The Value Relevancy of Nontraditional Bank Earnings

Brian Du
California State University, East Bay

Pei-Hui Hsu
California State University, East Bay

Due to the growing range of financial services offered by US bank holding companies, banks are increasingly relying on nontraditional activities to generate income. This study examines the extent to which external capital markets recognize the properties of earnings components resulting from the observed shift. We find that investors are unable to discern between the differential properties in bank earnings components by underweighting both components of income during economic booms and underweighting traditional income during crisis periods. This finding provides evidence which contradicts the view of an efficient market in which stock prices reflect all publicly available information.

INTRODUCTION

In the late 1980s, the Federal Reserve opened the door for commercial banks to set up investment banking subsidiaries. Further deregulation, most notably the Gramm-Leach-Bliley Act of 1999, provided the mechanism to modern banking and removed the barrier between traditional commercial banking and other financial services. This allowed for the creation of the financial holding company, which is an umbrella organization capable of owning subsidiaries in various new activities such as investment banking, advisory services, insurance services, and securities brokerage. These umbrella bank holding companies (BHCs) have a greatly expanded range of "nontraditional" activities and services which are reported under noninterest income in the income statement.

The topic of nontraditional income in financial institutions has received much attention in the extant literature due to its rapid growth and reliance as a source of bank income. The literature on banks' expansion into nontraditional activities has generally found mixed empirical results. One strand of research suggests that when banks expand their range of activities, they are able to diversify their risks and thereby reduce bank risk and earnings volatility. For example, Brewer (1989) finds substantial benefits in diversifying to nonbanking activities. Boyd, Hanweck, and Pithyachariyakul (1980) report potential for risk reduction for low levels of nonbank activities. Kwast (1989) shows that commercial banks can reduce their return risk by diversifying into securities activities. Gallo, Apilado, and Kolari (1996) find evidence that high levels of mutual fund activities is associated with high profitability with only slightly moderated risk levels. Lown, Osler, Strahan, and Sufi (2000) suggest that insurance

companies are the ideal merger candidates to reduce bank risk. Smith, Staikouras, and Wood (2003) show that European banks obtain diversification benefits when using both interest and non-interest income activities, suggesting that nontraditional banking stabilizes bank earnings. Lepetit, Nys, Rous, and Tarazi (2008) report a negative association between noninterest income and interest margin. Chiorazzo, Milani, and Salvini (2008) similarly find evidence of a positive relationship between diversification and risk-adjusted performance for a sample of Italian banks. Kwan and Laderman (1999) provides a more comprehensive review.

Conversely, another strand of evidence indicates that these diversification effects are outweighed by increased volatility in noninterest income. Stiroh (2004, 2006) documents an increasing portion of bank income is associated with noninterest income and that this is positively related to lower risk-adjusted profits and higher risk at the firm level. DeYoung and Rice (2004) argue that interest income (from deposit-taking or loan-making) is becoming less central to the financial health and business strategy of financial institutions. They find that well-managed banks rely less on noninterest income and increases in noninterest income are associated with increased volatility. Brunnermeier, Dong, and Palia (2014) find that noninterest income activities contribute more to systemic risk, especially during crisis periods. DeYoung and Torna (2013) find that income from nontraditional banking activities contributed to the failures of a large number of banks during the recent financial crisis. Stiroh and Rumble (2006) find that noninterest activities are volatile and less profitable than lending activities on a risk-adjusted basis. Laeven and Levine (2007) find that the market values of diversified banks are lower than those of specialized banks suggesting that the gains from economies of scope are insufficient to produce a diversification premium.

The purpose of this paper is to examine the value-relevancy of the traditional and nontraditional components of bank income. Specifically, we examine whether investors are fully aware of the information contained in the income statements, through an analysis of the extent to which stock prices reflect banks' reliance on the noninterest income component of earnings. Prior studies, such as Sloan (1996), find that investors are not fully aware of the differential persistence levels in the accrual and cash flow components of earnings. In a similar vein, we examine whether investors irrationally fixate on earnings and fail to take into account the differential persistence levels of various subcomponents of banks' income. If this were the case, it would suggest that investors overvalue (undervalue) bank stocks which have a relatively high (low) noninterest income component. We test the naïve expectation model, in which investors are unable to discriminate between the higher persistence levels of the interest component and the less persistent nature of the noninterest component, against the null hypothesis of market efficiency, in which investors are able to "see through" the nature of the two components.

