uncorrelated (contemporaneously). Stocks are assigned to a portfolio according to their quarterly loan and income terciles in the latest quarter for which financial information is publicly known; I assume that quarterly information is known by two months after the end of the data quarter.[1] These portfolios are rebalanced as new quarterly information becomes available. For example, the stock of a bank classified in the high income/low loan tercile for the March 31, 2000 data will be assigned to the high income/low loan portfolio for the months June, July, and August of 2000. For the following three months, (September, October, November 2000), the stock will be assigned a portfolio according to the bank's loan and income terciles based on June 30, 2000 financial data.

Value weighted (by market capitalization) monthly returns are calculated for each of the nine Loan/Income portfolios. The (9) time-series of portfolio returns are used to calculated excess returns (α) using the Carhart Four Factor Model. The portfolio α's are obtained from the following regression:

$$R_t^i - Rf_t = \alpha^i + \beta_M^i \times RM_t + \beta_{SMB}^i \times SMB_t + \beta_{HML}^i \times HML_t + \beta_{UMD}^i \times UMD_t + \epsilon_t^i$$

where R_t^i = the value weighted monthly return to portfolio i over the month t,

and i $\in$ {LL,LM,LH,ML,MM,MH,HL,HM,HH }, represents the income tercile/loan tercile portfolio.

Rf_t = the (risk free) return on the 1 Month Treasury Bill over month t

[1] Note that the average number of days between the end of the quarter and the earnings announcement date in the sample is 14 days.

$RM_t - Rf_t$ = the monthly return on the value weighted market portfolio minus the monthly return on the 1 month Treasury bill

SMB_t = the monthly return on the Fama French Small Minus Big portfolio (SMB size factor) over month t

HML_t = the monthly return on the Fama French High Minus Low portfolio (HML book to market factor) over month t

UMD_t = the monthly return on the Up Minus Down momentum portfolio (UMD momentum factor) over month t

In addition to the 9 tercile portfolios, 6 additional High Minus Low portfolios are built by taking a long position in the high tercile portfolio and a short position in the low tercile portfolio along each of the two dimensions. Portfolio alpha's are calculated for these portfolios using the same methodology.

3.4 Econometric Issues

The panel regressions in all three sections include both time and firm fixed effects to properly account for dependence in the observations across both time and firms. Standard errors are clustered along both dimensions, time and firm, to further account for any dependence left in the residuals as prescribed by Petersen [2009] for panel data sets.

3.5 Data Sources and Sample Construction

This study uses a sample of domestic bank holding companies over the sample period 1986 Q3 - 2008 Q4. In all, the sample covers 345 BHC's over 86 quarters.

- Bank financial statement data is obtained from the FR Y-9C regulatory forms collected by the Federal Reserve Bank. FR Y-9C forms are required of all domestic bank holding companies and are reported quarterly on a consolidated basis. The balance sheet items total assets, total loans, loan loss allowance and non-performing loans, as well as the income sheet items net income, loan loss provisions and loan charge-offs are obtained from this source. In addition, the reported capital ratio and a breakdown of the loan portfolio by type of loan (real estate, commercial, consumer) are also obtained from this source.
- Quarterly analyst forecasts of earnings are obtained from the IBES database (only those stocks with at least three analysts covering are included)

- Stock returns are obtained from CRSP at a daily and monthly frequency, for both the bank holding companies and various market indices
- Market interest rates (LIBOR,Treasury Bills, and Commercial Paper Bills) are obtained from FRED - the economic database of the St. Louis Federal Reserve.
- Bank Merger/Acquisition Data is obtained from the SDC Database (Domestic Mergers). I identify all mergers in the financial sector by the SIC codes of both the acquirer and the target. These records are merged with the rest of the bank level data by the cusips of the banks involved in the merger.

To be included in the sample, a bank holding company must have both financial data (FR Y-9C) and daily return data (from CRSP), as well as a link between the two sources. This greatly reduces the number of BHC's available for the analysis. Also, all quarters in which a bank underwent a merger/acquisition (either as the target or the acquirer) are removed from the sample. These observations are removed because changes in the size of the loan portfolio (and other balance sheet items) that result from a merger are fundamentally different than the organic loan portfolio growth which this study assesses. Because I use both quarterly and annual changes when calculating my variables of interest, the three quarters following the merger are also removed from the sample to avoid calculating a yearly change which spans the pre and post merger period. Finally, to complete the sample construction, the top and bottom 1% of observations in the overall distributions of each of the explanatory variables (excluding size) are removed. This is to ensure that the results are not driven by outlier observations. All in all, the final panel data set includes 6716 firm*quarter observations. Tables 1 - 3 descibe the composition of the sample. Table 1 reports the number of banks in the sample per year. The number of banks in the sample increases every year, and ranges from 24 to 182 banks in a given year. Table 2 reports summary statistics on the balance sheet and income statement characteristics of the sample. Many of the varibles in the sample have a distribution which is right skewed (see the difference between the mean and the median values); this is due to the presence of a few very large banks. The source of the skewness can be examined by comparing the average values of a particular characteristic by the size (total assets) of the bank. Only the large bank sub-sample exhibits this skewness. In addition, large and small banks differ in the composition of their loan portfolio, with large banks holding a larger percentage of their loan portfolio in commercial loans, and a smaller percentage in real estate loans, as compared to the sub sample of small banks. Finally,Table 3 reports the average cumulative abnormal announcement day returns (CARs) for the sample. The announcement day window is defined as days (-1,3) centered on the earnings announcement date. Average CARs are shown for the whole sample, as well as for two sub-periods respresenting periods of regulation and deregulation in the banking industry. Average returns are lower in the regulation (Pre 1994) period.

3.6 Variable Definition

This section describes the construction of the variables used for the three sets of tests. For the announcement day returns, we need measures of the unexpected components of those information items on the day of the release. In addition, for both the short and long term returns tests, we need a measure of abnormal returns. Finally, variables need to be appropriately scaled as the panel includes banks with balance sheets of differing sizes. The following describes the modeling choices made with these considerations in mind.

