Do Lower Returns on Bank Stocks Suggest Lower Cost of Capital? An Explanation for the Low Risk Anomaly and the Loan Growth Effect

Mike Qinghao Mao
Department of Finance
Deakin University
Email: mike.mao@deakin.edu.au
Tel.: (61)-0392446574

K.C. John Wei
School of Accounting and Finance
Hong Kong Polytechnic University
Email: johnwei@ust.hk
Tel.: (852)-2766-4953

Abstract
Banks with higher equity risk and faster loan growth have lower abnormal stock returns. By disentangling *ex ante* cost of capital from cash flow and discount rate news in bank stock returns, we show that the lower returns do not suggest lower cost of capital. The underperformance of banks with higher equity risk is explained by the poorer cash flow news. The underperformance of banks with faster loan growth is due to both the cash flow and the discount rate news components. Overall, the evidence points to the nontrivial role of investors' inefficient forecasts of expected bank risk and fundamentals.

JEL Classification: G12; G14; G21

Keywords: Capital requirements, bank loan growth, cash flow news, discount rate news, cost of capital.

* The authors thank Robert Dittmar, Tim Eisert, Bruce Grundy, Chien-Ting Lin, Spencer Martin, Rogier Quaedvlieg, Esad Smajlbegovic, Garry Twite, Yichao Zhu, and participants at FIRN banking and financial stability meeting, Deakin University, Erasmus University Rotterdam, Hong Kong Polytechnic University, and University of Melbourne for helpful comments and suggestions. All errors are our own.

Do Lower Returns on Bank Stocks Suggest Lower Cost of Capital?
An Explanation for the Low Risk Anomaly and the Loan Growth Effect

Abstract

Banks with higher equity risk and faster loan growth have lower abnormal stock returns. By disentangling *ex ante* cost of capital from cash flow and discount rate news in bank stock returns, we show that the lower returns do not suggest lower cost of capital. The underperformance of banks with higher equity risk is explained by the poorer cash flow news. The underperformance of banks with faster loan growth is due to both the cash flow and the discount rate news components. Overall, the evidence points to the nontrivial role of investors' inefficient forecasts of expected bank risk and fundamentals.

JEL Classification: G12; G14; G21

Keywords: Capital requirements, bank loan growth, cash flow news, discount rate news, cost of capital.

1. Introduction

Finance theories predict that under the efficient market hypothesis, banks with higher risk should pay higher cost of capital. Then financial regulations aiming to reduce banks' risk taking could be beneficial because they help to lower banks' cost of equity capital. However, a negative relation between bank risk and cost of capital could put the motive of such regulations into question. [1] Recently, Baker and Wurgler (2015) document that banks with higher equity beta as a result of lower capital ratio earn lower abnormal returns (the *low-risk anomaly*); Fahlenbrach, Prilmeier, and Stulz (2017) show that banks with faster loan growth underperform those with slower loan growth (the *loan-growth* effect). If these return differentials reflect gaps in the cost of capital, it would be used as justifications not to comply with risk reducing regulations such as a higher capital requirement or a tighter control of credit.

In this study, we address the question whether lower returns on bank stocks suggest lower cost of capital. We focus on the low-risk anomaly and the loan-growth effect in the cross-section of bank stock returns because banks' decisions on capital structure and investment are closely related to their risk taking. More importantly, a dynamic relation between the bank's equity beta and its loan growth policy can arise: banks that grow faster make riskier loans and therefore experience an increase in beta; banks with lower equity risk are more capable and tend to lend more; as banks take more risk by levering up and lending more, their profitability might benefit in the short run and deteriorate when the risks are realized ultimately. If investors and analysts overlook the dynamics between bank choices and the corresponding effects on bank risk and profitability, errors in expectations might lead to persistent pricing errors in bank stocks and generate predictable returns.

[1] For example, heightened capital ratios and other regulatory compliance requirement may reduce banks' risk but at the same time increase their cost of capital. It further lowers banks' capability to lend and therefore adversely affect the overall economy. Supporters of continued financial sector liberalization often vote for deregulation.

We use a return decomposition framework which is based on accounting valuation models and timely analyst earnings forecasts to disentangle sources of bank price movements: (i) changes in cash flow expectation, (ii) changes in the discount rate imposed by investors, and (iii) the *ex-ante* cost of equity capital.[2] The former two reflect shocks to investors' expectation about banks' fundamentals and risk; the latter is the required rate of return as implied in the current stock price. It follows that lower stock returns could suggest one or a combination of (i) worse-than-expected earnings prospects, (ii) increased risk perceived by investors, and (iii) lower cost of capital. The decomposition framework enables us to examine how the market initially forms and subsequently updates its expectations of risk and fundamentals in relation with banks' decision on capital ratios and lending policies. It also sheds light on whether biased expectation plays a role in accounting for the low-risk anomaly and the loan-growth effect, and in particular if so whether it is due to errors in forecasting cash flows or discount rates.

Overall, we find that the lower abnormal returns for bank stocks with higher equity risk are mainly driven by poorer cash flow news; the lower abnormal returns for those with faster loan growth are due to both poorer cash flow news and discount rate news. In neither case are the lower returns indicative of a lower cost of capital, but rather that the market is too optimistic about future cash flows or underestimates the discount rate.

We start with a sample based on U.S. bank stocks for the period 1985-2015, for which detailed analyst earnings forecasts are available to estimate the three components of realized monthly stock returns for each bank. The cash flow news (*CFret*) captures the effect of the change in cash flow expectation, the discount rate news (*DRret*) reflects the effect of the change

2 See, for example, Campbell and Shiller (1988), Campbell (1991), Chen, Da, and Zhao (2013), Mao and Wei (2016), and Vuolteenaho (2002).

in the discount rate, and the expected return (*Eret*) measures the implied cost of equity capital *ex ante*. The three return components add up to be equal to the total realized return by construction.

We first examine the low-risk anomaly and the loan-growth effect at the portfolio level. For the low-risk anomaly, we sort bank stocks into quintiles based on equity beta. For the loan-growth effect, we sort bank stocks into quintiles based on the past three-year loan growth rate. Consistent with the evidence in Baker and Wurgler (2015), bank stocks in the highest beta quintile on average underperform those in the lowest by around 55 basis points in abnormal returns after controlling for their exposures to risk factors. Consistent with the results in Fahlenbrach et al. (2017), bank stocks in the highest three-year loan growth quintile underperform those in the lowest by about 32 basis points in risk-adjusted returns. The low-risk anomaly and the loan-growth effect are thus confirmed for bank stocks covered by financial analysts, which are much larger in size than uncovered ones.

We then compare the average implied cost of equity capital (*ICC*) across these quintiles. Higher-risk banks exhibit higher *ICC*, with a spread between the two extreme quintiles of 8 basis points per month. For banks in the highest three-year loan growth quintile, *ICC* is about 3 basis points per month higher compared to the lowest quintile. Although the economic magnitudes are relatively small, the evidence supports a positive equity risk premium according to the standard asset-pricing theory. The evidence is also in contrast to the prediction that higher-risk banks, if they bear more implicit government guarantees, should have a lower cost of equity capital.[3] We next explore the explanations for the difference between the realized return and the implied cost of equity capital by focusing on the cash flow and discount rate return components. We find that the highest equity risk quintile portfolio exhibits systematically lower cash flow news compared

[3] Gandhi and Lustig (2015) find that large banks have higher leverage but much lower tail risk, indicating that investors perceive implicit government guarantees for large banks.

to the lowest one by 52 basis points per month, but half of the underperformance is offset by an outperformance of 26 basis points in the discount rate news. The highest three-year loan growth quintile portfolio underperforms the lowest one in the cash flow news by 9 basis points, and it further underachieves by another 30 basis points in the discount rate news.

The results point to market expectational errors in future cash flows news associated with bank equity risk, as well as in future cash flow news and discount rate news associated with bank loan growth. Investors' estimation of expected bank earnings and their *ex-ante* perceived risk exhibit systematic inefficiencies. Over time, revisions in earnings expectations and updates in risk perceptions exert price correction pressure across these bank stocks.

To validate whether the results are robust in a multivariate setting, we perform Fama and MacBeth (1973) cross-sectional regressions. After controlling for characteristics of bank size, book-to-market equity, return-on-equity and changes in book leverage, equity beta remains negatively predictive of cash flow news returns, and three-year loan growth remains negatively predictive of both cash flow news and discount rate news returns. The evidence substantiates portfolio-level analysis regarding the distinct mechanisms driving the two stylized effects in the cross-section of bank stock returns. In addition, the implied cost of equity capital is significantly and positively related to book-to-market equity, changes in book leverage as well as equity beta and past loan growth. All of this evidence implies a positive risk premium associated with risk-increasing bank policies. Therefore, the expected return measured by the *ex-ante* implied cost of equity capital from a valuation model shows that investors rationally charge a higher risk premium for banks adopting risk-increasing policies.

The implications based on asset prices are in accordance with firm fundamentals, revealed from the tests linking bank policies and bank characteristics to the future realized risk and profits to shareholders. Using panel regressions with both firm- and year-fixed effects, we find that high capital ratios negatively predict future equity risk measured by beta and idiosyncratic volatility. It implies that better capital adequacy leads to lower future risk. In addition, loan growth positively predicts future equity risk, supporting the notion that fast loan growth reflects risk taking. We also find that bank equity risk is negatively associated with subsequent profitability; in contrast, past loan growth is positively associated with profitability in the subsequent year, indicating a short-term earnings-enhancing effect. Taken together, subsequent risk and fundamental realizations echo the changes in market expectations regarding equity risk and cash flows. Initial inefficient expectations are gradually updated as investors learn from banks' disclosures and revelations in the financial market.[4]

Our paper contributes to the debate on whether measures that constrain bank equity risk will increase the cost of capital for banks by Admati et al. (2013), Adrian et al. (2015), Baker and Wurgler (2015), and Kisin and Manela (2016), among others. We underline the economic forces at play in bank stock performance to the extent that realized (abnormal) returns may not suggest cost of equity capital. Our finding indicates that increasing capital ratio requirement or constraining loan growth for banks may not necessarily lead to higher cost of capital. Second, our study offers an explanation for the low-risk anomaly and the loan-growth effect in the cross-section of bank stock returns.[5] Our results underline that the role of investors' expectational errors should not be overlooked when explaining the patterns of realized bank stock returns. The dynamics of changes in expectations can, to a large extent, cause price fluctuations.[6] Our study

---

[4] Furthermore, we verify the main results using return components estimated from VAR-based return decomposition method proposed by Vuolteenaho (2002).

[5] See also other stylized effects, for example, Barber and Lyon (1997), Gandhi and Lustig (2015), and Gandhi, Lustig, and Alberto (2016).