We examine market efficiency implications by assessing whether external capital markets incorporate the extent to which the magnitudes of current earnings components reflect future earnings. We find that investors are unable to discern between the differential properties in bank earnings components by underweighting both components of income during non-crisis periods and underweighted traditional income during crisis periods. The notion of market efficiency is rejected - it seems that investors are unable to distinguish between the differential persistence levels in the interest and noninterest components of earnings. In other words, stock prices do not respond as if investors are able to identify the nature of the properties of these two components of earnings. This result suggests that the market is unable to see through the procylical nature of activities associated with nontraditional banking.

Banks' reliance on nontraditional income highlights the importance of understanding its valuation by external capital markets. The extant literature generally excludes financial firms due to the underlying nature of banking operations. For example, Richardson, Sloan, Soliman, and Tuna (2005) note that "the demarcation between operating and financing activities are not clear for these firms." In this study, we fill the gap in the literature through a single-industry setting which inherently controls for unobserved industry-level heterogeneities. Additionally, we examine the notion of value relevancy and the ability of the stock market to correctly reflect the differential levels in earnings persistence from the interest and noninterest components. The results contribute to our understanding of the impact of the modernization of financial services and have important implications for researchers, bank managers, regulators, and

analysts. Our analysis provides insights into the role of various business practices which may contribute to instability in the banking system. There are also some implications for investors – our result that bank earnings are less persistent as the relative proportion of noninterest income increases implies that shareholders may better utilize information for readily available financial statements to readjust their portfolio to optimize their risk-return tradeoffs.

The remainder of the paper is organized as follows. Section 2 discusses the methodology. The data and empirical results are presented in Section 3. Section 4 provides robustness checks. Finally, Section 5 concludes.

METHODOLOGY

This section examines whether investors are fully aware of the information contained in the income statements through analysis of the extent to which stock prices reflect the reliance on noninterest income or components of noninterest income. The extant literature on market pricing generally uses the Mishkin (1983) test for rational pricing and market efficiency (Sloan 1996; Dechow, Richardson, and Sloan 2008). The assertion of the Mishkin test is straightforward: if markets are efficient, then the market's subjective expectation of future earnings must equal the true expectation of future earnings, conditional on the current information available. In other words, abnormal returns are zero in expectation conditional on information available today.

An earnings forecasting equation is employed to estimate how components in past earnings may forecast future earnings:

$$EARNINGS_{t+1} = \alpha_0 + \alpha_1 INTEREST_t + \alpha_2 NONINTEREST_t + \upsilon_t \qquad (1)$$

Assuming that earnings is the appropriate and correctly specified value-relevant variable, the rational pricing model condition is:

$$R_{t+1} = \beta(EARNINGS_{t+1} - E(EARNINGS_{t+1}|\phi_t)) + \varepsilon_{t+1} \qquad (2)$$

where R_{t+1} is the abnormal return in period t+1, $EARNINGS_{t+1}$ is the earnings in period t+1, β is the earnings response coefficient, and $E(EARNINGS_{t+1}|\phi_t)$ is the rational expectation of earnings in period t+1 conditional on information available in period t. Since $(EARNINGS_{t+1} - E(EARNINGS_{t+1}|\phi_t))$ is a measure of the deviation from the rational forecast of future earnings, market efficiency implies that only unexpected changes in future earnings are value-relevant.

