

## **Persistence of Nontraditional Income in Financial Institutions**

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### **Abstract**

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 properties of earnings components resulting from the observed shift. Consistent with our expectation, we first find that nontraditional income is less persistent than traditional income. We then document that the persistence level of nontraditional income experiences a greater marginal decrease compared to that of traditional income during economic downturns. This finding is consistent with the notion that nontraditional activities are associated with activities, which are non-recurring, transient, and highly procyclical in nature.

**JEL Classification:** G01; G20; G21; G28; M41

**Keywords:** Noninterest income; Earnings persistence; Banking; Financial crises

### **I. Introduction**

Financial institutions engage in the essential function of providing liquidity and allocating capital in the economy through their traditional business model of “originate-to-hold” (Diamond and Dybvig, 1983; Diamond, 1984; Gorton and Pennacchi, 1990; Kashyap, Rajan, and Stein, 2002; Gorton and Winton, 2002). The traditional role of financial intermediation involves originating (and holding) a large portfolio of loans while their main liability includes taking demand deposits. Yet, in the last two decades, banks are increasingly relying on nontraditional activities to generate income, evidenced by significant growth in noninterest income. Figure 1 shows that noninterest income has increased from approximately \$94 million to \$270 million from 2001 to 2013.

### **Refer Figure 1**

The reliance on nontraditional activities coupled with increasing involvement in asset securitization effectively transitioned banks to an “originate-to-distribute” model (Purnanandam, 2011). It is suggested that this unraveling of financial services separates the process of loan origination and monitoring and is at least partially responsible for the recent financial crisis due to the substantial uncertainty surrounding exposure to risks (Gorton and Metrick, 2012; Brunnermeier and Petersen, 2009). Accordingly, the topic of noninterest income in financial institutions has received much attention in the extant literature. Empirical studies have found mixed results regarding the implications of diversifying into nontraditional banking activities. Saunders and Smirlock (1987) find that bank profitability and risk were unaffected by banks’ expansion into discount brokerage. Boyd and Graham (1986) also find that nonbanking activity is not associated with risk or return. An alternative stream of literature suggests that nontraditional banking activities may be associated with the ability to diversify risks and thus, reduce bank risk (Brewer, 1989; Kwast, 1989; Gallo, Apilado, and Kolari, 1996).

However, the results from other studies imply that nontraditional banking is associated with more volatile earnings. For example, evidence suggests that reliance on nontraditional income has contributed to the failures of banks during the financial crisis (DeYoung and Torna, 2013), increased systemic risk (Brunnermeier, Dong, and Palia, 2014), and is associated with higher tail betas (DeJonghe, 2010). The purpose of this study is to examine

properties of earnings components (i.e., traditional vis-à-vis nontraditional) in the banking sector across periods of economic activity. To the best of our knowledge, this study is among the first to examine the quality of earnings for modern banks which are increasingly involved in nontraditional banking.

Our sample consists of 19,496 quarterly observations for 678 unique BHCs from 2001 to 2013. After controlling for other factors known to affect earnings, the persistence parameter of interest income (traditional banking activities) is 0.54 and the persistence parameter of noninterest income (nontraditional banking activities) is 0.43; the difference between these values are significant at the 1% level. Given that income from noninterest activities are primarily generated from activities such as mergers and acquisitions, IPOs, and trading revenue, we posit that noninterest income should experience a greater marginal reduction compared to that of interest income during economic downturns. We document that the persistence parameter for traditional income decreases by 0.176 (from 0.567 to 0.391) while the persistence parameter for nontraditional income decreases by 0.428 (from 0.456 to 0.028) when comparing from the non-crisis period to the crisis period. These differences are also significant at the 1% level. The results suggest that activities associated with nontraditional banking are typically non-recurring, highly procyclical, and transient in nature. Overall, these results imply that when bank earnings are more interest income-intensive, earnings are more persistent, more sustainable, and a better indicator for future cash flows. On the other hand, these results are inconsistent with the notion that expansion into nontraditional activities is associated with the ability for banks to diversify risks.

Our study contributes to literature in a couple of ways. Although recent literature considers earnings persistence as an important aspect of earnings quality, studies 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 through an examination of earnings persistence in banking industry. We find evidence that earnings streams are more persistent for those with more traditional income, which is an indicator for higher earnings quality. Additionally, our single-industry setting inherently controls for unobserved industry-level heterogeneities. Baginski et al. (1999) suggest that measures of persistence are related to characteristics of the firms’ economic environment that expected to influence earnings persistent. By focusing on banking industry only, we eliminate any potential endogenous problem.

Our results also have regulatory policy and managerial implications. Bank supervisors and regulators should consider the optimal product mix of traditional and nontraditional banking activities, especially surrounding periods of economic turmoil. There have already been some steps taken by the Federal Reserve to restrict various practices. For example, the Volcker Rule in the Dodd-Frank Act greatly constrains banks’ investments in entities like private equity and hedge funds and prohibits proprietary trading. However, some attention should focus on reexamining the tenets of the Gramm-Leach Bliley Act, which is an originating factor in bank product line deregulation.