[6] Gennaioli, Shleifer, and Vishny (2015) present a psychological theory of the neglect of risk. They derive a mechanism for the boom-bust financial crisis based on investor beliefs.

differs from Fahlenbrach et al. (2017) by quantifying market expectational bias on both fundamentals and also risk associated with bank loan growth. We highlight that discount rate news channel is equally important as the cash flow news channel to account for the underperformance of stocks with faster loan growth. The increases in the discount rate forerun lower cash flow news which happens mainly during bad times. Finally, our study adds to the literature that uses the tool of return decomposition to decipher stock price movements in general for nonfinancial firms.[7] We extend this literature by quantifying the relative roles of different return components associated with certain bank attributes and by demonstrating the strength of the approach in studying cross-sectional return patterns.

2. Background on Bank Policies and Equity Performance

Studies on the cross-section of equity returns have established well-known factors and characteristics such as size, book-to-market equity, investment, profitability, and past stock performance (Fama and French, 2016).[8] Because banks carry out influential policies that affect the performance of not only their own stocks but also those outside the financial sector, a growing body of literature has begun to study the cross-section of only bank stock returns. For example, an early study by Barber and Lyon (1997) documents a significant relation between both size and book-to-market equity and bank stock returns using financial data from 1973 to 1994. Gandhi and Lustig (2015) uncover a significant size factor in the component of bank stock returns, which reflects the market pricing for bank-specific tail risk.[9] Gandhi, Lustig, and Alberto

[7] See, for example, Campbell and Vuolteenaho (2004), Cochrane (2011), Chen, Da, and Zhao (2013).

[8] Typically, financial firms are excluded in the analysis due to their unique business model underlying the profit generating process, regulations, and their much higher leverage ratios than nonfinancial firms.

[9] Schuermann and Stiroh (2006) find that the market factor and the Fama and French (1993) three factors are informative about the returns for U.S. bank holding companies. Adrian, Friedman, and Muir (2015) show that a financial-sector return on equity (ROE) factor and a financial-sector-minus-market return SPREAD factor facilitate the explanation for the cross-sectional returns in the financial sector.

(2016) extend the size anomaly associated with financial institutions' equities to an international setting and document that the cross-country differences are consistent with the implicit government guarantees for large financial institutions.

Our study focuses on understanding the low-risk anomaly documented in Baker and Wurgler (2015) and the loan-growth effect discovered in Fahlenbrach et al. (2017). The low-risk anomaly concerns bank policies on capital structure.[10] There have been calls for heightened capital requirements after the 2008-2009 financial crisis to reduce equity risk for banks, assuming a positive relation between equity risk and the cost of equity capital.[11] This assumed relation is challenged by the low-risk anomaly for nonfinancial firms, as emphasized by Fama and French (1992) on beta risk and by Ang, Hodrick, Xing, and Zhang (2006) on idiosyncratic risk. The lower abnormal returns to higher-beta stocks can be reconciled using the rational explanation that constrained investors bid up high-beta stocks (Frazzini and Pedersen, 2014) or by the behavioral explanation that high-beta stocks are more prone to speculative overpricing (Hong and Sraer, 2016).[12]

Baker and Wurgler (2015) are the first to examine the existence of the low-risk anomaly for U.S. bank stocks. They document a negative relation between a bank stock's systematic risk and idiosyncratic risk and its subsequent abnormal returns. They therefore claim that tightened capital requirements may be costly for banks' shareholders and for society. While they state that the origin of the low-risk anomaly is not critical for their purposes, mixing realized returns with cost of capital might vague the justification of the conclusion. For example, if the anomaly is

[10] Bouwman, Kim, and Shin (2017) show that high-capital banks have higher risk-adjusted stock returns in bad times, consistent with uncertain economic environment and distorted investor belief.
[11] The Dodd-Frank Wall Street Reform and the Consumer Protection Act were signed into federal law in 2010 to subject banks to more stringent regulation.
[12] Baker, Bradley, and Wurgler (2011) provide explanations for why financial institutions are constrained to arbitrage away the low-risk, high-alpha anomaly. They find that benchmarking can be a limit on arbitrage.

driven by mispricing which ceases to exist out of the sample, then assuming a positive relation between bank capital ratio and cost of capital can be misleading. In addition, if the high-risk and low-alpha effect is driven by the biased expectations of investors who fail to account for the implications of banks' risk taking, requiring banks to have a high capital ratio may help prevent losses to investors. Many other studies highlight the advantages of bank equity capital in different dimensions, such as increasing the probability of survival (Berger and Bouwman, 2013) and encouraging the bank to commit to monitoring (Allen, Carletti, and Marquez, 2011).

The second phenomenon, the loan-growth effect, concerns bank policies on lending or growth. Fahlenbrach et al. (2017) document that banks' poor stock performance following fast loan growth cannot be explained by merger activity or the asset growth effect. They find that banks with high loan growth experience deterioration in return on assets (ROA) and increases in loan loss provisions after high-growth periods, consistent with the view that banks, analysts, and investors do not fully appreciate the consequences of loan growth for bank earnings and risk. Their finding generalizes the country-level evidence in Baron and Xiong (2017) that bank credit expansion negatively predicts average bank equity returns in the subsequent one to three years, which suggests over-optimism by bank shareholders. However, the extent of market bias, the exact (earnings or risk) channel and the time series evolution are not yet studied.

Several studies seek to explain the credit deterioration and risk-taking that occur during lending booms. For example, firms with low credit quality issue more debt when credit markets become overheated (Greenwood and Hanson, 2013). Banks strategically lower their lending standards as a response to changes in credit demand and in the information structure of the market (Dell'Ariccia and Marquez, 2006). Banks also securitize their loans, which allows them to move loans off their books so they can easily get refinancing, causing the decline in loan quality to accelerate (Mian and Sufi, 2009). One goal of the study is to quantify to what extent investors correctly adjust for the implications of bank choices on future fundamentals and risk.

Though the two phenomena are studied separately and put in different context by others, we consolidate the two to highlight potential dynamics among loan growth, bank risk and fundamentals. One direct linkage could be that loan growth leads to higher equity risk and higher equity risk predicts lower returns. We leave it to the empirical tests to address whether the two effects are independent.

Understanding policies of banks or financial intermediaries and the corresponding market implications can be meaningful for the pricing of nonfinancial firms. For example, the wealth of financial intermediaries affects the pricing of many asset classes when financial intermediaries are considered as the marginal investors (He and Krishnamurthy, 2013; He, Kelly, and Krishnamurthy, 2017). The leverage of financial intermediaries as broker-dealers reflects funding conditions and the marginal wealth of these active investors and therefore can price a wide range of asset classes (Brunnermeier and Pedersen, 2009; Adrian, Etula, and Muir, 2014). Our study is linked to this strand of literature by exploring the pricing or mispricing of bank capital ratio and growth.

3. Sample Construction and Summary Statistics

We construct the sample of banks defined based on SIC codes from Ken French's data library plus bank holding companies.[13] We then match the sample banks with monthly analyst earnings forecasts from the Institutional Brokers' Estimate System (I/B/E/S), including one- to three-year earnings per share and long-term growth rate forecasts. The restriction to banks with

[13] Following Baker and Wurgler (2015), we exclude those banks with SIC classifications as Federal Reserve Banks, Foreign Banks, Functions Related to Deposit Banking, Non-depository Credit Institutions, Federal Credit Agencies, or FNMA. Bank holding companies are defined as those with three-digit SIC code 671.

analyst forecasts leads to the inclusion of relatively large banks in our sample. We use annual accounting variables from Compustat and stock return data from the Center for Research in Security Prices (CRSP). The sample period is from 1985 to 2015.[14]

We first apply the GLS, CT, OJ, and MPEG valuation models to calculate the implied cost of equity capital each month. The detailed description of these models is provided in Appendix 1. We then use the valuation model corresponding to the median cost of equity capital to compute the three return components, i.e., the cash flow news component (*CFret*), the discount rate news component (*DRret*), and the expected return component (*Eret*). The return decomposition is also detailed in Appendix 1. The three return components add up to the total realized return by design.[15] The screening process results in a final sample of 91,148 firm-month observations and approximately 280 banks per year.[16]

At the end of March each year, we regress past one-year daily (with a minimum of 60 observations) stock returns ($Ret_{i,t}$) in excess of the risk-free rate (R_{ft}) on the contemporaneous CRSP value-weighted market returns ($Ret_{m,t}$) in excess of the risk-free rate as follows:

$$Ret_{i,t} - R_{ft} = \alpha_i + \beta_i(Ret_{m,t} - R_{ft}) + \varepsilon_{i,t}, \quad (1)$$

where $\varepsilon_{i,t}$ is the residual. The equity beta is the slope estimate from the above regression for each bank stock. We use Compustat item total loans to customers (LCUACU) to calculate three-year loan growth, defined as the annualized loan growth rates from year *t*-3 to year *t*. We define the two equity capital ratios of *CAP*1 and *CAP*2 following Baker and Wurgler (2015).[17] *CAP*1 is

---

[14] Comprehensive data coverage by I/B/E/S started in 1985.

[15] To ensure data integrity, we require firms in the final sample to have at least 12 monthly observations and non-missing estimates of the return components covering more than 80% of each sample period. We winsorize the data by deleting observations that have extreme discount rate values.

[16] This is approximately 40 percent of the total number of observations in the CRSP monthly bank stock returns file during the same period.

[17] Baker and Wurgler (2015) use five measures for bank capital: equity to assets, tier-1 capital to assets, risk-based capital to assets, tier-1 capital to risk-weighted assets, and risk-based capital to risk-weighted assets. The last two

calculated as Tier-1 capital (RCFD8274) to total risk-weighted assets (RCFDa223), and *CAP*2 is calculated as total risk-based capital (RCFD3792) to total risk-weighted assets (RCFDa223). The bank capital data are from quarterly call reports covered by the WRDS Bank Regulatory database. We use the CRSP PERMCO to bank RSSID ID link table from the Federal Reserve Bank of New York to merge the datasets.[18] We aggregate RCFD data items in case of multiple RSSIDs per PERMCO. Other accounting ratios are constructed consistent with those used in the literature. The variable definitions are described in detail in Appendix 2.

Table 1 reports summary statistics for the variables used in the tests. The cash flow news component and the discount rate news component have standard deviations close to that of the total return, while the expected return component exhibits a much more concentrated distribution. This is consistent with previous findings that stock price variations are mainly driven by either cash flow news or discount rate news (Campbell and Shiller, 1988; Chen, Da, and Zhao, 2013). Monthly cash flow news has a mean of -0.64%, which reflects analyst over-optimism in the form of more downward than upward forecast revisions. Market beta, which measures systematic risk, has a mean of 0.82. There are sizable variations in the annualized loan growth rates. The standard deviation for the three-year loan growth rate has an average of around 25%. The book leverage growth rate also shows sizable variation in the data, with a standard deviation of 36%. Consistent with banks having high leverage ratios, the two capital ratio measures *CAP*1 and *CAP*2 are relatively low, averaging 11% and 14%, respectively. The small standard deviations of the two variables indicate that bank capital ratios are industry-specific and heavily regulated.