To examine rational pricing, the specification in Equation (1) can be adopted into Equation (2):

$$R_{t+1} = \beta(EARNINGS_{t+1} - \alpha_0 - \alpha_1^* INTEREST_t - \alpha_2^* NONINTEREST_t) + \varepsilon_{t+1} \qquad (3)$$

The true expectation of earnings conditional on past information is reflected in the coefficients α_1 and α_2 from Equation (1). The market's subjective expectation of earnings conditional on past information is reflected in α_1^* and α_2^* from Equation (3). Therefore, a test for market efficiency imposes the dual constraints of $\alpha_1 = \alpha_1^*$ and $\alpha_2 = \alpha_2^*$.

More recently, Kraft, Leone, and Wasley (2007) compare the Mishkin test with the ordinary least squares (OLS) test and demonstrate that they are asymptotically equivalent. Specifically, Equation (1) may be substituted into Equation (3):

$$R_{t+1} = \beta(\alpha_0 + \alpha_1 INTEREST_t + \alpha_2 NONINTEREST_t + \upsilon_{t+1} - \alpha_0^* - \alpha_1^* INTEREST_t - \alpha_2^* NONINTEREST_t) + \varepsilon_{t+1} \qquad (4)$$

Combining terms, we obtain:

$$R_{t+1} = \gamma_0 + \gamma_1 INTEREST_t + \gamma_2 NONINTEREST_t + \gamma_3 \upsilon_{t+1} + \mu_t \qquad (5)$$

where $\gamma_i = \beta(\alpha_i - \alpha_i^*)$. It should also be noted that since υ_{t+1} is orthogonal to both $INTEREST_t$ and $NONINTEREST_t$, exclusion of υ_{t+1} does not bias the coefficient estimates of γ_1 and γ_2. Omitting υ_{t+1} from Equation (5) may yield slightly higher standard errors relative to those in the Mishkin test, however, it allows for us to test market efficiency with OLS. Kraft, Leone, and Wasley (2007) suggests that OLS offers several advantages over the Mishkin test, such as ease to implement with additional explanatory variables and ease to be understood. For example, the Mishkin test requires a subjective convergence criterion due to the iterative estimation procedure. OLS also eliminates survivorship bias induced by the Mishkin test. Mishkin (1983) notes that the parameter estimates generated by OLS are similar to those generated by nonlinear procedures and yield similar conclusions.

In this study, we examine market relevancy implications associated with Equation (5), with the omission of υ_{t+1}. If γ_1 or γ_2 is greater (less) than zero, this implies that investors are underweighting (overweighting) the information content in that particular component of earnings. Since we are examining the effects of the earnings components on future abnormal returns, a significant positive (negative) coefficient reflects an under (over)-reaction in the *contemporaneous* relationship of earnings components to stock prices. Thus, market efficiency implies the information contained in the interest and noninterest components of current earnings should be correctly reflected in the stock prices when the dual constraints, $\gamma_1 = 0$ and $\gamma_2 = 0$, are satisfied. It should be noted that the test for market efficiency with the dual constraints of $\gamma_1 = 0$ and $\gamma_2 = 0$ under OLS is tantamount to market efficiency with the dual constraints of $\alpha_1 = \alpha_1^*$ and $\alpha_2 = \alpha_2^*$ under the Mishkin test. In other words, the relative weights applied by the market to the interest and noninterest components in the pricing equation should be the same as the weights applied to those in the forecasting equation.

DATA AND EMPIRICAL RESULTS

We focus primarily on domestic BHCs in US. By definition, BHCs are the parent organizations which own a number of bank subsidiaries engaged in traditional banking activities (such as lending as deposit-taking) as well as nontraditional activities (such as securities dealing, underwriting, insurance, real estate, private equity, leasing and trust services, asset management, etc.). We derive our sample from the Consolidated Financial Statements for Bank Holding Companies in the FR Y-9C reports. This report is required by law be filed by BHCs with total consolidated assets of $500 million or more. In addition, BHCs meeting certain criterion must file this report regardless of size. Avraham, Selvaggi, and Vickery (2012) provides a more comprehensive overview of BHCs.