The remainder of the paper is organized as follows. Section 2 provides a review of related literature and hypotheses. Section 3 discusses the data and methodology. The empirical results are presented in Section 4. Section 5 provides robustness checks. Finally, Section 6 concludes.

## II. Related literature and hypotheses

In general, greater persistence of earnings indicates more sustainability in that current earnings will be a more meaningful metric for future performance (Dechow, Ge, and Schrand, 2010). It has been well documented that various components of earnings have differential implications in predicting earnings persistence. For example, Sloan (1996) shows that the accrual component of earnings offers lower persistence than that of the cash flow component of earnings due to lower likelihood of recurrence. The literature has since burgeoned to investigate the various components within accruals and earnings, as well as the role of special items.<sup>1</sup> Overall, the notion for the examination of earnings persistence is that, *ceteris paribus*, it provides an indicator for the quality of earnings through minimizing errors in valuation inputs.

In this paper, we specifically focus on banks' earnings components. Empirical evidence regarding banks' expansion into nontraditional activities is mixed. On the one hand, large financial holding companies which offer a broad stream of products are considered diversified. Empirical evidence suggests that when bank expands its range of activities, it can diversify their risks and thereby reduce bank risk and earnings volatility. For example, Boyd, Hanweck, and Pithyachariyakul (1980) report 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 that high levels of mutual fund activities are associated with high profitability with only slightly moderated risk levels. Recent evidence also indicates that banks obtain diversification benefits when using both interest and non-interest income activities. Smith, Staikouras, and Wood (2003) suggests that nontraditional banking stabilizes bank earnings. Lepetit, Nys, Rous, and Tarazi (2008) report a negative association between noninterest income and interest margin.<sup>2</sup>

However, on the other hand, DeYoung and Roland (2001) suggest there are three fundamental reasons why noninterest income may be associated with high volatility. First, banks may have different relationships between fee-based customers and loan-based customers. Due to high switching and information costs, traditional lending activities between borrowers (loan-based customers) and lenders may be more stable over time; while fee-based activities express less stable demand and high competitive rivalry within the industry. Second, extending credit involves only an increase to variable costs (in the form of interest expense) while expanding fee-based services requires hiring additional employees which increases operating leverage. Third, regulatory capital is not required for most fee-based activities. This suggests a high degree of financial leverage for these activities may lead to higher earnings volatility.

Empirical studies also find evidence that diversification effect is outweighed by increased volatility in noninterest income. For example, Stiroh (2004, 2006) documents an increasing portion of noninterest income is positively associated with higher risk at the firm level. DeYoung and Rice (2004) argue that banks rely less on noninterest income and increases in noninterest income, which are associated with increased volatility. Other studies suggest that noninterest income is related to financial crisis. For example, 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

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<sup>1</sup> For example, Dechow and Ge (2006) find that investors misunderstand the transitory nature of special items. McVay (2006) finds in that managers may manipulate earnings through intentionally misclassifying core expenses as special items within the income statement.

<sup>2</sup> See Kwan and Laderman (1999) for a more comprehensive review.

banking activities contributes to the failures of banks during the recent financial crisis. As a result, it is an empirical question whether noninterest income contributes to more volatile earnings stream in banking industry.

In general, income from recurring events and income from transitory events have different implications on information quality and firm valuation (Pope and Wang, 2005). Our analysis of traditional and nontraditional banking activities are consistent with the suggestions of Hamel and Prahalad (1990) in “sticking to core competencies.” The component of earnings associated with traditional banking activities such as deposit-taking and loan-making are considered to represent a permanent and more stable source of income. On the other hand, the ability for earnings associated with nontraditional banking activities such as venture capital, securities trading, and underwriting and advising services to diversify risks may be overshadowed by the underlying nature of these activities as they are considered to be typically non-recurring, highly procyclical, and transient in nature. Based on these insights, we provide the following hypothesis to examine the effects of nontraditional activities on relative persistence parameters:

*Hypothesis #1: The nontraditional income portion is less persistent than the traditional income portion of bank earnings.*

If nontraditional activities are less stable and subject to cyclical, then one would expect that this will be revealed during economic downturns. Anecdotal evidence suggests that periods of economic growth are associated with high merger and acquisition activity, IPO volume, and stock valuation. This would imply that financial institutions rely more heavily on noninterest income activities originating from underwriting services, advising services, trading revenue, and venture capital revenue during economic booms. In contrast, banks should experience declines in the ability to rely on such activities to generate income during periods of economic downturns. For example, trading revenue as well as fees generated from underwriting and advising services will precipitate during economic declines. Additionally, aggregate noninterest income should experience greater relative reductions than that of aggregate interest income due to fact that financial crises may constrain the availability of credit, increase the cost of financing, and have real effects on the economy (Dell’Ariccia, Detragiache, and Rajan, 2008). To the extent that noninterest income is associated with activities, which are procyclical in nature, we expect that the persistence parameter associated with the noninterest component to decline more than the persistence parameter of the interest component when comparing from periods of economic booms to busts:

*Hypothesis #2: If the ability for banks to generate income from noninterest income activities (M&A activity, IPOs, etc.) is increasing in economic health, then the persistence parameter of the noninterest income component will experience a greater marginal decline than the persistence parameter of the interest income during economic declines.*

### **III. Sample selection and methodology**

#### *III.1 Sample selection and variable definition*

Our sample is derived from domestic BHCs in US. 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 start our sample from the Consolidated Financial Statements for Bank Holding Companies in the FR Y-9C reports. Quarterly balance sheet and income statement

data are obtained from the FR Y-9C reports.<sup>3</sup> 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.<sup>4</sup> Our analysis is conducted at the quarterly interval to fully capture the effects of timing on the relationship between bank characteristics and value relevancy. The final sample consists of 19,496 firm-quarter observations for 678 unique firms, spanning from 2001 to 2013.

Our objective is 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. *INTEREST* is defined 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*.<sup>5</sup>

In this study, we focus on interest income and noninterest income rather than net interest income and net noninterest income for two reasons. First, the distinction between interest expense and noninterest expense is not clear on the income statement. For example, employee salary, advertising expenses, data processing expenses, expenses of premises, and amortization expenses are all listed under noninterest expense. These expenses are attributed to both interest income and noninterest income. It is for this reason that most studies which examine noninterest activities focus on noninterest income rather than net noninterest income (DeYoung and Rice, 2004; Stiroh, 2004; Stiroh and Rumble, 2006). Second, our focus hypotheses involve the ability for banks to rely on income generated from interest and noninterest activities. We posit that income from noninterest activities are non-recurring, highly procyclical, and transient in nature but we do not a priori form any expectations as to the cost structures of these activities.<sup>6</sup>

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<sup>3</sup> This report is required by law be filed by BHCs with total consolidated assets of \$500 million or more. Avraham, Selvaggi, and Vickery (2012) provides a more comprehensive overview of BHCs.

<sup>4</sup> This link matches regulatory entity codes and CRSP PERMCOs for publicly traded banks and bank holding companies. For more information, see [http://www.newyorkfed.org/research/banking\\_research/datasets.html](http://www.newyorkfed.org/research/banking_research/datasets.html).

<sup>5</sup> 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* only captures interest income and *NONINTEREST* only captures noninterest income, *OTHER* includes all expenses including provisions for loan losses and realized gains and loss on securities.

<sup>6</sup> In Section 5.3, we separately examine the impact of loan loss provision on persistence.

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. Appendix A includes the variables and definitions used in this study.

### III.2 Methodology

Hypothesis #1 suggests that the interest component of earnings is more persistent than the noninterest component of earnings. To examine Hypothesis #1, we employ an earnings forecasting equation to estimate how components in past earnings may forecast future earnings:

$$EARNINGS_{t+1} = \alpha_0 + \alpha_1 INTEREST_t + \alpha_2 NONINTEREST_t + \alpha_3 OTHER_t + \theta' CONTROLS_t + v_t \quad (1)$$

Equation (1) captures the persistence of the interest component of earnings and noninterest component of earnings. The coefficients  $\alpha_1$  and  $\alpha_2$  represent the degree to which the interest and noninterest component of current earnings is related to future earnings. Since both components are expected to be related to future earnings, we expect to find a positive association between the earnings components and future earnings (i.e.,  $\alpha_1 > 0$  and  $\alpha_2 > 0$ ). Per Hypothesis #1, we predict that the noninterest income portion of earnings is less persistent than the interest income portion of earnings.  $\alpha_1$  is expected to be significantly larger than  $\alpha_2$ . Hypothesis #2 suggests that the persistence parameter of noninterest income will experience a greater marginal decline than the persistence parameter of the interest income during economic declines. This implies that  $(\alpha_{1noncrisis} - \alpha_{1crisis}) < (\alpha_{2noncrisis} - \alpha_{2crisis})$  and we expect the difference in  $(\alpha_{1noncrisis} - \alpha_{1crisis})$  and  $(\alpha_{2noncrisis} - \alpha_{2crisis})$  should be significant.

## IV. Empirical results

### IV.1 Summary statistics

#### Refer Table 1

Table 1 presents the descriptive statistics. Since we require banks with stock price data from CRSP, our sample firms are fairly large. The median (mean) asset value is \$1.4 (\$23.5) billion. On average, bank's interest (noninterest) income is \$623 (\$349) million.<sup>7</sup> The average and median total income over assets (*EARNINGS*) is 0.46%. The average total interest income over assets (*INTEREST*) is 3.32% and the average total noninterest income over assets (*NONINTEREST*) is 0.91%. Since *OTHER* captures a number of expense items associated with total income, we find that the mean (median) value is -3.77% (-3.39%).

<sup>7</sup> The average noninterest income in our sample is larger than the number reported in Figure 1. We construct Figure 1 by including all banks with FR Y-9C reports. Since we required CRSP data for our sampled banks, the size of our sampled banks is large.