Loan Portfolio Growth: A measure of unexpected change in loans, $\Delta Loans_{j,t}$, is defined as the change in the size of the (net) loan portfolio from quarter t to quarter t-4. Using the loan portfolio 4 quarters lagged controls for any seasonality in the size of the loan portfolio. This variable is normalized by lagged total assets.

$$\Delta Loans_{j,t} = \frac{Loans_{j,t} - Loans_{j,t-4}}{Total\ Assets_{j,t-4}}$$

Earnings Surprise: Following the ERC literature, unexpected earnings, $UE_{j,t}$, is defined as the difference between realized earnings per share and the last available forecasted value of earnings per share. Analyst forecasts are taken from IBES. The median of all analyst forecasts is used for only those stocks covered by at least 3 analysts. The earnings surprise is normalized by the lagged stock price.

$$UE_{j,t} = \frac{Actual\ EPS_{j,t} - Forecasted\ EPS_{j,t}}{P_{j,t-1}}$$

Change in Net Income: The net income in quarter t is compared to the net income in quarter t-4. This 4 quarter lag controls for seasonality in the income time series. The change in earnings is normalized by the market value in quarter t-4.

$$\Delta NI_{j,t} = \frac{NI_{j,t} - NI_{j,t-4}}{MV_{j,t-4}}$$

Non Performing Loans: Unexpected Non Performing Loans, $\Delta NPL_{j,t}$, is defined as the difference between Non Performing Assets in quarter t and quarter t-1. This variable is scaled by

Table 1: **Summary Statistics: Panel Description**

This table reports the number of Bank Holding Companies (BHC's) in the sample for each year, as well as the total number of firm*quarter observations per year. The sample period is 1986Q3 - 2008Q4.

Year	Number of Banks	Number of Observations
1987	24	38
1988	32	88
1989	40	109
1990	36	94
1991	40	109
1992	49	135
1993	65	191
1994	77	226
1995	76	231
1996	80	253
1997	85	237
1998	87	235
1999	109	316
2000	105	317
2001	120	348
2002	137	439
2003	156	525
2004	168	536
2005	182	595
2006	181	633
2007	174	579
2008	155	482
Total		6716

Table 2: **Summary Statistics: Balance Sheet Composition**

This table reports summary statistics calculated for the panel of BHC quarterly financial data over the period 1986 Q3 - 2008 Q4. Mean (median) values are displayed for the full sample and for three size sub-samples. The size sub-samples are formed by partitioning the firm*quarter observations into (equal volume) terciles by total assets. All values are in thousands.

	Full Sample	Small BHC's	Medium BHC's	Large BHC's
Total Assets	40,427,465	2,488,909	7,292,925	111,330,608
	(6,717,173)	(2,062,449)	(6,383,935)	(35,196,364)
Total Loans	20,617,657	1,639,379	4,687,225	55,434,446
	(4,187,824)	(1,389,603)	(4,014,935)	(20,375,000)
RE Loans	9,994,327	1,023,197	2,710,168	26,203,527
	(2,254,711)	(927,347)	(2,429,379)	(9,140,598)
Consumer Loans	3,579,835	168,601	665,646	9,886,428
	(361,495)	(67,778)	(381,867)	(1,813,827)
Commercial Loans	4,803,499	324,065	967,813	13,097,734
	(699,192)	(205,023)	(674,565)	(4,196,514)
Net Income	107,748	6,540	21,708	294,515
	(18,199)	(5,333)	(18,283)	(104,162)
Equity Market Value	6,080,604	384,450	1,311,689	16,517,951
	(1,067,706)	(317,265)	(1,037,557)	(5,517,395)
Loan Pct	0.6441	0.6826	0.6491	0.6011
	(0.6713)	(0.6866)	(0.6671)	0.6633
RE Loan Pct	0.4847	0.6241	0.5782	0.4727
	(0.5384)	(0.6673)	(0.6051)	0.4486
COM Loan Pct	0.1736	0.1028	0.142	0.1783
	(0.0863)	(0.0488)	(0.0951)	0.089
CON Loan Pct	0.233	0.1977	0.2065	0.2363
	(0.167)	(0.1475)	(0.168)	0.206

Table 3: **Summary Statistics: Announcement Day Returns**

This table reports cumulative abnormal announcement day returns (CAR) over the (-1,4) day window around quarterly financial announcements. Average returns are shown for the entire sample period (1986Q3 - 2008Q4), as well as over two sub-periods: Pre 1994 (1986Q3-1993Q4) and Post 1994 (1994Q1-2008Q1), corresponding to periods of regulation and deregulation in the banking industry. Five different models are used to calculate abnormal returns. Rows (1) and (2) estimate CAR using market models estimated using daily stock returns over the quarter preceding that of the financial data. Row (1) uses a CAPM market model and row (2) uses a Four Factor (Carhart) market model. Columns (3)-(5) use simple CAR models where the return on a benchmark portfolio is subtracted from the return of the bank. The benchmark portfolios used are the CRSP value weighted return (3), the value weighted return on an index of financial intermediaries (4), the return on the corresponding Fama French decile portfolio (5).

	Full Sample	Pre 1994	Post 1994
Market Models			
Four Factor Market Model (Carhart)	0.00306	-0.00184	0.00388
CAPM Market Model	0.00291	-0.00107	0.00358
Benchmark Portfolio Models			
CRSP VW Market Portfolio	0.00296	-0.00115	0.00374
Fama French Decile Portfolio	0.00287	-0.00043	0.00345

lagged market value (because it represents that part of the loan portfolio which is likely to translate into a loss in future earnings).

$$\Delta NPL_{j,t} = \frac{NPL_{j,t} - NPL_{j,t-1}}{MV_{j,t-1}}$$

Loan Loss Provision: Unexpected Loan Loss Provision, $\Delta LLP_{j,t}$, is defined as the difference between the Loan Loss Provision in quarter t and quarter t-4. Using the loan loss provision 4 quarters lagged controls for any seasonality in this variable. This variable is scaled by lagged market value.

$$\Delta LLP_{j,t} = \frac{LLP_{j,t} - LLP_{j,t-4}}{MV_{j,t-4}}$$

Loan Charge Offs: Unexpected Loan Charge-Offs,$\Delta LCO_{j,t}$, is defined as the difference between the Loan Charge Offs in quarter t and quarter t-4. Using loan charge offs 4 quarters lagged controls for any seasonality in this variable. This variable is scaled by lagged market value.

$$\Delta LCO_{j,t} = \frac{LCO_{j,t} - LCO_{j,t-4}}{MV_{j,t-4}}$$

Abnormal Returns: For the announcement day returns tests, abnormal returns, $CAR_{j,t}$ are measured over a (-1,3) day announcement window. There are two approaches to calculating abnormal returns. The first is to simply subtract a benchmark portfolio return from the bank's return over the announcement window. The second method involves estimating a factor model, in which the loadings on risk factors are estimated and the abnormal return is the part of the return not explained by the factor loadings and prices of the risk factors. The following models are employed for calculating the abnormal announcement day return:

Benchmark Portfolios:

Market Portfolio

$$CAR_{j,t} = R_{j,t} - R_t^M$$

Where $R_{j,t}$ represents the return on stock j over the announcement window and R_t^M represents the return on the CRSP value weighted market portfolio over the announcement window. It should be noted that this is the main measure of abnormal returns used in this study.