---

measures are shown to be much stronger than the rest in the associations with forward systematic and idiosyncratic risk.

[18] See https://www.newyorkfed.org/research/banking_research/datasets.html for detail. It includes PERMCO-RSSD links from January 1, 1990 to December 31, 2015.

4. Empirical Results

4.1. The low-risk anomaly and the bank loan-growth effect

We start by tabulating average characteristics of the portfolios in relation with the low-risk anomaly as in Baker and Wurgler (2015) and the loan-growth effect as in Fahlenbrach et al. (2017) in our sample. At the end of March each year, bank stocks are sorted into quintiles based separately on equity beta and three-year loan growth.[19] The portfolios are then held for twelve months after formation. Table 2 reports average characteristics at the portfolio formation time and average changes in the characteristics from the formation time to one-year post portfolio formation. Column (1) shows that banks with higher equity beta exhibit higher idiosyncratic volatility, lower capital ratios, lower loan growth and lower profitability. Though higher-risk banks tend to experience a decrease in risk in the following year, the relatively slower loan growth and the lower profitability tend to persist, as indicated in column (2). On the other hand, column (3) shows that banks with faster loan growth are relatively less risky, more capitalized as well as more profitable. The changes in the characteristics in the following year demonstrate a reversal pattern in both risk and profitability, shown in the last column. Overall, the summary statistics present dynamics in characteristics across bank portfolios, highlighting potential interactions among loan growth, equity risk and fundamentals: banks that grow faster make riskier loans and experience an increase in risk; banks with lower equity beta lend more; as banks take more risk, their profitability deteriorate.

We then turn to reproduce the low risk anomaly and the loan growth effect in our sample. Panel A of Table 3 presents the equal-weighted average monthly returns for each portfolio and

---

[19] Equity beta is calculated using the previous 252 (a minimum of 60) daily returns as of the end of March in year *t*. Loan growth and other accounting ratios are measured using accounting data corresponding to the fiscal year ended in year *t*-1. We form portfolios at the end of March to ensure that all of the accounting information is available to investors. The results are robust if we form portfolios at the end of December of year *t*-1.

for the hedging portfolio that longs the highest quintile (D5) and shorts the lowest quintile (D1). Panels B and C of Table 3 report the intercept estimates for the portfolios from the following Fama-French three-factor model and Fama-French five factor model respectively:

$$Ret_{i,t} - R_{ft} = \alpha_i + \beta_{i,Mkt} R_{Mkt,t} + \beta_{i,HML} R_{HML,t} + \beta_{i,SMB} R_{SMBt} + \varepsilon_{i,t}, \qquad (2)$$

$$Ret_{i,t} - R_{ft} = \alpha_i + \beta_{i,Mkt} R_{Mkt,t} + \beta_{i,HML} R_{HML,t} + \beta_{i,SMB} R_{SMBt} + \beta_{i,RMW} R_{RMWt} + \beta_{i,CMA} R_{CMAt} + \varepsilon_{i,t}, \qquad (3)$$

where $R_{Mkt,t}$ is the market factor measured by the market excess return (i.e., $Ret_{m,t} - R_{ft}$), $R_{HML,t}$ is the value factor as measured by the return on the High-minus-Low (HML) book-to-market equity portfolio, $R_{SMB,t}$ is the size factor as measured by the return on the Small-minus-Big size portfolio, $R_{RMW,t}$ is the profitability factor as measured by the return on the Robust-minus-Weak profitability portfolio, and $R_{CMA,t}$ is the investment factor as measured by the return on the Conservative-minus-Aggressive investment portfolio.[20]

Columns (1) in Panel A shows that stocks in the highest beta quintile underperform those in the lowest by 11 basis points per month in raw returns. The small magnitude and significance indicate a nearly flat relation between beta and raw returns. After adjusting the returns using the Fama-French three-factor model (Panel B) and five-factor model (Panel C), the return spreads between the two extreme portfolios are statistically significant, confirming the findings of the low-risk anomaly by Baker and Wurgler (2015) that higher-risk banks have lower abnormal returns. Column (2) in Panel A shows that the highest three-year bank loan growth portfolio underperforms the lowest by 36 basis points per month in raw returns. The magnitudes become

[20] These factor returns are retrieved from Kenneth French's website. For the detailed definition of these risk factors, refer to Fama and French (1993) and Fama and French (2016).

34 and 29 after controlling for the Fama-French three factors and five factors respectively, but remains significant.[21]

4.2. Cost of equity capital, cash flow news, and discount rate news: Portfolio-level analysis

Table 4 reports the portfolio-level results on the bank cost of equity capital. We use the implied cost of capital (*ICC*) estimated from the return decomposition models and perform the tests similar to those in Table 2 by replacing raw returns with *ICC*. Column (1) shows that the difference in *ICC* between the highest and lowest beta portfolios ranges is 8 basis points per month.[22] Unlike the low-risk anomaly present in the abnormal returns of banks, higher-risk banks do exhibit higher *ICC*, which is consistent with a positive risk premium according to the standard asset-pricing theory.

Columns (2) shows the *ICC* results on portfolios sorted by loan growth. The difference in *ICC* between the highest and lowest quintiles is 3 basis points per month which is economically insignificant. This suggests that the market imposes similar levels of cost of equity capital across banks with different past loan growth rates. Whether such a pricing mechanism is efficient depends on whether the *ex-ante* market expectation is consistent with subsequent realizations in bank risk and fundamentals. The different patterns concerning average realized return and average cost of equity capital imply that the low-risk anomaly and the bank loan-growth effect are both likely associated with inefficient expectations. The realized return reflects the *ex-post* adjustment to the *ex-ante* market expectations.

[21] Fahlenbrach, Prilmeier, and Stulz (2017) find that one-year loan growth has little predictive power for subsequent returns up to two years. They document that the return predictability is much stronger for three-year loan growth.
[22] The seemingly small magnitude is economically significant as *ICC* is the long-run average cost of equity capital. A small change in *ICC* translates to a sizable change in firm value.

To reconcile the systematic differences between realized return and *ICC* associated with these portfolios, we now turn to the roles of the other two return components. Panel A of Table 5 presents monthly cash flow news and discount rate news of portfolios based on bank stocks sorted on equity beta and loan growth.[23] Column (1) shows that the low-risk anomaly is present in the cash flow news component. The cash flow news differential between the highest (D5) and lowest (D1) beta quintile portfolios is -52 basis points per month. The cash flow news decreases almost monotonically when moving from D1 to D5. The evidence demonstrates that the market is more negatively surprised by changes in expected earnings of banks with higher equity risk. Columns (2) shows the highest loan-growth portfolio on average underperforms the lowest only by 9 basis points per month.

The next two columns in Table 5 report portfolio-level test results based on the discount rate news component. Column (3) shows that discount rate news returns almost monotonically increase with bank equity risk. The spread between the two extreme portfolios is around 26 basis points though statistically insignificant. Therefore, it is evident that the substantial underperformance in cash flow news returns of banks with high relative to low equity risk is partially mitigated (about 50%) by their outperformance in discount rate news returns. The *ex-post* adjustment in cash flow expectation plays a dominant role in accounting for the low-risk anomaly in bank stock returns. Columns (4) presents the results of average discount rate news returns across portfolios sorted by three-year loan growth. We observe that discount rate news returns almost monotonically decrease with loan growth. The spread in discount rate news returns between the two extreme portfolios is -30 basis points, which is two times larger than that

[23] Note that cash flow news is negative while discount rate news is positive for all portfolios. This is because analysts, on average, issue overly optimistic earnings forecasts and tend to revise forecasts downward. Such bias in cash flow news is absorbed by the discount rate news component in the return decomposition framework. Therefore, we mainly focus on the cross-sectional interpretations.

in the cash flow news returns. The evidence indicates that the mild underperformance of fast relative to slow three-year loan-growth banks in cash flow news is aggravated by the further underperformance in discount rate news. Both cash flow news and discount rate news account for the loan growth effect.

To address the concern that the estimated cash flow news and discount rates may still capture exposures to risk factors, we estimate the intercepts from the Fama-French three-factor model and five-factor model using the return components as the dependent variable. Panels B and C of Table 5 present the results, showing that the spreads in abnormal returns between two extreme portfolios are comparable to those reported in Panel A, both economically and statistically.

Table 5 thus provides evidence that the market overestimates future earnings for high-risk banks and fast three-year loan-growth banks relative to their low-risk and slow loan-growth counterparts, while it relatively understates expected discount rates for fast loan-growth banks. These expectational errors demonstrate that the market might, for behavioral reasons or due to rational limitations, fail to foresee banks' risk-taking motives and the implications of risk taking on future fundamentals.

The portfolio-level results are further verified by exploring the event-time return realizations. More specifically, we compare the magnitude of the total return with that of each of the return components for each event month from six months before to twelve months after portfolio formation. Figure 1 shows the results. Panels A1 and A2 illustrate that the low-risk anomaly for banks is evident mainly due to the persistent cash flow news component. The hedge portfolio of D5-D1 for stocks sorted on measures of equity risk exhibits persistently negative cash flow news both before and after portfolio formation. The discount rate news component is more volatile during the event window, while the expected return component demonstrates a small but positive correlation between equity risk and *ICC*. Panels B1 and B2 correspond to portfolios of stocks sorted on past loan growth. The charts confirm that three-year loan growth negatively affects both cash flow news and discount rate news. They indicate that investors adjust expected cash flow (discount rates) downward (upward) for faster loan-growth banks

Overall, the event-time figures demonstrate the persistent and systematic revisions in expectations on cash flows and discount rates by investors for the beta-sorted bank stock portfolios and the loan growth-sorted portfolios. In Figure 2, we present the calendar-time return realizations, which show that the underperformance in cash flow news associated with higher-risk relative to lower-risk banks is persistent both during and outside the crisis period of 2007-2009. Moreover, for the hedge portfolio based on three-year loan growth, the significantly negative cash flow news is mainly concentrated during the financial crisis period, while the discount rate news underperformance is persistent.