#### IV.2 Persistence of noninterest income

To test Hypothesis #1 and establish the results for the overall association between the interest and noninterest portion of earnings and future earnings, we estimate Equation (1). Table 2 presents the results.

#### Refer Table 2

The persistent parameters of *INTEREST* and *NONINTEREST* are both significantly positive at 99% level ( $\alpha_1=0.541$  and  $\alpha_2=0.439$ ), consistent with the implications in prior studies that current earnings components are related to future earnings. The F test shows that the coefficient on *INTEREST* is significantly larger than the coefficient on *NONINTEREST* (F-test=8.93 with p-value<0.01), confirming that the interest portion of earnings is more persistent than the noninterest portion of earnings. The magnitude of the coefficients  $\alpha_1$  and  $\alpha_2$  provides an indication of the economic significance of the results. On average, one dollar of the current interest portion of earnings is associated with approximately 54.1 cents of future earnings while one dollar of the current noninterest portion of earnings is only associated with 43.9 cents of future earnings. Overall, the results in this table provide evidence supporting Hypothesis #1.

Since Kraft, Leone, and Wasley (2007) illustrate that omitting relevant variables will misspecify the forecasting and pricing equations, we include *SIZE*, *LEVERAGE*, and *MTB* to control for bank size, financial leverage, and growth opportunities. Table 2 shows a significant negative coefficient on *SIZE*. Firm size can proxy for various aspects, such as political cost and operating complexity (e.g., Watts and Zimmerman, 1986), the empirical evidence regarding how firms size affects earnings persistence is not concluded (Baginski, Lorek, Willinger and Branson 1999). *LEVERAGE* is found to be negatively related to future earnings. The coefficient on *MTB* is significantly positive, suggesting that firms with more growth opportunity have higher future earnings.

#### Refer Table 3

In Table 3, we examine the implications of the economic status on the relationship between noninterest income and future earnings. Since the financial crisis of 2007-2008 is associated with a period of decline in economic activity, the persistence parameters of both the interest and noninterest components of earnings will decline. Noninterest income is associated with activities, which are considered to be non-recurring, procyclical, and transient in nature. We expect that the noninterest income component will experience greater marginal decline than that of the interest income component of earnings during economic declines. We re-estimate Equation (1) by partitioning our sample into a crisis period and non-crisis period to examine Hypothesis #2.

We define the crisis period as 2007Q3 to 2008Q4 and the non-crisis period as 2001Q1 to 2007Q2 and 2009 to 2013Q4, following Fahlenbrach and Stulz (2011). We first find that both components of income are positive ( $\alpha_1>0$  and  $\alpha_2>0$ ) for both the non-crisis and crisis periods, but *NONINTEREST* is only significant for the non-crisis period. We also find that interest income is more persistent than noninterest income ( $\alpha_1>\alpha_2$ ) for both periods and the differences are significant. These results reiterate those found in Table 2 and provide support for Hypothesis #1.

Consistent with the notion for Hypothesis 2, we first find that the persistence parameters of both components decline during the crisis period. The coefficient on *INTEREST* during the crisis period is 0.391, which is significantly smaller than its counterpart of 0.567 in Column (1) during the non-crisis period. The F-test for the difference in the coefficients for *INTEREST* for the crisis and non-crisis period is 17.05 (a). Similarly, *NONINTEREST* during the crisis period is smaller in magnitude than that found in the non-crisis period, but the difference is not significant. The F-test for the difference in the coefficients for *NONINTEREST* in the crisis and non-crisis period is 0.98 (b).<sup>8</sup> This suggests that the financial crisis of 2007-2008 is associated with greater uncertainty and a decline in economic production.

Hypothesis #2 predicts that decline in the persistence parameter associated with the noninterest component is greater than the decline in the persistence parameter associated with the interest component because of the procyclical nature nontraditional activities. We further examine whether there is a significant difference between (a) and (b). We find evidence consistent with this prediction – the F-test for the difference between (a) and (b) is 9.41, significant at 99%.<sup>9</sup> The results from Table 3 indicate that the persistence parameters of both interest and noninterest components decrease during the crisis period. Due to the nature of the activities associated with noninterest income, the coefficient on *NONINTEREST* experiences a greater marginal decline in the persistence parameter compared to that of *INTEREST* during the crisis.

Overall, Table 2 and Table 3 document a few key pieces of evidence worth reiterating. First, the persistence level of interest income is greater than the persistence level of noninterest income, regardless of the time period (crisis vs. non-crisis). Second, the persistence parameters of both the interest and noninterest income components are higher during the non-crisis period and lower in the crisis period. Finally and most importantly, even though both interest and noninterest components decline in their persistence levels during the crisis, the persistence of the noninterest income component decreases more than that of the interest component (consistent with the suggestions in Hypothesis #2).