Quarterly balance sheet and income statement data is obtained from the FR Y-9C reports. Monthly stock returns and market returns are obtained from the Center for Research in Security Prices (CRSP) monthly file. A CRSP-FRB link provided by the Federal Reserve Bank of New York is utilized to match entity numbers in FR Y-9C to PERMCO numbers in CRSP. This link matches regulatory entity codes and CRSP PERMCOs for publicly traded banks and bank holding companies. Data from CRSP is used to construct a quarterly series. Our analysis is conducted at the quarterly interval to fully capture the effects of timing on the relationship between bank characteristics and value relevancy. Our sample period spans from 2001 to 2013. Our final sample consists of 19,496 firm-quarter observations for 678 unique firms.

To decompose bank earnings into components associated with core traditional activities and nontraditional activities, we define *EARNINGS* as income (loss) before extraordinary items (BHCK4300), scaled by total assets (BHCK2170) at the beginning of fiscal quarter. We define *INTEREST* as total interest income (BHCK4107), divided by total assets at the beginning of period. BHCK4107 includes interest and fee income on loans, income from lease financing receivables, interest income on balances due from depository institutions, interest and dividend income on security, interest income from trading assets, interest income on federal funds sold and securities purchased under agreements to resell, and other interest income. *NONINTEREST* is defined as total noninterest income (BHCK4079) scaled by total assets at the beginning of fiscal quarter. BHCK4079 captures income from the following activities:

income from fiduciary activities, service charges on deposit accounts in domestic offices, trading revenues, fees and commissions from securities brokerage, investment banking, advisory, and underwriting fees and commissions, investment banking, advisory, and underwriting fees and commissions, fees and commissions from annuity sales, underwriting income from insurance and reinsurance activities, income from other insurance activities, venture capital revenue, net servicing fees, net securitization income, and net gains (losses) on sales of loans and leases. Finally, we define other income (*OTHER*) as the total income minus interest income and noninterest income. *OTHER* captures any income items that were not classified in *INTEREST* or *NONINTEREST*. Total income (BHCK4300) has three major components: net interest income (interest income minus interest expense), net noninterest income (noninterest income minus noninterest expense), and net other income. Since *INTEREST* is defined as interest income and *NONINTEREST* is noninterest income, *OTHER* includes all expenses including provisions for loan losses and realized gains and loss on securities.

We also include three other variables to control for firm-level characteristics that have been used in prior literature. Kraft, Leone, and Wasley (2007) demonstrate that the omission of variables relevant to forecasting earnings and returns will affect inferences obtained from the results, especially if the omitted variables are not rationally priced. For example, they find that the accrual anomaly documented by Sloan (1996) disappears after the inclusion of additional explanatory variables. For each regression, we include firm size (*SIZE*), leverage (*LEVERAGE*), and the market to book ratio (*MTB*). *SIZE* is defined as the natural logarithm of total assets. *LEVERAGE* is the total liability (BHCK2948) divided by total assets. *MTB* is defined as market value divided by book value; where book value is measured as total assets minus total liabilities (BHCK2948) and market value is the product of stock price and the number of shares outstanding.

Table 1 presents the descriptive statistics for the variables used in this study. The median (mean) asset value is $1.4 ($23.5) billion indicating the distribution of banks is right-skewed. Average interest (noninterest) income is $623 ($349) million. The average and median total income over assets (*EARNINGS*) is 0.46%. The average total interest income over assets is 3.32% and the average total noninterest income over assets is 0.91% indicating substantial variation in earnings from interest and noninterest across bank size. Since *OTHER* captures a number of expense items associated with total income, we find that the mean (median) value is -3.77% (-3.39%).