4.3. Fama and MacBeth (1973) cross-sectional regressions

The portfolio-level analysis offers implications for the univariate relations between bank characteristics and subsequent return components. To substantiate the baseline results, we now move to the tests using multivariate regressions by controlling for those bank characteristics that are known to be associated with future returns. We conduct the Fama and MacBeth (1973) tests by performing month-by-month cross-sectional regressions of total returns, the implied cost of equity capital, the cash flow news, and the discount rate news on a set of bank characteristics: size (Ln(Size)), book to market (Ln(BM)), return on equity (ROE), and change in book leverage (ΔLev). We then take the time-series averages of the coefficient estimates and report the means and their corresponding statistical significance and average R-squares.

Table 6 reports the results, with the dependent variables being the total return in Panel A, the *ICC* in Panel B, the cash flow news in Panel C, and the discount rate news in Panel D. Consistent with the portfolio analysis findings, Panel A shows a nearly flat relation between beta and total returns after controlling for other bank characteristics.[24] Past three-year loan growth significantly and negatively predicts subsequent total returns.

In Panel B of Table 5, bank risk and loan growth variables are positively associated with the expected cost of equity capital (*ICC*) for banks, which supports a positive equity premium associated with equity risk and loan growth. In addition, banks with higher book-to-market ratios, ROE, and changes in bank leverage have relatively higher *ICC*. These associations are also in line with a positive premium associated with a bank characteristic that increases in risk.

Panel C of Table 6 shows that equity beta and three-year loan growth are significantly and negatively associated with subsequent cash flow news, after controlling for other bank characteristics. Panel D demonstrates that bank equity beta positively predicts but loan growth negatively predicts subsequent discount rate news. These results confirm the insight from the portfolio-level analyses that investors overstate expected cash flows for high-risk relative to low-risk banks, while they overestimate expected cash flows and underestimate discount rates for banks with fast relative to those with slow three-year loan growth. Note also that value firms tend to exhibit higher discount rate news and lower cash flow news than growth firms, as implied by the coefficients on the book-to-market ratio; this is consistent with growth firms getting better earnings prospects but becoming riskier over time.

---

[24] To justify that the capital asset pricing model (CAPM) holds, the coefficient on beta should be close to the equilibrium market risk premium.

4.4. Implications for bank policies on future equity risk and earnings

In this section, we relate bank policies to the subsequent realization of equity risk and earnings. In the first part, we explore whether bank capital ratio and loan growth decisions affect future equity risk. In a panel regression setting, we regress an equity-risk proxy on its own lag and the measures of capital ratio and loan growth with other bank characteristic controls. Table 7 reports the results. Both bank- and year-fixed effects are included to account for any unobservable variables that are time- or bank-invariant. The two bank capital ratio measures are tier-1 capital to total risk-weighted assets (*CAP*1) and total risk-based capital to total risk-weighted assets (*CAP*2), following Baker and Wurgler (2015).

The estimated coefficients on the lagged risk variables are significant in both panels, indicating strong short-run persistence in beta and idiosyncratic volatility. Banks with higher equity risk continue to exhibit higher risk in the subsequent year, with a partial attenuation as indicated by the less-than-unity coefficients. Higher equity capital ratio is associated with lower future beta and idiosyncratic volatility. Column (3) shows that past three-year loan growth positively predicts subsequent bank equity and idiosyncratic volatility. Overall, the table highlights the equity risk implications of bank policies. The finding that better-capitalized banks exhibit lower equity risk is consistent with theories and empirical findings in the capital structure literature. The evidence regarding bank loan growth strengthens the insight by Fahlenbrach et al. (2017) that fast loan growth reflects risk taking by banks.

In the second part, we explore whether bank policies affect future profitability. Table 8 reports regression results of return-on-equity (ROE) on the lagged bank characteristics. Both firm- and year-fixed effects are included. Columns (1) shows that beta significantly and negatively predicts subsequent ROE, suggesting that increasing equity risk may be detrimental to the next-year earnings to shareholders. If the market naively forecasts future earnings using extrapolation, it would be more negatively surprised by cash flows of banks with higher equity risk. Assuming the current level of equity risk is around the optimal level, excessive risk taking of which shareholders are unaware would lead to a financial loss. This is in contrast to the interpretation that lower realized returns are a sign of lower risk. Column (2) shows that past bank loan growth is positively associated with the next-year ROE. Together with the finding in Table 7, the net effect of loan growth would be a trade-off between increasing short-term profitability and increasing equity risk, which has long-run cash flow implications. Recall the previous evidence that banks with high three-year loan growth experience both lower cash flow news and lower discount rate news relative to their low-growth counterparts. This implies that risk taking through fast long-run loan growth may hurt long-run cash flows and result in underestimation of risk by investors. If the market fails to incorporate the dynamic relations among bank policies, equity risk, and earnings, inefficiencies in forming expectations on expected cash flows and discount rates naturally appear.

4.5. Robustness check: VAR-based return decomposition

We check the robustness of our results using an alternative return decomposition method: the VAR approach. Instead of relying on the observed expected discount rate or cash flow forecasts as in a valuation model-based decomposition framework, a VAR approach uses an autoregressive specification to calculate the expected values. More specifically, we follow Vuolteenaho (2002) and Chen, Da, and Zhao (2013) to decompose firm-level excess returns into cash flow news and discount rate news components. Imposing a VAR structure on the state variables of stock returns, return on equity, and book-to-market ratio, we decompose firm-level annual returns from April of year *t* to March of year *t*+1 using the accounting information for the fiscal year ended in year *t*-1. The advantage of this approach is that the sample is no longer constrained to those bank stocks with available analyst earnings forecasts. However, the assumptions and the forecasting structure under the VAR approach make it subject to potential issues of misspecification and sensitive inferences to different assumptions. The details of the decomposition method are explained in Appendix 1.

We first conduct portfolio-level tests using the VAR-based return components. Table 9 reports the average monthly cash flow news for each quintile of bank stocks and the hedging portfolio D5-D1 in Panel A and the average monthly discount rate news in Panel B. It shows that bank stocks with higher beta underperform those with lower beta in the cash flow news component, although the spread is statistically insignificant. Column (2) shows that bank stocks with higher three-year loan growth underperform those with lower loan growth, which is mainly through the cash flow news component, contrary to the evidence in Table 5. The difference may arise from the low power of capturing true discount rate news under the VAR approach or a different decomposition horizon. If decomposing returns at the annual frequency better captures long-run effects, the evidence here suggests that the poorer performance of high loan-growth bank stocks manifests as underperformance in cash flow news.

We then turn to Fama-MacBeth cross-sectional regressions in the multivariate setting. Table 10 reports the results of tests similar to those in Table 6 but using VAR-based return components as dependent variables. The associations of bank risk and past loan-growth measures with the subsequent year's cash flow news are both negative and significant, as shown in Panel A. The evidence confirms that the higher equity risk and lower return phenomenon is mainly driven by the cash flow news component. It also suggests that higher loan growth leads to lower cash flow news. However, the associations of bank risk and past loan-growth measures with the subsequent year discount rate news are insignificant. The consistent results using return components estimated from the two different approaches regarding the cash flow news underscore market inefficiencies in forecasting future earnings associated with bank equity risk and loan growth.

In sum, the test results using VAR-based return components reinforce the insight that investors underreact to bank risk-taking motives and the consequences on fundamentals. Further, the cross-sectional differences in realized returns do not purely mirror the differences in the implied cost of equity capital.

5. Conclusions

We show that the lower returns associated with banks of high equity risk and fast loan growth do not suggest lower cost of capital. Risk-increasing bank policies such as lower capital ratios or faster loan growth predict higher equity risk which in turn forecasts lower profitability. The low-risk anomaly and the loan-growth effect in the cross-section of bank stock returns load largely on the systematic differentials between realized returns and cost of capital, highlighting the roles of both cash flow news and discount rate news components. The evidence suggests that investors overlook the effect of bank policies on future bank risk and fundamentals and therefore form biased expectations. It sheds light on the mispricing-based explanation for the two phenomena and signals the presence of market frictions in discerning banks' excessive risk-taking.

Our study cautions against equating lower returns with lower cost of capital and overlooking the economic forces at play. Market participants may not be fully aware of the risk and return implications of various bank policies and react inefficiently. Therefore, banking regulations designed to constrain risk taking by banks can help prevent losses to investors especially when the market is overoptimistic about banks' growth and fails to fully account for the risk involved.

Our study is subject to the limitation that implied cost of equity capital, cash flow news, and discount rate news are unobservable and difficult to perfectly disentangle from each other. Future research in the area of more accurately modeling and measuring market expectation may be fruitful and help us better understand discount rates (Cochrane, 2011).

References

Admati, Anat R., Peter M. DeMarzo, Martin F. Hellwig, and Paul Pfleiderer, 2013, Fallacies, irrelevant facts, and myths in the discussion of capital regulation: Why bank equity is not socially expensive, *Working Paper*.

Adrian, Tobias, Erkko Etula, and Tyler Muir, 2014, Financial intermediaries and the cross-section of asset returns, *Journal of Finance* 69, 2557–2596.

Adrian, Tobias, Evan Friedman, and Tyler Muir, 2015, The cost of capital of the financial sector, *Working Paper*.

Allen, Franklin, Elena Carletti, and Robert Marquez, 2011, Credit market competition and capital regulation, *Review of Financial Studies* 24, 983–1018.

Ang, Andrew, Robert J. Hodrick, Yuhang Xing, and Xiaoyan Zhang, 2006, The cross-section of volatility and expected returns, *Journal of Finance* 61, 259–299.

Baker, Malcolm, Brendan Bradley, and Jeffrey Wurgler, 2011, Benchmarks as limits to arbitrage: Understanding the low-volatility anomaly, *Financial Analysts Journal* 67, 40–54.

Baker, Malcolm, and Jeffrey Wurgler, 2015, Do strict capital requirements raise the cost of capital? Banking regulation and the low risk anomaly, *American Economic Review: Papers and Proceedings* 105, 315–320.

Barber, Brad M, and John D Lyon, 1997, Firm size, book-to-market ratio, and security returns: A holdout sample of financial firms, *Journal of Finance* 52, 875–883.

Baron, Matthew, and Wei Xiong, 2017, Credit expansion and neglected crash risk, *Quarterly Journal of Economics* 132, 713–764.

Berger, Allen N., and Christa H.S. Bouwman, 2013, How does capital affect bank performance during financial crises? *Journal of Financial Economics* 109, 146–176.

Bouwman, Christa, Hwagyun Kim, and Sang-Ook Shin, 2017, Bank capital and bank stock performance, *Working paper*.

Brunnermeier, Markus, and Lasse Pedersen, 2009, Market liquidity and funding liquidity, *Review of Financial Studies* 22, 2201–2238.

Campbell, John Y., 1991, A variance decomposition for stock returns, *Economic Journal* 101, 157.

Campbell, John Y., and Robert J. Shiller, 1988, The dividend-price ratio and expectations of future dividends and discount factors, *Review of Financial Studies* 1, 195–228.