## V. Robustness check

### V.1 Lagged independent variables

#### Refer Table 4

In this section, we conduct tests for specifications, which lag independent variables by up to three quarters ahead in the earnings forecasting equation in Equation (1). Table 4 presents the results. Columns (1) and (4) provide the results for the full sample period on two-quarter ahead and three-quarter ahead earnings, respectively. The point estimate for the coefficient on *INTEREST* (*NONINTEREST*) is 0.570 (0.481) from our main results (Table 2) and this steadily diminishes to 0.342 (0.164) in Column (1) and 0.242 (0.125) in Column (4). The

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<sup>8</sup> To compare coefficients during crisis and non-crisis period, we create a variable, *CRISIS*, which is a dummy variable equal one during the crisis period and zero otherwise. We estimate a regression with *CRISIS* along with its interaction with all right-hand side variables. We test whether the interaction terms of *CRISIS\*INTEREST* (*CRISIS\*NONINTEREST*) are significantly different from zero in order to examine whether the persistence of interest component (noninterest component) decreases significantly from non-crisis period to crisis period.

<sup>9</sup> To compare the decrease in *INTEREST* with the decrease in *NONINTEREST* (from non-crisis period to crisis period), we test whether the coefficient of *CRISIS\*INTEREST* is significantly different from the coefficient of *CRISIS\*NONINTEREST*.

significance for the coefficients on both variables remains significant at 99%. Consistent with the findings from Table (2), the persistence parameter of the interest component is greater than that of the noninterest component for extended time horizon. This result generally holds for the non-crisis period in Columns (2) and (5).

However, for the crisis period, it appears that the persistence parameter for noninterest income is volatile and is not a consistent predictor of future earnings. In Columns (3) and (6), the coefficients on *NONINTEREST* are both negative and significant in Column (3). This result provides further evidence that the activities associated with noninterest income are volatile and highly procyclical in nature, given the short time frame of the crisis period.

### V.2 Loan types

Since interest income is derived from the origination of loans, it is possible that banks that hold different compositions of loans in their portfolio can alter the relative persistence of the parameters associated with interest and noninterest income. We classify loans into five categories: home, commercial, C&I, consumer mortgages, and all other loans. See Appendix B for the definitions of these loan types. For each type of loan, we calculate the median loan amount across all sampled banks in a given year and partition our sample into LARGE group (if the specific type of loan amount is great than or equal to the median amount) and SMALL group (if the specific type of loan amount is lower than the median amount). To examine whether loan portfolio affect the persistence of earnings differently during crisis and non-crisis period, we re-estimate Equation (1) for LARGE and SMALL loans during the crisis period and non-crisis period.

### Refer Table 5

Table 5 presents the results of the analysis for earnings persistence of various loan types. In Panel A, we find that loan portfolio does not play a significant role on earnings persistence during the non-crisis period. Both interest income and noninterest income are positively associated with future earnings across all ten models. The persistent parameters of *INTEREST* are significantly larger that of *NONINTEREST*, except Consumer and Other loan.

However, during the crisis period in Panel B, we find that interest income is not related to future earnings for banks with large home mortgages (model 1) and consumer loans (model 7). The results also indicate that banks with a small composition of home mortgages (model 2) and consumer loans (model 8) have superior earnings quality (earnings predictability) in that the coefficient on *INTEREST* is significant and positive. Taken together, these results suggest that banks with a greater proportion of home mortgages and consumer loans have less persistent interest income during the crisis period, compared to banks with a lower proportion of home mortgages and consumer loans. Consistent with the fact that the originating source of the financial crisis of 2007-2008 was the housing market bubble, the results in this table imply that banks with more home and consumer loans were more severely affected during the crisis period.

### V.3 Loan loss provision (LLP)

The main results in this paper primarily consider the implications of income from traditional and nontraditional banking activities on the persistence of earnings. However, it may be argued that the persistence associated traditional activities of originating loan during the crisis period may be attributed to the fact that loan loss provision (LLP) was not considered in the analysis. To further address the concern, we re-estimate Table 2 (full sample) and Table 3

(crisis and non-crisis period) by creating a new variable, *INTEREST, NET OF LLP*. This variable is *INTEREST* less loan loss provisions. Note that loan loss provisions will no longer be included in the variable *OTHER*.

#### **Refer Table 6**

The results are presented in Table 6. Our main results remain qualitatively similar to those reported in Table 2 and 3. The coefficients on *INTEREST, NET OF LLP* are larger than the coefficients on *NONINTEREST* across all three columns and the difference are all significant at 99% level. We also find that the persistence parameter on *INTEREST, NET OF LLP* is lower in the crisis, suggesting that higher loan loss provisions induce lower earnings persistence during the crisis period. Overall, the results imply that lower earnings persistence associated with high LLP do not drive our results.

#### **VI. 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 the heterogeneity in banks' reliance on nontraditional activities affects the quality of earnings, particularly for the crisis period.

The results in this study document that banks which rely on nontraditional sources of income have lower quality earnings in that they exhibit lower earnings persistence. This finding is robust to the inclusion of additional explanatory variables and varying periods of economic activity. We find that the quality of earnings deteriorates during the crisis period as the persistence parameters of both interest and noninterest income declines. However, for banks which rely more heavily on noninterest income, the quality of earnings deteriorates to a greater degree. These findings provide support for the idea that nontraditional banking activities associated with noninterest income are highly procyclical and do not serve as a consistent predictor of future earnings.