TABLE 1
SUMMARY STATISTICS

	N	Mean	STD	Q1	Median	Q3
Total assets (in mil.)	19,496	23,544	158,168	700	1,428	4,234
Total income (in mil.)	19,496	123	949	2.00	6.00	21
Interest income (in mil.)	19,496	623	4,338	20	44	126
Noninterest income (in mil.)	19,496	349	2,524	3.00	7.00	27
EARNINGS	19,496	0.46%	0.98%	0.23%	0.47%	0.81%
INTEREST	19,496	3.32%	1.68%	1.83%	3.16%	4.53%
NONINTEREST	19,496	0.91%	2.51%	0.28%	0.55%	0.97%
OTHER	19,496	-3.77%	2.75%	-4.92%	-3.39%	-1.98%
SIZE	19,496	14.54	1.54	13.46	14.17	15.26
MTB	19,496	1.45	0.74	0.93	1.37	1.90
LEVERAGE	19,496	0.90	0.03	0.89	0.91	0.92

The sample period is from 2001 to 2013. *EARNINGS* is income before extraordinary items and other adjustments (BHCK4301) scaled by total assets (BHCK2170) at the beginning of quarter. *INTEREST* is total interest income (BHCK4107) scaled by total assets (BHCK2170) at the beginning of quarter. *NONINTEREST* is total noninterest income (BHCK4079) scaled by total assets (BHCK2170) at the beginning of quarter. *OTHER* is oncome (loss) before extraordinary items and other adjustments (BHCK4301) minus INTEREST and NONINTEREST scaled by total assets (BHCK2170) at the

beginning of quarter. *SIZE* is logarithm of total assets (BHCK2107) at the beginning of fiscal quarter. *MTB* is market value (PRC*SHROUT) divided by book value of equity (BHCK2170) at the beginning of fiscal quarter. *LEVERAGE* is total liability (BHCK2948) divided by total assets (BHCK2170). All variables are winsorized at the top and bottom 1%.

We examine whether the market is able to discern this information in the valuation of stock prices. We examine and test whether investors are able to "see through" the nature of the two earnings components (null hypothesis) or they fail to recognize the lower persistence associated with noninterest income (naïve expectations hypothesis). Empirically, we estimate Equation (5) and Table 2 presents the results. In Column (1), we find that the coefficients on both *INTEREST* and *NONINTEREST* are significantly different from zero for the entire sample period from 2001 to 2013. A significant positive coefficient on both *INTEREST* and *NONINTEREST* suggests that investors are underweighting the contemporaneous components of earnings as it is associated with higher future returns. Market efficiency is rejected as F-test for the dual constraints, $\gamma_1 = 0$ and $\gamma_2 = 0$, is 10.86 (with p-value<0.01). Column (2) examines the non-crisis period and finds similar results to those in Column (1). However, Column (3) shows that during the crisis period, investors severely underweight the interest component of earnings but correctly weights the noninterest component of earnings. The economic implication in this result suggests that investors account for the decline in production during the crisis, however, they do not correctly distinguish between the interest and noninterest components of bank earnings. Overall, it appears that investors irrationally fixate on earnings and fail to recognize the higher degree of persistence associated with interest income.

TABLE 2
FUTURE RETURN REGRESSION: INTEREST INCOME VS. NONINTEREST INCOME

	$RETURN_{t+1}$		
	Full sample	Non-crisis	Crisis
	(1)	(2)	(2)
$INTEREST_t$	0.561***	0.752***	1.423***
	[5.165]	[6.095]	[3.188]
$NONINTEREST_t$	0.200**	0.236***	-0.051
	[2.482]	[2.758]	[-0.119]
$OTHER_t$	0.271***	0.376***	0.083
	[3.278]	[4.092]	[0.398]
$SIZE_t$	-1.347***	-1.077***	-5.344***
	[-9.377]	[-7.585]	[-3.133]
$LEVERAGE_t$	9.150***	8.820***	88.070***
	[3.994]	[3.607]	[3.612]
MTB_t	-1.612***	-1.728***	-6.478***
	[-15.811]	[-16.295]	[-7.946]
Observations	19,465	17,346	2,119
Adjusted R-squared	0.273	0.263	0.382
F-test			
INTEREST=NONINTEREST=0	10.86***	19.20***	10.36***
	(p <0.01)	(p<0.01)	(p <0.01)

Non-crisis period is defined as 2001Q1 to 2007Q2 and 2009 to 2013Q4. Crisis period is defined as 2007Q3 to 2008Q4. Dependent variable is RETURN in period t+1. See Appendix 1 for variable definitions. Intercept is included but not reported. Year-quarter dummies are included. T-statistics shown

in brackets are based on standard errors clustered by firm. (*), (**), (***) indicate significance at the 10%, 5% and 1% levels.