Decile Portfolio

$$CAR_{j,t} = R_{j,t} - R_t^D$$

Where $R_{j,t}$ represents the return on stock j over the announcement window and R_t^D represents the return on the corresponding Fama French Size Decile portfolio over the announcement window. It should be noted that stocks are assigned to a size decile by their market capitalization.

Factor Models:

CAPM:

$$CAR_{j,t} = R_{j,t} - \beta(RM_t - RF_t)$$

where $RM_t - RF_t$ represents the market risk premium factor for day t. β, the loading on this risk factor, is estimated for each bank separately, using daily returns over the entire sample period.

Carhart Four Factor Model:

$$CAR_{j,t} = R_{j,t} - \beta_{RM}(RM_t - RF_t) - \beta_{HML}(HML_t) - \beta_{SMB}(SMB_t) - \beta_{UMD}(UMD)$$

where $RM_t - RF_t$ represents the market risk premium factor for day t, and HML_t,SMB_t, and UMD_t represent the High Minus Low, Small Minus Big, and Momentum factors, respectively. The β's, the loadings on these risk factors, are estimated for each bank separately, using daily returns over the entire sample period.

The main measure of abnormal returns to test announcement day returns is the market portfolio benchmark model. However, the other measures described are used in robustness tests.

For the long-term portfolio return tests, excess returns are calculated using the four factor model as described in the methodology section.

Other Cross Sectional Characteristics:

Size: Size is defined as the log of the market value of the BHC in a given quarter.

Bank Risk: Bank risk is measured by a bank's beta (systemic risk), idiosyncratic volatility, and total return volatility (total risk). The beta of a BHC in a given quarter is estimated using daily returns over the previous quarter and is defined as the coefficient on the market return from the following regression:

$$R_{j,t} - Rf_{j,t} = \alpha + \beta\,(RM_t - Rf_t) + \epsilon_{j,t}$$

Idiosyncratic volatility is defined as the standard error of the residuals from the regression above. Total volatility is defined as the standard deviation of equity returns using daily returns over the previous quarter.

screening Level: The following variable is used to proxy for the screening level of the bank:

$$Screening\ Level_{j,t} = \frac{Number\ of\ Employees_{j,t}}{Total\ Loans_{j,t}}$$

Capital Ratio: The reported capital ratio is given by the Total Risk Based Capital Ratio (from the FR Y-9C regulatory data). Note that this variable is only available from the year 2001.

4 Results

4.1 Earnings Announcement Day Returns

Table 4 shows the first set of results from the regressions of earnings announcement day returns on the loan growth variable, as well as earnings and other controls. The basic model is estimated using the complete panel of BHC's over the sample period of 1986 Q3 - 2008 Q4. The positive and statistically significant coefficient on the loan growth * unexpected earnings variables suggests that the valuation implications of loan growth depend on the earnings level of the bank. Loan growth cannot be interpreted on its own, rather it should be interpreted in the context of bank characteristics, specifically earnings. I find that the market reacts positively (negatively) to the announcement of loan growth in banks with large (small) earnings surprises. At the mean level of the earnings surprise variable (unexpected earnings scaled by share price), a one standard deviation increase in the loan growth variable (loan growth scaled by total assets), leads to a 10.48 basis point abnormal announcement day return. At the tails of the earnings distribution, however, loan growth information has a much larger affect on market valuations. Specifically, at the low (one standard deviation below mean) level of the earnings surprise variable, a one standard deviation loan portfolio growth announcement leads to a -47.1 basis point abnormal announcement day return, while at the high (one standard deviation above mean) earnings surprise level, a one standard deviation loan portfolio growth announcement leads to a 68.06 basis point abnormal announcement day return.

The second column of Table 4 further highlights the differential valuation of loan growth across banks with differing levels of unexpected earnings. Specifically, dummy variables for the inclusion of a bank in the first (low) and fourth (high) quartile of the unexpected earnings distribution for

Table 4: **Determinants of Earnings Announcement CAR's**

This table reports the coefficient estimates (t statistics) from a panel regression of the CAR over days (-1,3) centered on the earnings announcement date on loan growth, unexpected earnings, an interaction term and control variables. The dependent variable, the CAR, is defined as $R_{i,t} - R_{vw,t}$, where $R_{vw,t}$ is the return on the CRSP value weighted market portfolio over the announcement window. The observation unit is a firm-quarter. Time and firm fixed effects are included, and standard errors are clustered by time and firm. $\Delta Loans_{j,t} = \frac{Loans_{j,t} - Loans_{j,t-4}}{TotalAssets_{j,t-4}}$, $UE_{j,t} = \frac{ActualEPS_{j,t} - ForecastedEPS_{j,t}}{P_{j,t-1}}$, $\Delta NPL_{j,t} = \frac{NPL_{j,t} - NPL_{j,t-1}}{MV_{j,t-1}}$, $\Delta LLP_{j,t} = \frac{LLP_{j,t} - LLP_{j,t-4}}{MV_{j,t-4}}$, $\Delta LCO_{j,t} = \frac{LCO_{j,t} - LCO_{j,t-4}}{MV_{j,t-4}}$,$\Delta Deposits_{j,t} = \frac{Deposits_{j,t} - Deposits_{j,t-1}}{TotalAssets_{j,t-1}}$