**Appendix A Variable definitions**

<b>Variable</b>	<b>Definitions</b>
EARNINGS	Income (loss) before extraordinary items and other adjustments (BHCK4300) scaled by total assets (BHCK2170) at the beginning of quarter.
INTEREST	Total interest income (BHCK4107) scaled by total assets (BHCK2170) at the beginning of quarter.
NONINTEREST	Total noninterest income (BHCK4079) scaled by total assets (BHCK2170) at the beginning of quarter.
OTHER	Income (loss) before extraordinary items and other adjustments (BHCK4300) minus total interest income (BHCK4107) and total noninterest income (BHCK4079), scaled by total assets (BHCK2170) at the beginning of quarter.
SIZE	Logarithm of total assets (BHCK2107) at the end of fiscal quarter.
MTB	Market value (PRC*SHROUT) divided by book value of equity (BHCK2170) at the beginning of fiscal quarter.
BHAR	Buy-and-hold return on the entity's stock measured over the quarter, less the buy-and-hold return on the equally-weighted CRSP market index over the same period.

**Appendix B Loan Type**

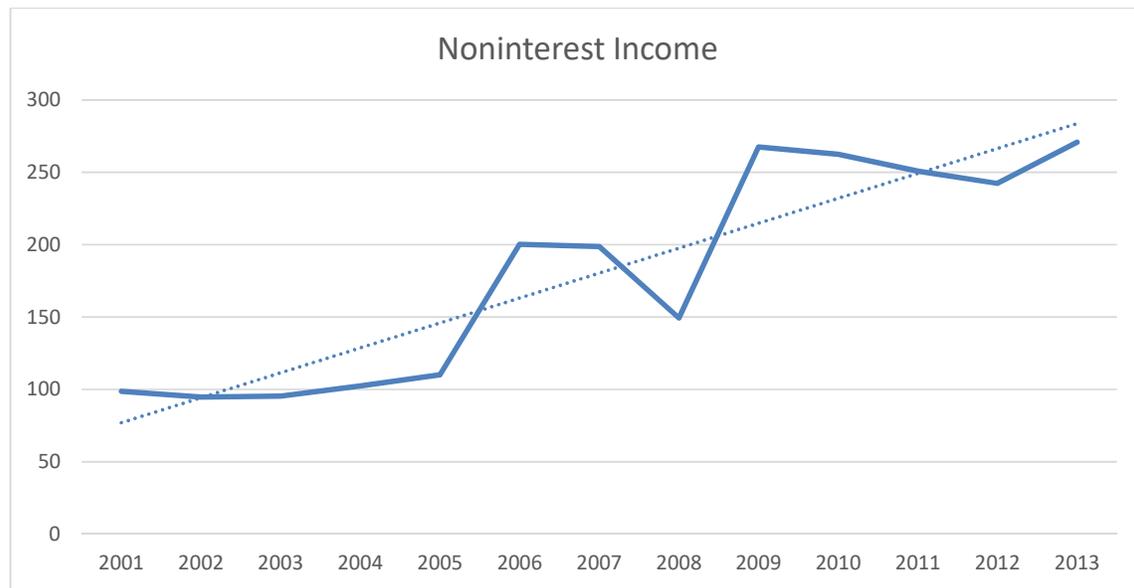
<b>Variable</b>	<b>Definitions</b>
Home Mortgage	Revolving, open-end loans secured by 1-4 family residential properties and extended under lines of credit (BHCK1797), closed-end loans secured by 1-4 family residential properties (BHDM5367 and BHDM5368), and loan secured by multifamily residential properties (BHDM1460), scaled by total assets (BHCK2170) at the beginning of quarter.
Commercial Mortgage	Loan secured by nonfarm nonresidential properties (BHCKF160 and BHCKF161), scaled by total assets (BHCK2170) at the beginning of quarter
C&I Mortgage	Loans to finance agricultural production and other loans to farmers (BHDM1590) and commercial and industrial loans (BHDM1766), scaled by total assets (BHCK2170) at the beginning of quarter.
Consumer Mortgage	Loans to individuals for household, family, and other personal expenditures (BHDM1975) scaled by total assets (BHCK2170) at the beginning of quarter

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Figure 1 Average noninterest income from 2001 to 2013



This figure reports the average annual noninterest income (BHCK4079). This variable captures income from 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. Units are in millions.

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
<i>EARNINGS</i>	19,496	0.46%	0.98%	0.23%	0.47%	0.81%
<i>INTEREST</i>	19,496	3.32%	1.68%	1.83%	3.16%	4.53%
<i>NONINTEREST</i>	19,496	0.91%	2.51%	0.28%	0.55%	0.97%
<i>OTHER</i>	19,496	-3.77%	2.75%	-4.92%	-3.39%	-1.98%
<i>SIZE</i>	19,496	14.54	1.54	13.46	14.17	15.26
<i>MTB</i>	19,496	1.45	0.74	0.93	1.37	1.90
<i>LEVERAGE</i>	19,496	0.90	0.03	0.89	0.91	0.92

The sample period is from 2001 to 2013. See Appendix A for variable definitions. All variables are winsorized at the top and bottom 1%.