Campbell, John Y, and Tuomo Vuolteenaho, 2004, Bad beta, good beta, *American Economic Review* 94, 1249–1275.

Chen, Kevin C. W., Zihong Chen; and K. C. John Wei, 2011, Agency costs of free cash flow and the effect of shareholder rights on the implied cost of equity capital, *Journal of Financial and Quantitative Analysis* 46, 171–207.

Chen, Long, Zhi Da, and Xinlei Zhao, 2013, What drives stock price movements? *Review of Financial Studies* 26, 841–876.

Claus, James, and Jacob Thomas, 2001, Equity premia as low as three percent? Evidence from analysts' earnings forecasts for domestic and international stock markets, *Journal of Finance* 56, 1629–1666.

Cochrane, John H, 2011, Presidential address: Discount rates, *Journal of Finance* 66, 1047–1108.

Dell'Ariccia, Giovanni, and Robert Marquez, 2006, Lending booms and lending standards, *Journal of Finance* 61, 2511–2546.

Easton, Peter D., 2004, PE ratios, PEG ratios, and estimating the implied expected rate of return on equity capital, *Accounting Review* 79, 73–95.

Fahlenbrach, Rüdiger, Robert Prilmeier, and René Stulz, 2017, why does fast loan growth predict poor performance for banks? *Review of Financial Studies*, forthcoming

Fama, Eugene F., and Kenneth R. French, 1992, the cross-section of expected stock returns, *Journal of Finance* 47, 427–465.

Fama, Eugene F., and Kenneth R. French, 2016, Dissecting anomalies with a five-factor model, *Review of Financial Studies* 29, 69–103.

Fama, Eugene F., and James D. MacBeth, 1973, Risk, return, and equilibrium: Empirical tests, *Journal of Political Economy* 81, 607–636.

Frazzini, Andrea, and Lasse Heje Pedersen, 2014, Betting against beta, *Journal of Financial Economics* 111, 1–25.

Gandhi, Priyank, and Hanno Lustig, 2015, Size anomalies in U.S. bank stock returns, *Journal of Finance* 70, 733–768.

Gandhi, Priyank, Hanno Lustig, and Plazzi Alberto, 2016, Equity is cheap for large financial institutions: The international evidence, *Working paper*.

Gebhardt, William R., Charles M. C. Lee, and Bhaskaran Swaminathan, 2001, Toward an implied cost of capital, *Journal of Accounting Research* 39, 135–176.

Gennaioli, Nicola, Andrei Shleifer, and Robert Vishny, 2015, Neglected risks: The psychology of financial crises, *American Economic Review: Papers and Proceedings* 105, 310–314.

Gode, Dan, and Partha Mohanram, 2003, Inferring the cost of capital using the Ohlson-Juettner model, *Review of Accounting Studies* 8, 399–431.

Greenwood, Robin, and Samuel G. Hanson, 2013, Issuer quality and corporate bond returns, *Review of Financial Studies* 26, 1483–1525.

Hail, Luzi, and Christian Leuz, 2006, International differences in the cost of equity capital: do legal institutions and securities regulation matter? *Journal of Accounting Research* 44, 485-31.

He, Zhiguo, Bryan Kelly, and Arvind Krishnamurthy, 2017, Intermediary asset pricing: New evidence from many asset classes, *Journal of Financial Economics* 126, 1-35.

He, Zhiguo, and Arvind Krishnamurthy, 2013, Intermediary asset pricing, *American Economic Review* 103, 732–770.

Hong, Harrison, and David A. Sraer, 2016, Speculative betas, *Journal of Finance* 71, 2095–2144.

Kisin, Roni, and Asaf Manela, 2016, The shadow cost of bank capital requirements, *Review of Financial Studies* 29, 1780–1820.

Mao, Mike Qinghao, and K. C. John Wei, 2016, Cash-flow news and the investment effect in the cross section of stock returns, *Management Science* 62, 2504–2519.

Mian, Atif, and Amir Sufi, 2009, The consequences of mortgage credit expansion: Evidence from the U.S. mortgage default crisis, *Quarterly Journal of Economics* 124, 1449–1496.

Ohlson, James A., and Beate E. Juettner-Nauroth, 2005, Expected EPS and EPS growth as determinants of value, *Review of Accounting Studies* 10, 349–365.

Schuermann, Til, and Kevin J Stiroh, 2006, Visible and hidden risk factors for banks, *Working paper*.

Vuolteenaho, Tuomo, 2002, What drives firm-level stock returns? *Journal of Finance* 57, 233–264.

Appendix 1. Valuation models and return decomposition

1. Valuation models

Following Hail and Leuz (2006), Chen, Chen, and Wei (2011), and others, we use the I/B/E/S analyst forecasts to proxy for earnings expectations, the accounting variables from Compustat, and the stock pricing variables from the CRSP. Four accounting valuation models are applied to map for each firm and at the end of each month the earnings forecasts to the current stock price. The implied cost of capital is solved to balance both sides of the respective valuation formula.

(1) The model of Gebhardt, Lee, and Swaminathan (GLS, 2001)

$$P_t^* = B_t + \sum_{i=1}^{T-1} \frac{(FROE_{t+1} - R_{gls}) \times B_{t+i-1}}{(1+R_{gls})^i} + \frac{(FROE_{t+T} - R_{gls}) \times B_{t+T-1}}{R_{gls} \times (1+R_{gls})^{T-1}}; \quad \text{(A1)}$$

(2) The model of Claus and Thomas (CT, 2001)

$$\mathrm{P_t^*} = \mathrm{B_t} + \sum_{\mathrm{i=1}}^{5} \frac{(\mathrm{FEPS_{t+1}} - \mathrm{R_{ct}} \times \mathrm{B_{t+i-1}})}{(1+\mathrm{R_{ct}})^{\mathrm{i}}} + \frac{(\mathrm{FEPS_{t+5}} - \mathrm{R_{ct}} \times \mathrm{B_{t+4}}) \times (1+\mathrm{g_{lt}})}{(\mathrm{R_{ct}} - \mathrm{g_{lt}}) \times (1+\mathrm{R_{ct}})^5}; \quad \text{(A2)}$$

(3) The model of Ohlson and Juettner-Nauroth (OJ, 2005) as implemented by Gode and Mohanram (2003)

$$\mathrm{P_t^*} = \frac{\mathrm{E(EPS_{t+1})}}{\mathrm{R_{oj}}} + \frac{\mathrm{E(EPS_{t+1})} \times \mathrm{E\{g_{st} - R_{oj} \times (1 - POUT)\}}}{\mathrm{R_{oj}} \times (\mathrm{R_{oj}} - \mathrm{g_{lt}})}; \quad \text{(A3)}$$

(4) The modified PEG ratio model of Easton (MPEG, 2004)

$$\mathrm{P_t^*} = \frac{\mathrm{E(EPS_{t+1})}}{\mathrm{R_{mpeg}}} + \frac{\mathrm{E(EPS_{t+1})} \times \mathrm{E\{g_{st} - R_{mpeg} \times (1 - POUT)\}}}{\mathrm{R_{mpeg}^2}}; \quad \text{(A4)}$$

Note that earnings forecasts correspond to a firm's fiscal year-end accounting performance. We use $P_t/(1+R_{gls})^{lag/12}$ to adjust the stock price so that P_t^* is twelve months ahead of the I/B/E/S earnings forecast date (fpedats), where lag is 12 minus the number of months that have passed since the I/B/E/S earnings forecast date. B_t is the book value of equity per share in month *t*. *T* is set at 12 and $FROE$ is the earnings per share forecast divided by the book value of equity per share for the first three years, declining linearly to an equilibrium return on equity from the 4th year to the 12th year. The equilibrium return on equity is calculated as the past 10-year industry-level median return on equity. The industry level ROE is winsorized to a value between the risk-free rate and 0.3. The book value of equity is estimated by $B_{t+1} = B_t + EPS_{t+1} - DPS_{t+1}$, which is the clean-surplus condition, and where DPS_{t+1} is equal to EPS_{t+1} multiplied by $POUT$, $POUT$ is the current dividend payout ratio, and EPS_{t+1} is calculated using the long-term earnings growth rate from I/B/E/S or the growth rate implied by EPS_{t+2} and EPS_{t+3}. The long-term abnormal earnings growth rate, g_{lt}, is calculated using the contemporaneous risk-free rate minus 3%. The short-term earnings growth rate, g_{st}, is the average of the short-term earnings growth rate implied by EPS_{t+1}, EPS_{t+2}, and analysts' long-term growth rate forecasts.

2. Return decomposition

We follow the approach of return decomposition suggested by Chen, Da, and Zhao (2013) and extended by Mao and Wei (2016) to decompose monthly realized stock returns into three components. We apply a valuation function to map cash flow expectation (cf_t) and the discount rate (dr_t) into the stock price at time *t*. The cash flow expectation is constructed from analyst earnings forecasts of earnings per share and earnings growth rate estimates and supplemented by related accounting information such as payout ratio and book equity. We strictly follow Mao and Wei (2016) and for convenience adopt their notation in defining each of the return components. Let $P_t = f(cf_t, dr_t, t)$ denote the valuation technology. The discount rate is essentially the implied cost of equity capital that is solved from the valuation function. We represent the realized stock return from *t* - 1 to *t* (Ret_t) as follows:

$$\mathrm{Ret_t} = \frac{\frac{\partial f_t}{\partial cf} \times \Delta cf}{P_{t\text{-}1}} + \frac{\frac{\partial f_t}{\partial dr} \times \Delta dr}{P_{t\text{-}1}} + \frac{\frac{\partial f_t}{\partial t} \times \Delta t}{P_{t\text{-}1}} = \mathrm{CFret_t} + \mathrm{DRret_t} + \mathrm{Eret_t}, \tag{A5}$$

where $CFret$, $DRret$, and $Eret$ denote the cash flow news component, the discount rate news component, and the expected return component, respectively. Each component captures its effect on stock price from changes in each one of the three parameters in the valuation function.