Variable	(1)	(2)
Intercept	0.368	0.293
	(7.469)***	(7.433)***
UE Earnings	1.377	4.846
	(4.823)***	(1.913)*
UE Earnings * DUM (UE Earnings in bottom quartile)		-3.843
		(-1.571)
UE Earnings * DUM (UE Earnings in top quartile)		0.592
		(0.201)
Δ Loans (t - t-4)	0.019	0.019
	(2.039)**	(1.803)*
Δ Loans * UE Earnings	11.422	
	(3.38)***	
Δ Loans*UE Earnings * DUM (UE Earnings in bottom quartile)		10.238
		(2.717)***
Δ Loans *UE Earnings * DUM (UE Earnings in top quartile)		16.343
		(1.852)*
Δ NPL	-0.284	-0.291
	(-2.871)***	(-2.868)***
Δ LLP	0.102	0.101
	(1.648)*	(1.668)*
Lagged Size	-0.018	-0.016
	(-3.923)***	(-3.758)***
Number of Observations	6716	6716
R^2	0.219	0.231

a given quarter are included in the basic market reaction regression. The statistical significance of the interaction terms of loan growth with these tail group earnings level dummy variables confirms that loan growth has a much larger valuation effect at the tails. Also note that the coefficient on the interaction between loan growth and earnings in the top quartile has a higher coefficient than the corresponding variable in the bottom quartile, suggesting an asymmetry in the markets reaction to this growth.

The results in Table 4 confirm several previous findings related to the information content of accounting figures. The statistically significant positive coefficient on unexpected earnings is consistent with the well known result that earnings are persistent, conveying information about future earnings, and thus affecting firm value. It should be noted that in addition to its statistical significance, the magnitude of the earnings response coefficient is very large. In contrast to the loan growth information, which affects abnormal announcement day returns by approximately 50 basis points at the tail values of the income distribution, a one standard deviation increase in the earnings surprise variable, at the mean loan growth level, leads to a 123.96 basis point abnormal announcement day return. The loan loss accounting variables, non-performing loans and loan loss provisions, are also found to convey information. Non-performing loans, a relatively non-discretionary measure of the credit condition of existing loans, is found to have a negative (statistically significant) association with announcement day returns, consistent with previous studies including Wahlen [1994] and Liu and Ryan [1995]. I find a significant positive association between Loan Loss Provisions (LLP) and announcement day returns. There is no consensus in the literature on the information contents of the LLP variable, which has both a discretionary and a non-discretionary component. My results, of positive valuation implications for increased LLP, are consistent with, for example, Wahlen [1994] and can be attributed to banks using increases in LLP as a signal to the market of future bank profitability. I should note however, that this result regarding LLP *is not robust* to the various other tests which I perform and as such, I do not attempt to infer its information content. In addition, I find no (new) information in the quarterly change in loan charge-offs (LCO), an additional loan loss accounting figure. One interpretation of the lack of information content of this item is that it offers no information beyond what is already captured in current earnings (because loan charge-offs are deducted from earnings).

It should be noted that the variable of interest in this study, loan portfolio growth, conveys information distinct from that conveyed by both earnings and the loan loss accounting variables. This is due to the fact that loan growth conveys information about new investments, while the other variables convey information about existing investments.

4.1.1 Bank Specific Characteristics

Tables 5,6, 7, and 8 demonstrate that the information content of loan growth indeed depends on features of the individual bank. At the firm level, both a bank's risk level and its screening ability affect the market reaction to loan growth. For these tests, the basic regression is run separately on three sub-samples representing low, medium, and high levels of the characteristic of interest.

Tables 5 and 6 show the effect of bank risk on the valuation implications of loan growth. Using the bank's beta (estimated from a CAPM model using daily returns over the previous quarter), as a measure of systematic risk, banks are split into terciles by their relative risk in a given quarter. The basic announcement day return regressions are then run separately on each of the risk level sub-samples. The results in Table 5 demonstrate that for high beta (systematic risk) banks, the market rewards loan growth in high earnings banks and discounts loan growth in low earnings banks. This is evident in the positive and statistically significant coefficient on the loans $\times$ earnings interaction term found in the high beta sub-sample. For the low risk bank sub-sample, the coefficient on the loan growth main effect is statistically significant, and that of the loan*income interaction term is not statistically different from zero. This suggests that for low risk banks, the average abnormal return increases with the announcement of loan growth independent of the banks earnings level. This difference between the valuation of loan growth in high and low risk banks is consistent with the market fearing evergreening in high risk banks, and thus requiring a signal of a bank's health (earnings) in order to valuate loan growth. Table 6 confirms that the coefficient on the loan*earnings interaction term indeeds differs significantly between the low and high risk sub-samples. This table shows the results of the basic regression performed on a pooled sample of low and high beta banks. In addition to the original explanatory variables, 7 additional terms are added: each of the the original variables is interacted with a dummy variable which takes on a value of 1 for all observations in the highest tercile by systematic risk in the given quarter. A significant coefficient on any of these new term interaction terms suggests a statistical difference in that coefficient across the two groups. Indeed, in the second column of 6, the coefficient on the loans*income variable, interacted with the the high beta group dummy, is positive and significant, suggesting that this variable affects valuations more for the high risk group.

Tables 7 and 8 demonstrate the effects of a bank's screening ability on the valuation implications of loan portfolio growth. Using the number of employees as a fraction of total loans as proxy for

Table 5: **Determinants of Earnings Announcement by Systematic Risk of BHC**

This table reports the coefficient estimates (t statistics) from a panel regression of the CAR over days (-1,3) centered on the earnings announcement date on loan growth, unexpected earnings, an interaction term and controls. The dependent variable, the CAR, is defined as $R_{i,t} - R_{vw,t}$. Firm-quarters are split into terciles by the bank's beta, estimated from a CAPM model using daily returns over the quarter of the financial data and one lagged quarter. Time and firm fixed effects are included, and standard errors are clustered by time and firm. Columns (1)-(3) show the estimates from the sub-sample of low, medium, and high beta banks respectively.