Table 2 Earnings persistence regression: interest income vs. noninterest income

	EARNINGS <sub>t+1</sub>
<i>INTEREST<sub>t</sub></i>	0.541*** [14.974]
<i>NONINTEREST<sub>t</sub></i>	0.439*** [19.614]
<i>OTHER<sub>t</sub></i>	0.458*** [18.885]
<i>SIZE<sub>t</sub></i>	-0.097** [-2.472]
<i>LEVERAGE<sub>t</sub></i>	-5.147*** [-7.555]
<i>MTB<sub>t</sub></i>	0.323*** [12.915]
Observations	19,496
Adjusted R <sup>2</sup>	0.654
F-test: <i>INTEREST=NONINTEREST</i>	8.93*** (p<0.01)

See Appendix A 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.

Table 3: Earnings persistence regression: non-crisis versus crisis period

	EARNINGS <sub>t+1</sub>	
	Non-crisis (1)	Crisis (2)
<i>INTEREST<sub>t</sub></i>	0.567*** [17.242]	0.391*** [3.515]
<i>NONINTEREST<sub>t</sub></i>	0.456*** [19.524]	0.028 [0.417]
<i>OTHER<sub>t</sub></i>	0.492*** [21.893]	0.086* [1.874]
<i>SIZE<sub>t</sub></i>	-0.064* [-1.879]	0.767*** [2.619]
<i>LEVERAGE<sub>t</sub></i>	-5.221*** [-7.890]	-7.993 [-1.457]
<i>MTB<sub>t</sub></i>	0.284*** [13.336]	0.422* [1.876]
Observations	17,372	2,124
Adjusted R <sup>2</sup>	0.695	0.504
F-test: <i>INTEREST=NONINTEREST</i>	11.34** (p=0.01)	9.39*** (p<0.01)
F-test:	(Non-crisis) vs. (Crisis)	p-value
<i>INTEREST</i> (a)	17.05***	(p<0.01)
<i>NONINTEREST</i> (b)	0.98	(p=0.32)
Difference between (a) and (b)	9.41***	(p<0.01)

Non-crisis period is defined as 2001Q1 to 2007Q2 and 2009 to 2013Q4. Crisis period is defined as 2007Q3 to 2008Q4. See Appendix A 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.

Table 4 Future earnings regression: two-quarter and three-quarter ahead

	EARNINGS <sub>t+2</sub>			EARNINGS <sub>t+3</sub>		
	Full (1)	Non-crisis (2)	Crisis (3)	Full (4)	Non-crisis (5)	Crisis (6)
<i>INTEREST<sub>t</sub></i>	0.342*** [10.618]	0.354*** [11.063]	0.284** [2.199]	0.242*** [7.475]	0.249*** [8.199]	0.284** [2.482]
<i>NONINTEREST<sub>t</sub></i>	0.164*** [5.342]	0.162*** [5.637]	-0.326** [-2.542]	0.125*** [4.774]	0.095*** [4.153]	-0.061 [-0.669]
<i>OTHER<sub>t</sub></i>	0.224*** [10.211]	0.244*** [11.751]	-0.204*** [-2.620]	0.151*** [7.794]	0.144*** [7.256]	-0.167*** [-2.967]
<i>SIZE<sub>t</sub></i>	-0.170*** [-2.948]	-0.091* [-1.841]	0.763* [1.820]	-0.255*** [-3.804]	-0.095* [-1.835]	0.447 [0.958]
<i>LEVERAGE<sub>t</sub></i>	-6.050*** [-6.900]	-6.485*** [-7.551]	-8.870 [-1.562]	-4.709*** [-4.955]	-5.774*** [-7.146]	1.723 [0.243]
<i>MTB<sub>t</sub></i>	0.463*** [15.436]	0.412*** [14.440]	0.479*** [3.372]	0.465*** [14.563]	0.382*** [13.852]	0.501*** [3.232]
Observations	18,840	16,749	2,091	18,188	16,130	2,058
Adjusted R <sup>2</sup>	0.566	0.603	0.479	0.543	0.587	0.533
F-test:						
<i>INTEREST</i> <i>=NONINTEREST</i>	31.62*** (p<0.01)	42.71*** (p<0.01)	20.03*** (p<0.01)	11.74*** (p<0.01)	26.59*** (p<0.01)	9.10*** (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 EARNINGS in period t+2 and t+3. See Appendix A 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.