In our examination of the value relevancy of earnings components, we examine whether investors irrationally fixate on earnings and fail to take into account the differential persistence levels of various subcomponents of banks' income. In other words, investors overvalue (undervalue) stocks which have a relatively high (low) noninterest income component if we find that γ_1 or γ_2 is greater (less) than zero in Equation (5) for future returns. However, this implies that the relationship should reverse in the examination of contemporaneous returns. For example, if interest income has a positive relationship with future returns, this suggests that investors are underreacting to the information content in interest income for current returns. The contemporaneous relationship of earnings components and returns is presented in Table 3. Column (1) reports that the coefficient on *NONINTEREST* is positive, indicating that investors overvalue the noninterest component of earnings. The F-test reports that the coefficient on *INTEREST* is less than the coefficient on *NONINTEREST* which provides further evidence of market inefficiency consistent with the naïve expectations hypothesis. In Column (2), we examine the non-crisis period and obtain similar inferences. In Column (3), we find interest income is undervalued by the market for the assessment of contemporaneous returns. In all cases, we find that the coefficient on *INTEREST* is significantly less than the coefficient on *NONINTEREST*. The results support our hypothesis that the markets fail to distinguish between the lower (higher) earnings persistence level reflected in noninterest (interest) income.

TABLE 3
CONTEMPORANEOUS RETURNS

	RETURN$_t$	Non-crisis	Crisis
	(1)	(2)	(3)
INTEREST$_t$	-0.066	0.091	-1.488***
	[-0.467]	[0.574]	[-4.128]
NONINTEREST$_t$	0.731***	0.797***	-0.468
	[6.593]	[6.718]	[-1.494]
OTHER$_t$	0.657***	0.764***	-0.275*
	[6.415]	[6.823]	[-1.723]
SIZE$_t$	-0.625**	-0.558*	0.002
	[-2.192]	[-1.875]	[0.002]
LEVERAGE$_t$	15.723**	21.142***	-86.031***
	[2.295]	[2.899]	[-5.518]
MTB$_t$	1.345***	0.995***	6.879***
	[8.094]	[5.885]	[7.160]
Observations	19,442	17,320	2,122
Adjusted R^2	0.186	0.160	0.438
F-test:			
INTEREST=NONINTEREST	9.86***	11.34***	9.39***
	(p<0.01)	(p<0.01)	(p<0.01)

Non-crisis period is defined as 2001Q1 to 2007Q2 and 2009 to 2013Q4. Crisis period is defined as 2007Q3 to 2008Q4. Dependent variable is BHAR in period t. See Appendix 1 for variable definitions. Intercept is included but not reported. Year-quarter dummies are included. T-statistics shown in brackets are based on standard errors clustered by firm. (*), (**), (***) indicate significance at the 10%, 5% and 1% levels.

CONCLUSION

This paper examines the implications of regulatory changes in the banking industry to allow for a greater range of services provided by financial institutions. The Gramm-Leach-Bliley Act of 1999 allowed for the creation of the financial holding company, capable of owning subsidiaries in various new activities such as investment banking, advisory services, insurance services, and securities brokerage. These activities and services are considered to be nonrecurring, procyclical, and transient in nature and are reported as the noninterest income portion of earnings. The purpose of this study is to examine whether market participants recognize the information contained in the different components of earnings. The results in this study document that equity market participants are not aware of the different properties associated with interest and noninterest income. The results show that investors are unable to discern between the differential properties in bank earnings components by underweighting both components of income during economic booms and underweighted traditional income during crisis periods. This finding provides evidence which contradicts the view of an efficient market in which stock prices reflect all publicly available information.

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CONTACT INFORMATION:
Brian Du
25800 Carlos Bee Blvd.
VBT434
Hayward, CA 94542

(909) 740-4740