	(1)	(2)	(3)
Variable	Low Beta	Medium Beta	High Beta
Intercept	0.407	0.193	0.424
	(4.392)***	(2.958)***	(3.838)***
UE Earnings	1.769	0.698	1.739
	(2.367)**	(1.777)*	(5.109)***
Δ Loans (t - t-4)	0.037	-0.011	0.02
	(1.956)*	(-0.649)	(1.313)
Δ Loans * UE Earnings	-1.603	17.685	13.386
	(-0.252)	(2.379)**	(3.759)***
Δ NPL	-0.253	-0.173	-0.422
	(-2.196)**	(-1.41)	(-2.131)**
Δ LLP	0.095	0.065	0.103
	(0.62)	(0.967)	(1.529)
Lagged Size	-0.021	-0.017	-0.028
	(-2.558)**	(-2.929)***	(-3.287)***
Number of Observations	2210	2265	2241
R^2	0.3914	0.3039	0.3257
*Wald Test for joint restriction that all parameters are equal for the low and high beta samples**			
F statistic	4.155	p-value	0.00036

Table 6: **Determinants of Earnings Announcement by Systematic Risk of BHC**

This table reports the coefficient estimates (t statistics) from a from a pooled regression of low and high beta banks. The dependent variable, the CAR over days (-1,3) centered on the earnings announcement date is regressed on loan growth, unexpected earnings, an interaction term and controls. The CAR is defined as $R_{i,t} - R_{vw,t}$. Firm-quarters are split into terciles by the bank's beta, estimated from a CAPM model using daily returns over the quarter of the financial data and one lagged quarter. The pooled sample includes the low and high beta terciles. Time and firm fixed effects are included, and standard errors are clustered by time and firm. This regression includes interaction terms with an indicator for the high group, used to evaluate the difference in effects between the low and high beta sub-samples.

Variable	Main Effect	Effect*DUM(GROUP = H)
Intercept	0.392	0.006
	(5.605)***	(0.218)
UE Earnings	1.764	-0.048
	(2.391)**	(-0.061)
Δ Loans (t - t-4)	0.02	0.022
	(1.413)	(1.149)
Δ Loans * UE Earnings	1.285	11.657
	(0.201)	(1.701)*
Δ NPL	-0.265	-0.154
	(-2.259)**	(-0.708)
Δ LLP	0.152	-0.042
	(1.062)	(-0.28)
Lagged Size	-0.02	-0.00034
	(-3.013)***	(-0.179)
Number of Observations	4451	
R^2	0.2578	

Table 7: **Determinants of Earnings Announcement by Screening Level of BHC** This table reports the coefficient estimates (t statistics) from a panel regression of the CAR over days (-1,3) centered on the earnings announcement date on loan growth, unexpected earnings, an interaction term and control variables. The CAR is defined as $R_{i,t} - R_{vw,t}$. Firm-quarters are split into terciles by the screening level of the bank, measured by $\frac{NumEmployees_{j,t-1}}{TotalLoans_{j,t-1}}$ at the start of the quarter of the financial data.Time and firm fixed effects are included, and standard errors are clustered by time and firm. Columns (1)-(3) show the estimates from the sub-sample of low, medium, and high screening level banks respectively.

	(1)	(2)	(3)
Variable	Low	Medium	High
Intercept	0.377	0.265	0.348
	(6.762)***	(1.781)*	(2.895)***
UE Earnings	1.636	0.686	2.553
	(2.323)**	(1.801)*	(3.2)***
Δ Loans (t - t-4)	-0.017	0.033	0.054
	(-1.153)	(1.386)	(3.008)***
Δ Loans * UE Earnings	5.383	10.942	17.991
	(0.958)	(6.204)***	(2.099)**
Δ NPL	-0.392	-0.277	-0.309
	(-2.152)**	(-2.659)***	(-2.332)**
Δ LLP	0.086	0.068	0.115
	(0.792)	(0.762)	(0.647)
Lagged Size	-0.019	-0.016	-0.02
	(-3.72)***	(-1.715)*	(-2.766)***
Number of Observations	2210	2265	2241
R^2	0.2674	0.2646	0.2659
*Wald Test for joint restriction that all parameters are equal for the low and high screening level samples**			
F statistic	5.442	p-value	0.00001

Table 8: **Determinants of Earnings Announcement by Screening Level of BHC** This table reports the coefficient estimates (t statistics) from a pooled regression of low and high screening level banks. The dependent variable, the CAR over days (-1,3) centered on the earnings announcement date on loan growth, unexpected earnings, an interaction term and control variables. Firm-quarters are split into terciles by the screening level of the bank, measured by $\frac{NumEmployees_{j,t-1}}{TotalLoans_{j,t-1}}$ at the start of the quarter of the financial data. The pooled sample includes the low and high screening level terciles. Time and firm fixed effects are included, and standard errors are clustered by time and firm. This regression includes interaction terms with an indicator for the high group, used to evaluate the difference in effects between the low and high sub-samples.

Variable	Main Effect	Effect*DUM(GROUP = H)
Intercept	0.38	-0.032
	(7.812)***	(-0.834)
UE Earnings	1.648	0.711
	(2.501)**	(0.669)
Δ Loans (t - t-4)	-0.008	0.058
	(-0.669)	(2.52)**
Δ Loans * UE Earnings	6.153	11.51
	(1.127)	(1.194)
Δ NPL	-0.361	0.05
	(-2.143)**	(0.247)
Δ LLP	0.096	-0.002
	(1.072)	(-0.012)
Lagged Size	-0.019	0.00161
	(-4.311)***	(0.628)
Number of Observations	4451	
R^2	0.2448	

the screening ability of the bank, banks are split into terciles by their relative screening ability in a given quarter. The basic announcement day return regressions are then run separately on each of the screening level sub-samples. Comparing the coefficient on loan growth across the screening level sub-samples in Table 7, the results indicate that higher abnormal announcement day returns are associated with loan portfolio growth in banks with higher screening ability. Table 8 confirms that this loan growth coefficient indeed differs between the low and high screening ability sub-samples. This table shows the results of the basic regression on a pooled sample of low and high screening ability banks. In addition to the original explanatory variables, 7 additional terms are added: each of the original variables is interacted with a dummy variable which takes on a value of 1 for all observations in the highest screening level tercile in the given quarter. A significant coefficient on any of these new terms suggests a statistical difference in that coefficient across the two groups. Indeed, in the second column of 8, the coefficient on the loan growth variable,interacted with the high screening level dummy, is positive and significant, suggesting that this variable affects valuations more for the high screening group. This finding is consistent with the notion that the market trusts that banks with higher screening abilities are better able to capitalize on their information advantage in order to (over) price their loans and generate positive NPV investments.