In a different form, the total return (Ret_t) and the three components are as follows:

$$\mathrm{Ret_t} = \frac{P_t - P_{t\text{-}1}}{P_{t\text{-}1}} = \frac{f(cf_t, dr_t, t) - f(cf_{t\text{-}1}, dr_{t-1}, t\text{-}1)}{P_{t\text{-}1}}, \tag{A6}$$

$$\mathrm{CFret_t} = \frac{\{\mathrm{f(cf_t, dr_t, t) - f(cf_{t\text{-}1}, dr_t, t) + f(cf_t, dr_{t\text{-}1}, t) - f(cf_{t\text{-}1}, dr_{t\text{-}1}, t)}\}/2}{\mathrm{P_{t-1}}}, \tag{A7}$$

$$DRret_t = \frac{\{f(cf_t, dr_t, t) - f(cf_t, dr_{t\text{-}1}, t) + f(cf_{t\text{-}1}, dr_t, t) - f(cf_{t\text{-}1}, dr_{t\text{-}1}, t)\}/2}{P_{t-1}}, \tag{A8}$$

$$\mathrm{Eret_t} = \frac{\{\mathrm{f(cf_{t\text{-}1}, dr_{t\text{-}1}, t) - f(cf_{t\text{-}1}, dr_{t\text{-}1}, t\text{-}1)}\}}{\mathrm{P_{t-1}}}. \tag{A9}$$

Eq. (A9), combined with the valuation structure of a stock, implies that the expected return component is equivalent to the implied cost of equity capital determined at *t*-1. Eq. (A7) and Eq. (A8) calculate the average cash flow news and average discount rate news components in two hypothetical scenarios, with one assuming that the cash flow news is incorporated first and the other assuming that the discount news is incorporated first.

3. Return decomposition using the VAR-approach

We follow Vuolteenaho (2002) and Chen, Da, and Zhao (2013) in assuming that the vector indicating a firm's state $Z_{i,t} = [r,\ roe,\ bm]$ follows a first-order VAR:

$$Z_{i,t} = \Gamma Z_{i,t-1} + \mu_{i,t}, \tag{A10}$$

where *r* is the log annual stock return calculated from April of year t to March of year t+1; *roe* is the log return on book equity, $\log(1 + NI/BV)$ where *NI* is net income and *BV* is book equity; and *bm* is the log book-to-market ratio.

The one-period unexpected return is composed of cash flow news and discount rate news:

$$Cash\ flow\ news = (\mathrm{e1}' + \lambda')\mu_{i,t}, \tag{A11}$$

$$Discount\ rate\ news = -\lambda'\mu_{i,t}, \tag{A12}$$

where $\mathrm{e1}' \equiv [1\ 0\ 0]$, $\lambda' = \mathrm{e1}'\rho\Gamma(\mathrm{I} - \rho\Gamma)^{-1}$ and $\rho = 0.96$.

We estimate the VAR using pooled prediction regressions per state variable with year-fixed effects, similar to de-meaning all variables in each cross-section.

Appendix 2. Variable definitions

Variable	Definition
Return	Total stock return.
CFret	The cash flow news return component.
DRret	The discount rate news return component.
Eret	The expected return component. It is also the implied cost of equity capital (ICC).
$Beta, \beta$	Equity beta computed by regressing a minimum of 60 and a maximum of 252 past daily stock returns in excess of the riskless rate on the contemporaneous CRSP value weighted market returns (VWRETD) in excess of the riskless rate.
g_loan3yr	Three-year loan growth rate calculated as the annualized growth rate of the total loans to customers (LCUACU) from year t-3 to year.
Ln(Size)	Size, calculated as the log of the market value of equity at the end of December.
Ln(BM)	Book to market, calculated as the log of the book value of equity divided by the market value of equity at the end of December. The book value of equity is calculated according to Fama and French (1992).
ROE	Return on equity, calculated as net income (NI) divided by the market value of equity at the end of previous year's December.
ΔLev	Change in book leverage, calculated as the growth rate in book leverage from year *t*-1 to year *t*. Book leverage is calculated as the total liability (LT) divided by the book value of equity.
$\sigma(\varepsilon)$	Idiosyncratic volatility, the root mean squared error using the residuals from the regressions for estimating beta.
CAP1	Tier-1 capital (RCFD8274) to total risk-weighted assets (RCFDa223).
CAP2	Total risk-based capital (RCFD3792) to total risk-weighted assets (RCFDa223).

Table 1. Summary statistics

This table reports summary statistics for total returns (*Return*), the cash flow news component (*CFret*), the discount rate news component (*DRret*), the expected return component (*Eret*), equity beta (β), three-year loan growth rate (g_loan3yr), size (Ln(Size)), book to market (Ln(BM)), return on equity (ROE), change in book leverage (ΔLev), idiosyncratic volatility (σ(ε)), tier-1 capital to total risk-weighted assets (CAP1), and total risk-based capital to total risk-weighted assets (CAP2). Detailed variable definitions are in Appendix 2. All return variables are expressed at monthly frequency and in percent. Volatilities are annualized. The sample period is from 1985 to 2015.

	Mean	Std Dev	1%	25%	Median	75%	99%
Return (%)	1.09	9.75	-27.74	-3.59	0.93	5.76	29.76
CFret (%)	-0.64	10.80	-47.29	-1.59	0.00	1.13	38.78
DRret (%)	0.87	14.13	-43.19	-5.40	0.30	6.33	53.06
Eret (%)	0.84	0.25	0.33	0.68	0.80	0.96	1.80
Beta(β)	0.82	0.52	-0.11	0.40	0.79	1.18	2.18
g_loan3yr	0.19	0.25	-0.13	0.05	0.13	0.26	1.41
Ln(Size)	6.32	1.61	3.28	5.16	6.13	7.34	10.19
Ln(BM)	-0.38	0.53	-1.71	-0.72	-0.40	-0.08	1.13
ROE	0.07	0.15	-0.50	0.06	0.08	0.11	0.35
Δlev	0.03	0.36	-0.49	-0.08	-0.01	0.07	0.99
σ(ε)	0.31	0.18	0.12	0.21	0.27	0.37	1.04
CAP1	0.11	0.03	0.06	0.09	0.11	0.13	0.22
CAP2	0.14	0.04	0.10	0.12	0.13	0.15	0.31

Table 2. Summary statistics of portfolios of stocks sorted on equity risk and loan growth

This table reports averages (at portfolio formation time) and average changes (Δ) (during the twelve months after portfolio formation) of variables of portfolios of stocks sorted on equity risk and loan growth. The variables include beta (β), tier-1 capital to total risk-weighted assets (CAP1), total risk-based capital to total risk-weighted assets (CAP2), idiosyncratic volatility (σ(ε)), three-year loan growth rate (g_loan3yr) and return on equity (ROE). Each year at the end of March, bank stocks are sorted into quintiles. Decile 1 (D1) groups stocks in the lowest quintile, decile 5 (D5) groups stocks in the highest quintile, and D5-D1 is a zero-cost hedge portfolio that longs D5 and shorts D1. The sample period is from 1985 to 2015. The *t*-statistics are in parentheses.

	Sorting by Beta (β)				Sorting by g_loan3yr			
		(1)		(2)		(3)		(4)
D1	*Beta (β)*	0.17	*ΔBeta (β)*	0.15	*Beta (β)*	0.91	*ΔBeta (β)*	0.02
D2		0.55		0.10		0.80		0.03
D3		0.79		0.05		0.75		0.04
D4		1.04		0.01		0.76		0.06
D5		1.46		-0.16		0.82		0.05
D5-D1		1.28		-0.32		-0.09		0.03
(t-statistics)		(25.09)		(-8.42)		(-3.62)		(1.88)
D1	*CAP1*	0.12	*ΔCAP1*	0.00	*CAP1*	0.12	*ΔCAP1*	0.00
D2		0.12		0.00		0.12		0.00
D3		0.11		0.00		0.11		0.00
D4		0.11		0.00		0.11		0.00
D5		0.11		0.00		0.11		0.00
D5-D1		-0.01		0.00		-0.01		0.00
(t-statistics)		(-3.71)		(1.49)		(-3.29)		(-0.87)
D1	*CAP2*	0.15	*ΔCAP2*	0.00	*CAP2*	0.15	*ΔCAP2*	0.00
D2		0.15		0.00		0.14		0.00
D3		0.14		0.00		0.14		0.00
D4		0.14		0.00		0.14		0.00
D5		0.14		0.00		0.14		0.00
D5-D1		-0.01		0.00		-0.01		0.00
(t-statistics)		(-3.63)		(1.91)		(-4.97)		(-0.51)
D1	*σ(ε)*	0.32	*Δσ(ε)*	0.00	*σ(ε)*	0.32	*Δσ(ε)*	-0.02
D2		0.29		0.01		0.29		0.00
D3		0.29		0.00		0.28		0.00
D4		0.31		0.00		0.29		0.01
D5		0.36		-0.02		0.30		0.01
D5-D1		0.04		-0.02		-0.02		0.02
(t-statistics)		(2.81)		(-2.08)		(-1.49)		(3.38)
D1	*g_loan3yr*	0.18	*Δg_loan3yr*	-0.01	*g_loan3yr*	-0.01	*Δg_loan3yr*	0.03
D2		0.19		0.00		0.08		0.02
D3		0.21		-0.01		0.14		0.00
D4		0.19		-0.02		0.22		-0.01
D5		0.16		-0.03		0.52		-0.10
D5-D1		-0.02		-0.02		0.52		-0.12
(t-statistics)		(-1.90)		(-2.55)		(20.68)		(-8.48)
D1	*ROE*	0.08	*ΔROE*	0.00	*ROE*	0.03	*ΔROE*	0.02
D2		0.08		-0.01		0.08		-0.01
D3		0.09		-0.02		0.08		-0.01
D4		0.08		-0.01		0.10		-0.02
D5		0.05		0.00		0.10		-0.03
D5-D1		-0.03		0.00		0.07		-0.05
(t-statistics)		(-3.43)		(0.25)		(3.71)		(-2.44)

Table 3. Monthly returns of portfolios of stocks sorted on equity risk and loan growth

Panel A reports average returns (in percent) of portfolios of bank stocks sorted on equity beta (β) and three-year loan growth rate (g_loan3yr). Each year at the end of March, bank stocks are sorted into quintiles. Decile 1 (D1) groups stocks in the lowest quintile, decile 5 (D5) groups stocks in the highest quintile, and D5-D1 is a zero-cost hedge portfolio that longs D5 and shorts D1. The portfolios are held for 12 months. Panel B and C report excess returns of the portfolios adjusted by the Fama and French three-factor model and five-factor model respectively. Average monthly returns are equal-weighted. The sample period is from 1985 to 2015. The *t*-statistics are in parentheses.