4.1.2 Loan Characteristics

Table 9 concludes the results from the earnings announcement market reaction tests. In this table, loan growth is broken down by the type of loan (Commercial, Real Estate, Consumer). The growth in the portfolios of each loan type are added to the model, as well as the interaction of these loan growth terms with unexpected earnings. The results in Table 9 demonstrate that the type of loan issued also affects market valuations of loan growth. Notice that the coefficient on the consumer loan growth variable is positive and significant, while its interaction term with earnings is not significantly different than zero. Conversely, for both commercial loan portfolio and real estate portfolio growth, the main effects do not differ significantly from zero, while their interactions with earnings have positive and significant coefficients. Growth in the consumer loan portfolio is met with a uniform positive market valuation, while the valuation of growth to the real estate and commercial loan portfolios depends on the health of the bank. This finding is consistent with banks having pricing power in the market for individual loans, leading to these loans being overpriced and constituting positive NPV investments. Commercial loans, on the other hand, are more competitively priced, thus the market does not attribute positive value to this type of loan growth across the board. Instead, for these loans, for which in addition evergreening is more

Table 9: **Determinants of Earnings Announcement CARs by Loan Type**

This table reports the coefficient estimates b(t statistics) from a panel regression of the CAR over days (-1,3) centered on the earnings announcement date on loan growth by type of loan, unexpected earnings, the interaction between loans and earnings, and controls. The dependent variable, the CAR, is defined as $R_{i,t} - R_{vw,t}$, where $R_{vw,t}$ is the return on the CRSP value weighted market portfolio over the announcement window. Time and firm fixed effects are included, and standard errors are clustered by time and firm. $\Delta Loans_{j,t} = \frac{Loans_{j,t} - Loans_{j,t-4}}{TotalAssets_{j,t-4}}$, $UE_{j,t} = \frac{ActualEPS_{j,t} - ForecastedEPS_{j,t}}{P_{j,t-1}}$, $\Delta NPL_{j,t} = \frac{NPL_{j,t} - NPL_{j,t-1}}{MV_{j,t-1}}$, $Size_{j,t} = \log(MarketValue_{j,t})$. Loan main effect terms as well as loan*earnings interaction terms are estimated for the following loan types: Real Estate Loans, Commercial Loans, and Consumer Loans.

Variable	Estimate
UE Earnings	1.987
	(5.103)***
Δ RE Loans (t - t-4)	-0.003
	(-0.238)
Δ RE Loan * UE Earnings	10.795
	(2.96)***
Δ Commercial Loans (t - t-4)	0.032
	(0.843)
Δ Commercial Loans * UE Earnings	27.423
	(4.275)***
Δ Consumer Loans (t - t-4)	0.078
	(2.405)**
Δ Consumer Loans * UE Earnings	-9.565
	(-0.328)
Δ NPL	-0.385
	(-3.678)***
Δ LLP	0.076
	(0.506)
Lagged Size	-0.02
	(-3.704)***
Number of Observations	6275
R^2	0.2250

likely, the market requires a signal of bank health to valuate this growth and rewards (discounts) commercial loan growth only in high (low) earnings banks.

4.2 Predictive Regressions

Building on the insights gleaned from the announcement day returns tests, I assess whether the market valuations of loan growth are accurate. If the market "gets it right", then loan growth should predict future firm performance. To test this hypothesis, measures of future firm performance are regressed on current accounting figures. The explanatory variables in the predictive regressions differ from those in the announcement day market reaction regressions in that they do not represent the unexpected components of those variables, rather they represent the actual observed change in the variable over the quarter of the financial data. Most notably, the earnings surprise variable is replaced with two dummy variables indicating that a bank is in the top and bottom quartiles respectively, of the distribution of change in income for each quarter. This allows the evaluation of the predictability of loan growth in those banks in both tails of the earnings distribution, as this loan*earnings interaction was identified as an important determinant of firm value in the market reaction tests. Also, the dependent variable in these regressions represents a *future* performance measure: non-performing loans in the four quarters subsequent to the quarter of the financial data. Indeed, Table 10 provides evidence that the loan*interaction variable predicts this important measure of firm performance. Specifically, loan growth by banks in the bottom earnings quartile in a given quarter is associated with statistically significant higher non-performing loans two and three quarters ahead. This is evident by the positive and significant coefficient on loan growth in bottom earnings quartile banks in the first and second column of Table 10. Notice also that the coefficient on the current change in Non-Performing Loans does not differ statistically from zero. Thus, the loan growth variable, in conjunction with the earnings signal, has more predictive power for future non-performing loans. This is consistent with loan growth conveying information about new investments by the bank, while the non-performing loans item conveys information about the state of existing investments.

4.3 Long-Term Portfolio Returns

In a final set of tests, I examine long-term market returns to portfolios of bank stocks formed by sorting by loan growth and earnings. Banks are sorted independently into three groups each by both loan growth and change in earnings in each quarter. I assume that the market knows this loan

Table 10: **Predicting Future Non-Performing Loans**

This table reports the coefficient estimates (t statistics) from a panel predictive regression of the change in Non Performing Loans (NPL) over future (cumulative) intervals from two to four quarters ahead. Future change in NPL is regressed on time t loan growth, change in earnings, an interaction term and control variables. The dependent variable, quarterly change in NPL, is defined as $\frac{NPL_{j,t+k}-NPL_{j,t}}{TotalAssets_{j,t}}$ for k=2 to 4 quarters. The observation unit is a firm-quarter. Time and firm fixed effects are included, and standard errors are clustered by time and firm. $\Delta Loans_{j,t} = \frac{Loans_{j,t}-Loans_{j,t-4}}{TotalAssets_{j,t-4}}$, $\Delta NI_{j,t} = \frac{NI_{j,t}-NI_{j,t-4}}{MV_{j,t-4}}$, $\Delta NPL_{j,t} = \frac{NPL_{j,t}-NPL_{j,t-1}}{MV_{j,t-1}}$, $\Delta LLP_{j,t} = \frac{LLP_{j,t}-LLP_{j,t-4}}{MV_{j,t-4}}$,$Size_t = \log(MktVal_t)$. Banks are classified into quartiles each quarter by the change in net income.