Panel A: raw returns

Sorting by	Beta (β)	g_loan3yr
	(1)	(2)
D1	1.23	1.37
D2	1.17	1.29
D3	1.09	1.15
D4	1.10	1.00
D5	1.12	1.01
D5-D1	-0.11	-0.36
(t-statistics)	(-0.46)	(-2.48)

Panel B: returns adjusted by Fama and French three-factor model

Sorting by	Beta (β)	g_loan3yr
	(1)	(2)
D1	0.66	0.48
D2	0.51	0.49
D3	0.29	0.36
D4	0.20	0.23
D5	0.03	0.14
D5-D1	-0.64	-0.34
(t-statistics)	(-3.34)	(-2.32)

Panel C: returns adjusted by Fama and French five-factor model

Sorting by	Beta (β)	g_loan3yr
	(1)	(2)
D1	0.54	0.40
D2	0.44	0.44
D3	0.20	0.28
D4	0.08	0.16
D5	0.09	0.11
D5-D1	-0.45	-0.29
(t-statistics)	(-2.29)	(-1.90)

Table 4. Monthly expected cost of equity capitals of portfolios of stocks sorted on equity risk and loan growth

This table reports the average expected cost of equity capital (in percent) of portfolios of bank stocks sorted on equity beta (β) and three-year loan growth rate (g_loan3yr). Each year at the end of March, bank stocks are sorted into quintiles. Decile 1 (D1) groups stocks in the lowest quintile, decile 5 (D5) groups stocks in the highest quintile, and D5-D1 is a zero-cost hedge portfolio that longs D5 and shorts D1. The expected cost of equity capital is equally weighted. The sample period is from 1985 to 2015. The *t*-statistics are in parentheses.

	cost of equity capital	
Sorting by	Beta (β)	g_loan3yr
	(1)	(2)
D1	0.84	0.88
D2	0.84	0.86
D3	0.85	0.86
D4	0.88	0.87
D5	0.93	0.90
D5-D1	0.08	0.03
(t-statistics)	(18.12)	(7.44)

Table 5. Monthly cash flow news and discount rate news of portfolios of stocks sorted on equity risk and loan growth

Panels A report average cash flow news and discount rate news of portfolios of bank stocks sorted on equity beta (β) and three-year loan growth rate (g_loan3yr). Each year at the end of March, bank stocks are sorted into quintiles. Decile 1 (D1) groups stocks in the lowest quintile, decile 5 (D5) groups stocks in the highest quintile, and D5-D1 is a zero-cost hedge portfolio that longs D5 and shorts D1. The portfolios are held for 12 months. Panels B and C report the intercepts from regressions of the portfolio cash flow news and discount rate news on the Fama and French three factors and five factors respectively. Equal-weighted average monthly cash flow news and discount rate news are reported in percent. The sample period is from 1985 to 2015. The *t*-statistics are in parentheses.

Panel A: Return components

	cash flow news		discount rate news	
Sorting by	Beta (β)	g_loan3yr	Beta (β)	g_loan3yr
	(1)	(2)	(3)	(4)
D1	-0.47	-0.69	0.87	1.13
D2	-0.58	-0.70	0.91	1.14
D3	-0.74	-0.55	0.95	0.87
D4	-0.70	-0.73	0.89	0.85
D5	-0.99	-0.78	1.12	0.84
D5-D1	-0.52	-0.09	0.26	-0.30
(t-statistics)	(-3.23)	(-0.53)	(0.94)	(-1.47)

Panel B: Return components adjusted by Fama and French three-factor model

	cash flow news		discount rate news	
Sorting by	Beta (β)	g_loan3yr	Beta (β)	g_loan3yr
	(1)	(2)	(3)	(4)
D1	-0.50	-0.75	0.33	0.32
D2	-0.64	-0.72	0.31	0.37
D3	-0.83	-0.61	0.24	0.14
D4	-0.77	-0.78	0.05	0.13
D5	-1.06	-0.86	0.10	0.05
D5-D1	-0.56	-0.11	-0.24	-0.26
(t-statistics)	(-3.42)	(-0.62)	(-1.00)	(-1.26)

Panel C: Return components adjusted by Fama and French five-factor model

	cash flow news		discount rate news	
Sorting by	Beta (β)	g_loan3yr	Beta (β)	g_loan3yr
	(1)	(2)	(3)	(4)
D1	-0.48	-0.68	0.20	0.18
D2	-0.64	-0.66	0.25	0.25
D3	-0.80	-0.61	0.12	0.07
D4	-0.70	-0.74	-0.11	0.02
D5	-1.03	-0.82	0.14	0.00
D5-D1	-0.55	-0.14	-0.07	-0.18
(t-statistics)	(-3.19)	(-0.76)	(-0.28)	(-0.81)

Table 6. Fama–MacBeth (1973) cross-sectional regressions

This table presents results from monthly Fama and Macbeth (1973) cross-sectional regressions. Time-series averages of cross-sectional coefficient estimates and the average R-squared values are reported. The dependent variables are total returns (*Return*) in Panel A, expected return component (*Eret*) in Panel B, cash flow news component (*CF news*) in Panel C, and discount rate news component (*DR news*) in Panel D. The explanatory variables are lagged size (Ln(Size)), book to market (Ln(BM)), return on equity (ROE), change in book leverage (ΔLev), equity beta (β) and three-year loan growth rate (g_loan3yr). The sample period is from 1985 to 2015. The *t*-statistics are in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Panel A: Total return		
Ln(Size)	-0.045	-0.038
	(-0.81)	(-0.76)
Ln(BM)	0.037	-0.172
	(0.19)	(-0.67)
ROE	0.602	0.328
	(0.81)	(0.32)
Δlev	-0.060	0.326
	(-0.43)	(0.99)
Beta (β)	0.068	
	(0.38)	
g_loan3yr		-1.095***
		(-3.12)
N	88,264	70,941
N(group)	372	372
R-squared	0.10	0.11

	(1)	(2)
Panel B: Eret (ICC)		
Ln(Size)	-0.001	0.027***
	(-0.26)	(6.71)
Ln(BM)	0.112***	0.154***
	(8.47)	(10.58)
ROE	0.336***	0.348***
	(4.61)	(4.11)
Δlev	0.054***	0.025
	(4.00)	(1.63)
Beta (β)	0.075***	
	(7.39)	
g_loan3yr		0.101***
		(6.09)
N	88,264	70,941
N(group)	372	372
R-squared	0.18	0.21

	(1)	(2)
Panel C: CF news		
Ln(Size)	-0.000	-0.088*
	(-0.00)	(-1.70)
Ln(BM)	-0.567***	-0.810***
	(-3.51)	(-3.46)
ROE	0.005	-0.593
	(0.01)	(-0.60)
Δlev	-0.359	-0.109
	(-1.22)	(-0.22)
Beta (β)	-0.328**	
	(-2.08)	
g_loan3yr		-0.714***
		(-3.60)
N	88,264	70,941
N(group)	372	372
R-squared	0.04	0.05

	(1)	(2)
Panel D: DR news		
Ln(Size)	-0.041	0.008
	(-0.70)	(0.13)
Ln(BM)	0.440**	0.394*
	(2.41)	(1.80)
ROE	0.136	0.619
	(0.14)	(0.59)
Δlev	0.239	0.332
	(0.78)	(0.71)
Beta (β)	0.268	
	(1.55)	
g_loan3yr		-0.583*
		(-1.71)
N	88,264	70,941
N(group)	372	372
R-squared	0.06	0.07

Table 7. Bank capital ratio, loan growth, and future equity risk

This table presents results from panel regressions of bank equity risk in year *t*+1 on the lagged equity risk, tier-1 capital (RCFD8274) to total risk-weighted assets (RCFDa223) (CAP1), total risk-based capital (RCFD3792) to total risk-weighted assets (RCFDa223) (CAP2), and three-year loan growth rate (g_loan3yr). The dependent variable is equity beta (β) in Panel A and idiosyncratic volatility (σ(ε)) in Panel B. Control variables include lagged size (Ln(Size)), book to market (Ln(BM)), return on equity (ROE), change in book leverage (ΔLev). Firm fixed and year fixed effects are included. The sample period is from 1985 to 2015. The *t*-statistics are in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
Panel A: Beta (β) in Year t+1			
Beta (β)	0.443***	0.443***	0.458***
	(23.74)	(23.61)	(25.78)
CAP1	-0.426*		
	(-1.70)		
CAP2		-0.443**	
		(-2.20)	
g_loan3yr			0.064**
			(2.55)
Ln(Size)	0.094***	0.096***	0.058***
	(5.16)	(5.20)	(3.42)
Ln(BM)	0.047*	0.051**	0.021
	(1.82)	(1.98)	(0.94)
ROE	-0.090	-0.090	-0.104**
	(-1.59)	(-1.58)	(-2.08)
Δlev	-0.002	-0.001	-0.021
	(-0.07)	(-0.04)	(-0.92)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	5,084	5,087	5,961
R-squared	0.60	0.60	0.56

Panel B: $\sigma(\varepsilon)$ in Year t+1	(1)	(2)	(3)
σ(ε)	0.326***	0.326***	0.359***
	(10.16)	(10.16)	(14.80)
CAP1	-0.319***		
	(-3.34)		
CAP2		-0.296***	
		(-3.49)	
g_loan3yr			0.031**
			(2.54)
Ln(Size)	-0.005	-0.004	-0.001
	(-0.81)	(-0.75)	(-0.31)
Ln(BM)	0.049***	0.052***	0.043***
	(5.21)	(5.41)	(4.89)
ROE	-0.061**	-0.060**	-0.038*
	(-2.43)	(-2.41)	(-1.81)
Δlev	0.045***	0.046***	0.040***
	(3.49)	(3.54)	(3.11)
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
N	5,084	5,087	5,961
R-squared	0.69	0.69	0.67

Table 8. Bank characteristics and future profitability

This table presents results from panel regressions of bank return on equity (ROE) in year *t*+1 on equity beta (β) and three-year loan growth rate (g_loan3yr). Control variables include lagged size (Ln(Size)), book to market (Ln(BM)), return on equity (ROE), change in book leverage (ΔLev). Firm fixed and year fixed effects are included. The sample period is from 1985 to 2015. The *t*-statistics are in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

ROE in Year t+1	(1)	(4)
Beta (β)	-0.024***	
	(-2.87)	
g_loan3yr		0.017
		(1.58)
Ln(Size)	-0.008	-0.010
	(-0.97)	(-1.11)
Ln(BM)	-0.100***	-0.121***
	(-6.52)	(-6.40)
Δlev	-0.008	-0.053*
	(-0.47)	(-1.76)
ROE	0.242***	0.195***
	(5.01)	(4.01)
Firm FE	Yes	Yes
Year FE	Yes	Yes
N	7,515	5,961
R-squared	0.21	0.23

Table 9. VAR-based monthly cash flow news and discount rate news of portfolios of stocks sorted on equity risk and loan growth

Panel A and B report average cash flow news and discount rate news of portfolios of bank stocks sorted on equity beta (β) and three-year loan growth rate (g_loan3yr). Each year at the end of March, bank stocks are sorted into quintiles. Decile 1 (D1) groups stocks in the lowest quintile, decile 5 (D5) groups stocks in the highest quintile, and D5-D1 is a zero-cost hedge portfolio that longs D5 and shorts D1. The portfolios are held for 12 months to end of March of the following year. Cash flow news and discount rate news are estimated using the VAR approach described in Appendix 1. Equal-weighted average monthly cash flow news and discount rate news are reported in percent. The sample period is from 1985 to 2015. The *t*-statistics are in parentheses.

Panel A: cash flow news

Sorting by	Beta (β)	g_loan3yr
	(1)	(2)
D1	0.15	0.26
D2	0.18	0.30
D3	0.06	0.27
D4	0.08	0.15
D5	0.00	-0.03
D5-D1	-0.15	-0.30
(*t*-statistics)	(-0.88)	(-1.96)

Panel B: discount rate news

Sorting by	Beta (β)	g_loan3yr
	(1)	(4)
D1	-0.03	0.02
D2	-0.04	-0.02
D3	0.00	-0.01
D4	0.00	-0.02
D5	-0.01	-0.01
D5-D1	0.02	-0.03
(*t*-statistics)	(0.53)	(-1.32)

Table 10. Fama–MacBeth (1973) cross-sectional regressions: VAR-based return components

This table presents monthly Fama and Macbeth (1973) cross-sectional regressions. Time-series averages of cross-sectional coefficient estimates and the average R-squared values are reported. The dependent variables are the cash flow news in Panel A and the discount rate news in Panel B. The explanatory variables are lagged size (Ln(Size)), book to market (Ln(BM)), return on equity (ROE), change in book leverage (ΔLev), equity beta (β) and three-year loan growth rate (g_loan3yr). Cash flow news and discount rate news are estimated using the VAR approach described in Appendix 1. The sample period is from 1985 to 2015. The *t*-statistics are in parentheses. The superscripts ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)
Panel A: CF news		
Ln(Size)	0.102***	-0.002
	(3.12)	(-0.04)
Ln(BM)	-0.095	-0.393**
	(-0.75)	(-2.07)
ROE	0.217	0.539
	(0.41)	(0.63)
Δlev	0.081	0.285
	(0.90)	(1.07)
Beta (β)	-0.342*	
	(-1.97)	
g_loan3yr		-0.925***
		(-3.17)
N	14,834	10,940
N(group)	32	32
R-squared	0.07	0.11

	(1)	(2)
Panel B: DR news		
Ln(Size)	0.001	0.010
	(0.13)	(1.14)
Ln(BM)	0.047*	0.101***
	(1.73)	(3.35)
ROE	-0.380**	-0.260
	(-2.36)	(-1.37)
Δlev	-0.019	-0.108
	(-0.45)	(-1.60)
Beta (β)	0.024	
	(0.95)	
g_loan3yr		0.004
		(0.10)
N	14,834	10,940
N(group)	32	32
R-squared	0.09	0.13

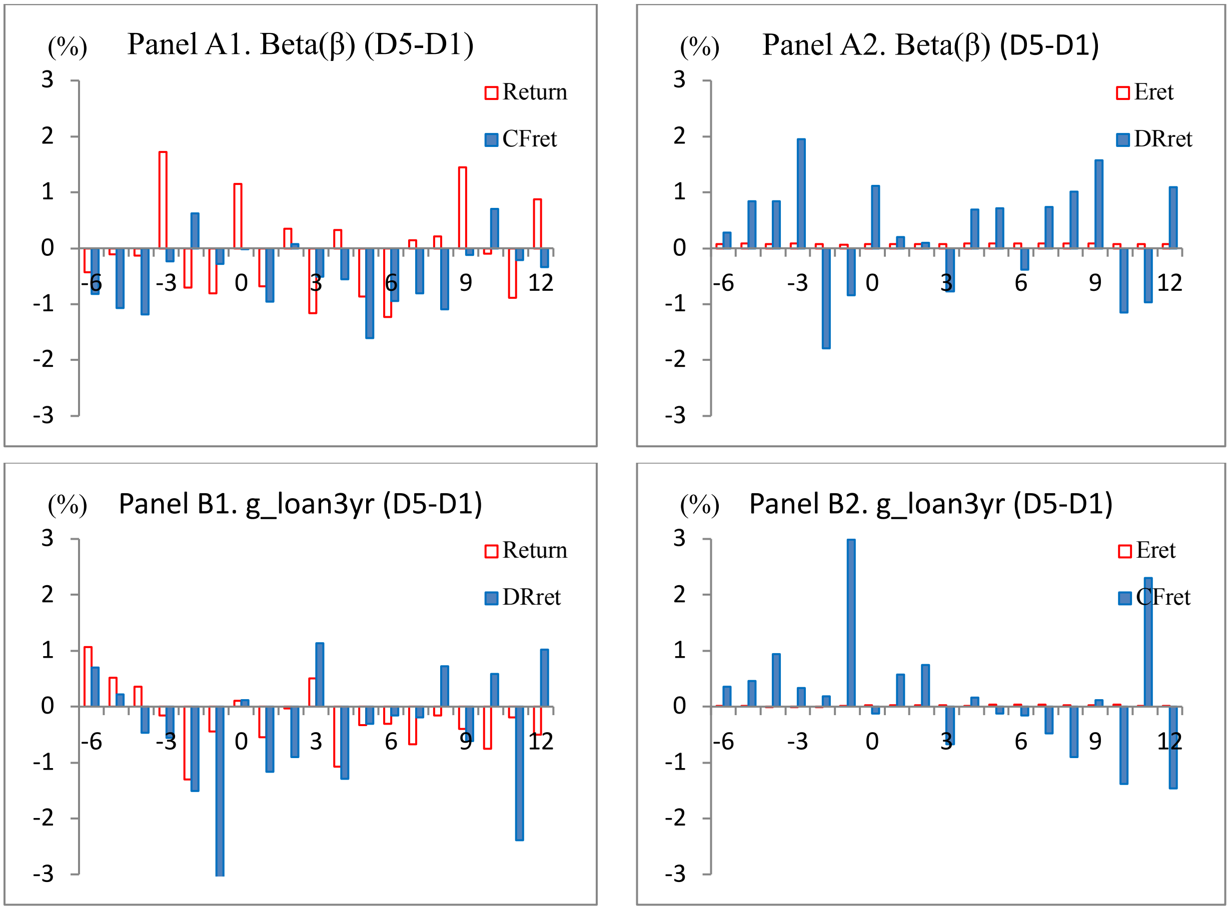

Figure 1. Event-time return realizations. This figure presents event-time average returns and return components of the hedge portfolio D5-D1 based on stocks sorted on equity beta (β) and three-year loan growth rate (g_loan3yr). Each year at the end of March, bank stocks are sorted into quintiles of D1 to D5. The event window spans from six months before portfolio formation to twelve months after portfolio formation. *Ret*, *CFret*, *DRret*, and *Eret* correspond to total returns, the cash flow news component, the discount rate news component, and the expected return component respectively. The sample period is from 1985 to 2015.

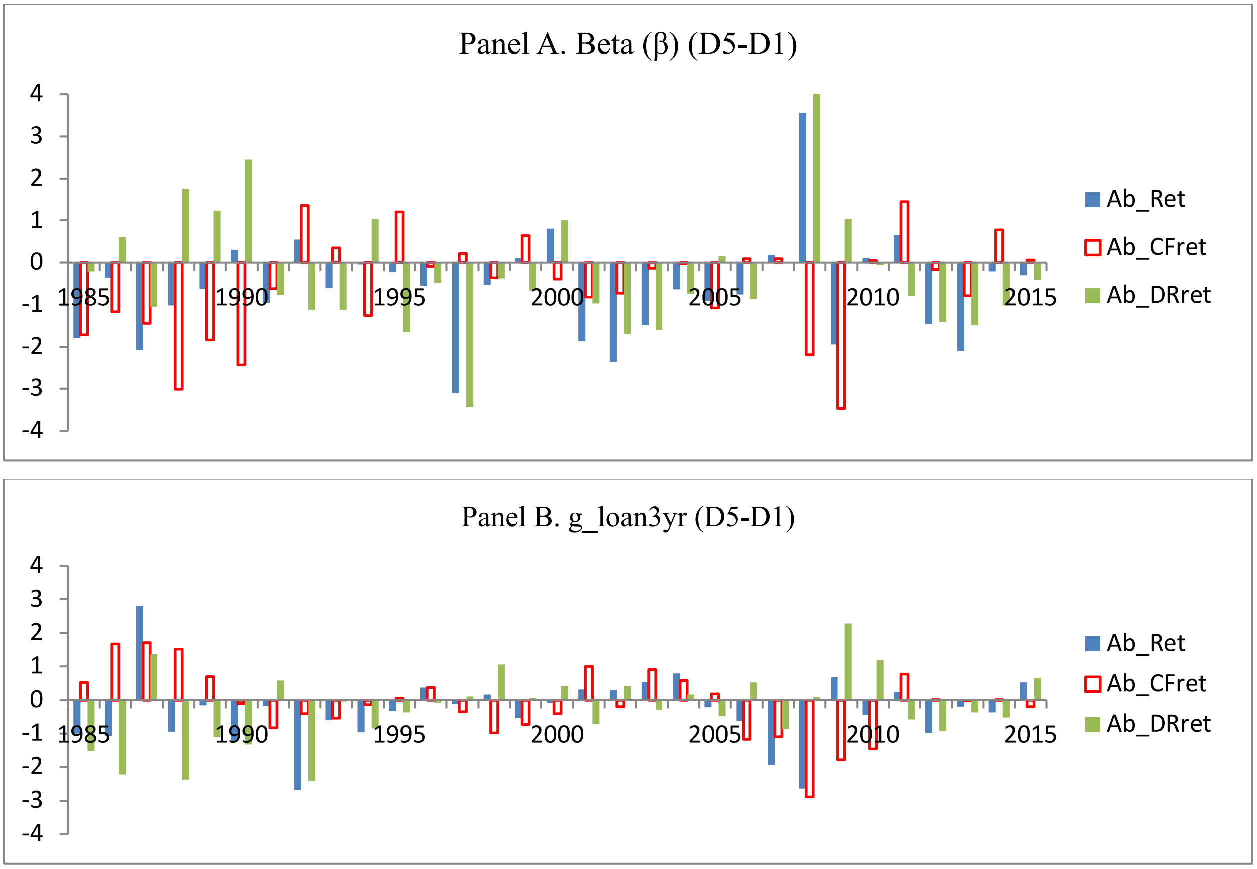

Figure 2. Calendar-time return realizations. This figure presents calendar time average abnormal returns (Ab_Ret), abnormal cash flow news (Ab_CFret), and abnormal discount rate news (Ab_DRret) of the hedge portfolio D5-D1 based on stocks sorted on equity beta (β) and three-year loan growth rate (g_loan3yr). Each year at the end of March, bank stocks are sorted into quintiles of D1 to D5. Portfolios are held for twelve months after formation. The sample period is from 1985 to 2015.