	k Quarters Ahead Change in NPL		
Variable	k=2	k=3	k=4
Δ Net Income (t - t-4)	-0.007	-0.012	-0.012
	(-1.556)	(-1.824)*	(-1.524)
DUM (Δ Net Income in Q1)	-0.0002	-0.0002	-0.0003
	(-1.062)	(-1.0001)	(-1.057)
DUM (Δ Net Income in Q4)	-0.0003	-0.0003	-0.0004
	(-1.459)	(-1.068)	(-1.4)
Δ Loans (t - t-4)	0.0003	0.0003	0.0004
	(0.192)	(0.157)	(0.273)
Δ Loans * DUM (Δ Net Income in Q1)	0.00466	0.005	0.003
	(2.143)**	(2.062)**	(1.6)
Δ Loans * DUM (Δ Net Income in Q4)	0.00069	-0.00025	-0.00015
	(0.444)	(-0.132)	(-0.087)
Δ NPL	-0.002	-0.014	-0.008
	(-0.259)	(-1.184)	(-0.784)
Δ LLP	0.001	0.008	-0.01
	(0.14)	(0.799)	(-1.461)
Size	0.0002	0.0007	0.0011
	(0.75)	(1.875)*	(2.427)**
Number of Observations	5350	4975	4626
R^2	0.3741	0.4436	0.4860

Table 11: **Monthly Portfolio Returns**

This table reports the coefficient estimates (t statistics) from a panel regression of the CAR over days (-1,3) centered on the earnings announcement date on loan growth, unexpected earnings, an interaction term and controls. The dependent variable, the CAR, is defined as $R_{i,t} - R_{vw,t}$. Firm-quarters are split into terciles by the bank's idiosyncratic risk, measured by the standard error of the residuals of a CAPM model using daily returns over the quarter of the financial data and one lagged quarter. Time and firm fixed effects are included, and standard errors are clustered by time and firm. Columns (1)-(3) show the estimates from the sub-sample of low, medium, and high idiosyncratic risk banks respectively.

	Income			
Loans	L	M	H	HML
L	-0.0013	-0.0036	0.0011	0.0042
	(-0.3697)	(-1.2388)	(0.3271)	(1.0906)
M	-0.0025	0.0015	0.0045	0.0062
	(-0.5949)	(0.4171)	(1.3168)	(1.3393)
H	-0.0102	0.0004	0.0011	0.0116
	(-2.4948)**	(0.1149)	(0.3263)	(2.9108)***
HML	-0.0081	0.0055	-0.0007	
	(-2.0797)**	(1.4273)	(-0.1827)	

growth and earnings information by two months after the end of the data quarter. Thus, banks are assigned this income tercile/loan tercile combination starting two months after the end of the quarter, and held for three months, at which point banks are reassigned to portfolios based on the next quarter financial information. In all, nine loan*income combination portfolios are formed and value weighted monthly returns are calculated for each of these portfolios every month. Average excess returns are then calculated for these nine portfolios using the intercept estimates from the Carhart four factor model. Table 11 shows the estimated alphas (and their t-statistics) for each of the loan portfolios. Note the significant negative excess return to the low earnings/high loan growth portfolio in the lower left cells of Table 11. In addition, I investigate all of the portfolios formed by holding the high portfolio long and the low portfolio short along both dimensions of the table. Notice that forming a portfolio that is long high earnings/high loan growth bank stocks and short low earnings/high loan growth bank stocks generates a statistically significant excess monthly return of 1.16% (lower right corner of Table 11). This result is consistent with either market inefficiency (specifically a drift in the market reaction to the loans and earnings information) or the presence of a risk factor priced by the market but not captured in the Carhart four factor model. In this paper, I cannot distinguish between these two possibilities and present the result as an interesting puzzle for future study.

5 Robustness

To ensure that the results are not simply artifact of the study design, I test the robustness of the results to the definitions of the important inputs.

5.1 Abnormal Return Definition

Table 12 reports the results of the determinants of announcement day CAR's for five different models of abnormal returns. All of the main results hold, using all the definitions. Specifically, I see a positive and significant loan main effect, as well as a positive and significant loan*earnings interaction term across the models (with the exception of the loan growth main effect in the second column of Tale 12). This robustness is perhaps not surprising, because benchmark returns over the very short announcement window are close to zero regardless of the benchmark.

Table 12: **Robustness: Determinants of Earnings Announcement CARS by CAR Model**
This table reports the coefficient estimates (t statistics) from a panel regression of the CAR (using different models) over days (-1,3) centered on the earnings announcement date on loan growth, unexpected earnings, an interaction term and controls. Columns (1) and (2) estimate CAR using factor models estimated over the quarter preceding that of the financial data. Columns (3)-(5) use simple CAR models where the return on a benchmark portfolio is subtracted from the return of the bank. The benchmark portfolios used are the CRSP value weighted return (3), the value weighted return on an index of financial intermediaries (4), the return on the corresponding Fama French decile portfolio (5). Time and firm fixed effects are included, and standard errors are clustered by time and firm.

	Factor Model		Benchmark Portfolio	
Variable	CAPM	4 Factor	CRSP VW Market	FF Size Portfolio
Δ Loans (t - t-4)	0.022	0.012	0.02	0.018
	(2.335)***	(1.458)	(2.148)**	(1.972)**
UE Earnings	1.16	1.288	1.311	1.326
	(3.809)***	(4.357)***	(4.4764)***	(4.587)***
Δ Loans * UE Earnings	10.339	10.381	11.433	11.661
	(3.013)***	(2.908)***	(3.408)***	(3.392)***
Δ NPL	-0.257	-0.216	-0.268	-0.271
	(-2.844)***	(-2.275)**	(-2.693)***	(-2.764)***
Lagged Size	-0.019	-0.014	-0.018	-0.018
	(-4.123)***	(-5.268)***	(-3.905)***	(-3.751)***
Number of Observations	6716	6716	6716	6716
R^2	0.212	0.176	0.218	0.209

5.2 Alternative Models for Unexpected Loans

Because loan growth is the variable of interest in this study, I examined several methods for measuring the unexpected component of loan growth. Following Foster [1977], which discusses the time series properties of accounting data, we estimate two models for expected loan growth, and use the residuals from these models as measures of unexpected loan growth. The two models are given by:

Model 1: $Loans_t = a_0 + a_1 Loans_{t-4} + \epsilon_t$

Model 2: $Loans_t - Loans_{t-4} = a_0 + a_1(Loans_{t-4} - Loans_{t-8}) + \epsilon_t$

Both models assume that there is an annual seasonality in loan growth. Model 1 assumes that the level of loans follows a random walk with drift, while Model 2 assumes that the *change in loans* follows a random walk with drift. The parameters of both models are estimated for each bank separately, using the entire sample period for estimation. The difference between the model predicted loan growth and actual loan growth is used as the measure of unexpected earnings and is scaled by total assets of the bank at time t-4. Table 13 reports the results of estimating the basic CAR determinants regression using these alternate definitions of loan growth as well as using our main measure, $\Delta Loans = \frac{Loans_t - Loanst-4}{Assets_{t-4}}$. Studying Table 13, we see that the simple model captures the part of loan growth to which the market is reacting as well as the alternate models tested.

Finally, we test the robustness of the loan growth definition to the time frame over which the change in loans is calculated. Table 14 reports the results of the basic CAR determinants regression using both a quarterly and an annual (seasonally adjusted) change in loans as the measure of loan growth. The obtained results are qualitatively the same using both loan growth definitions. Using the annual change in loan growth yields a slightly better fit, as measured by the model's R^2, as well as higher significance of the loan growth variables of interest. This evidence suggests that the annual change in loan growth variable is better capturing the information relevant to investors.

6 Conclusion

I assess the information content of loan growth in banks and find that this content depends on both features of the bank and of the loan issued. Loan growth, in contrast to the loan loss accounting variables, conveys information about new investments of the bank (and not on the state of existing

Table 13: **Model for Unexpected Loans** This table reports the coefficient estimates (t statistics) from a panel regression of the CAR over days (-1,3) centered on the earnings announcement date on loan growth, unexpected earnings, an interaction term and controls. The dependent variable, the CAR, is defined as $R_{i,t} - R_{vw,t}$, where $R_{vw,t}$ is the return on the CRSP value weighted market portfolio over the announcement window. Time and firm fixed effects are included, and standard errors are clustered by time and firm. Unexpected Loans is calculated using three methods. In column (1), UE Loans $= \Delta Loans = \frac{Loans_t - Loans_{t-4}}{Assets_{t-4}}$. In columns (2) and (3), unexpected loans is estimated using two models adapted from Foster (1977). Model 1: $Loans_t = a_0 + a_1 Loans_{t-4} + \epsilon_t$. Model 2: $Loans_t - Loans_{t-4} = a_0 + a_1(Loans_{t-4} - Loans_{t-8}) + \epsilon_t$. The models are estimated separately for each bank using the entire sample period. The residuals from these regressions are then normalized by the total assets of the bank at time t-4.

Variable	Loans(t) - Loans(t-4)	Foster (1977) Model (1)	Foster (1977) Model (2)
Intercept	0.368	0.42	0.422
	(7.469)***	(6.882)***	(6.93)***
UE Loans	0.019	0.014	0.017
	(2.039)**	(0.792)	(0.926)
UE Earnings	1.377	1.758	1.652
	(4.823)***	(5.184)***	(5.543)***
UE Loans * UE Earnings	11.422	15.885	16.313
	(3.38)***	(1.964)**	(1.978)**
Delta NPL	-0.284	-0.279	-0.279
	(-2.871)***	(-3.055)***	(-3.037)***
Delta LLP	0.102	0.001	-0.002
	(1.648)*	(0.011)	(-0.033)
Lagged Size	-0.018	-0.021	-0.022
	(-3.923)***	(-3.819)***	(-3.841)***
Number of Observations	6716	6189	6189
R^2	0.219	0.219	0.219

Table 14: **Model for Unexpected Loans: Annual vs. Quarterly Loan Changes**

This table reports the coefficient estimates (t statistics) from a panel regression of the CAR over days (-1,3) centered on the earnings announcement date on loan growth, unexpected earnings, an interaction term and controls. The CAR model used is the bank return - the return on the CRSP value weighted market portfolio. Time and firm fixed effects are included, and standard errors are clustered by time and firm. Unexpected Loans at both an annual and quarterly frequency. In column (1), UE Loans = $\Delta Loans = \frac{Loans_t - Loans_{t-4}}{Assets_{t-4}}$. In column (2), UE Loans = $\Delta Loans = \frac{Loans_t - Loans_{t-1}}{Assets_{t-1}}$. Note that using the annual change in loan growth adjusts for seasonality in loan growth.

	Change in Loan Frequency		
Variable	Annual	Quarterly	Both
Intercept	0.372	0.37	0.368
	(7.361)***	(7.229)***	(7.123)***
UE Earnings	1.311	1.605	1.4
	(4.476)***	(5.099)***	(4.884)***
Δ Loans (t - t-4)	0.02		0.019
	(2.148)**		(1.678)*
Δ Loans * UE Earnings	11.433		8.068
	(3.408)***		(1.701)*
Δ Loans (t - t-1)		0.035	0.009
		(1.708)*	(0.361)
Δ Loans * UE Earnings		24.389	14.852
		(2.648)***	(1.288)
Δ NPL	-0.268	-0.272	-0.268
	(-2.693)***	(-2.757)***	(-2.731)***
Lagged Size	-0.018	-0.018	-0.018
	(-3.905)***	(-3.82)***	(-3.78)***
Number of Observations	6716	6716	6716
R^2	0.218	0.217	0.22

ones). My main finding is that, in capital markets, loan growth conveys good news in high earnings (healthy) banks and bad news in low earnings (unhealthy) banks. Furthermore, the capital market valuations of this information item are, at least somewhat, accurate in that loan growth information, in conjunction with earnings, predicts future bank performance. This information is especially important to regulators, who have identified loan growth as a red flag for detecting bank distress. I both confirm empirically and refine this statement to conclude that *loan growth in low earnings banks* be used as a red flag as it is shown to predict subsequent poor performance. Additionally, loan growth in banks with higher systematic risk needs to be evaluated in conjunction with earnings, as these banks are more likely to evergreen loans. Loan portfolio growth in banks with higher screening abilities conveys positive valuation information, presumably because these banks are better able to price new loans favorably. Finally, growth to the consumer loan portfolio has uniformly positive valuation implications, suggesting that the pricing power of banks in the market for this type of loan allows for the overpricing of this type of loan. Growth in real estate and commercial loans, on the other hand, has to be interpreted in conjunction with earnings. This is because for these types of loans, 1)evergreening is more likely, and 2)competitive pricing makes it harder to generate positive NPV investments.

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