Table 5 Earnings persistence of different loan types

Panel A: Non-Crisis Period										
	Home		Commercial		C&I		Consumer		Other	
	LARGE (1)	SMALL (2)	LARGE (3)	SMALL (4)	LARGE (5)	SMALL (6)	LARGE (7)	SMALL (8)	LARGE (9)	SMALL (10)
<i>INTEREST<sub>t</sub></i>	0.573*** [17.137]	0.523*** [10.827]	0.488*** [17.301]	0.527*** [6.903]	0.611*** [18.782]	0.506*** [9.912]	0.475*** [8.306]	0.613*** [14.876]	0.533*** [18.900]	0.530*** [5.364]
<i>NONINTEREST<sub>t</sub></i>	0.432*** [16.485]	0.422*** [11.202]	0.420*** [14.934]	0.456*** [8.791]	0.472*** [15.645]	0.418*** [11.519]	0.449*** [15.025]	0.449*** [10.309]	0.457*** [16.780]	0.389*** [6.471]
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,683	8,689	13,913	3,459	8,691	8,681	8,690	8,682	13,918	3,454
Adjusted R <sup>2</sup>	0.704	0.698	0.721	0.680	0.717	0.683	0.684	0.710	0.717	0.624
F-test:										
<i>INTEREST</i> =	13.00** (p<0.01)	5.49** (p=0.01)	5.55** (p=0.01)	0.64 (p=0.42)	14.05*** (p<0.01)	3.64* (p=0.05)	0.19 (p=0.65)	17.24 (p<0.01)	8.23*** (p<0.01)	1.54 (p=0.21)
<i>NONINTEREST</i>										

Panel B: Crisis Period										
	Home		Commercial		C&I		Consumer		Other	
	LARGE (1)	SMALL (2)	LARGE (3)	SMALL (4)	LARGE (5)	SMALL (6)	LARGE (7)	SMALL (8)	LARGE (9)	SMALL (10)
<i>INTEREST<sub>t</sub></i>	0.160 [1.124]	0.487*** [2.922]	0.606*** [3.082]	0.364*** [2.637]	0.400*** [2.806]	0.438*** [2.815]	0.175 [1.167]	0.605*** [3.738]	0.486*** [2.686]	0.180* [1.774]
<i>NONINTEREST<sub>t</sub></i>	-0.050 [-0.415]	0.076 [0.752]	-0.049 [-0.405]	0.072 [0.976]	-0.104 [-1.024]	0.174* [1.824]	0.008 [0.096]	0.127 [1.256]	-0.076 [-0.707]	0.042 [0.603]
Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,062	1,062	1,062	1,062	1,062	1,062	1,063	1,061	1,064	1,060
Adjusted R <sup>2</sup>	0.502	0.509	0.483	0.504	0.514	0.496	0.579	0.466	0.530	0.485
F-test:										
<i>INTEREST=</i>	1.08	8.29***	8.10***	5.15**	9.12***	3.84*	1.55	7.36***	9.95***	1.39
<i>NONINTEREST</i>	(p=0.29)	(p<0.01)	(p<0.01)	(p=0.02)	(p<0.01)	(p=0.05)	(p=0.22)	(p<0.01)	(p<0.01)	(p=0.23)

Non-crisis period is defined as 2001Q1 to 2007Q2 and 2009 to 2013Q4. Crisis period is defined as 2007Q3 to 2008Q4. Dependent variable is EARNINGS in period t+1. A bank is classified into LARGE (SMALL) group if the specific loan amount (i.e. home mortgage, commercial loan, C&I loan, Consumer loan, and other) is great than or equal to (lower than) the median amount of specific loan in a given year. See Appendix B for loan definitions. Control variables (SIZE, LEVERAGE, and MTB) and intercept are 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.

Table 6 Earnings persistence and loan loss provision

	Full sample	Non-crisis	Crisis
	(1)	(2)	(3)
<i>INTEREST, NET OF LLP<sub>t</sub></i>	0.605*** [27.509]	0.609*** [27.152]	0.343*** [4.624]
<i>NONINTEREST<sub>t</sub></i>	0.399*** [17.850]	0.422*** [17.839]	-0.068 [-1.076]
<i>OTHER<sub>t</sub></i>	0.391*** [14.371]	0.440*** [19.086]	-0.028 [-0.626]
<i>SIZE<sub>t</sub></i>	-0.079** [-2.133]	-0.047 [-1.441]	0.797*** [2.730]
<i>LEVERAGE<sub>t</sub></i>	-4.798*** [-7.783]	-4.918*** [-7.986]	-10.326* [-1.816]
<i>MTB<sub>t</sub></i>	0.291*** [12.826]	0.261*** [13.376]	0.333 [1.474]
Observations	19,492	17,368	2,124
Adjusted R <sup>2</sup>	0.659	0.699	0.512
F-test			
<i>INTEREST=NONINTEREST</i>	55.24*** (p<0.01)	43.32*** (p<0.01)	19.92*** (p<0.01)

Non-crisis period is defined as 2001Q1 to 2007Q2 and 2009 to 2013Q4. Crisis period is defined as 2007Q3 to 2008Q4. INTEREST, NET OF LLP is measured as interest income (BHCK4107) less loan loss provision (BHCK4230), scaled by total assets at the beginning of quarter (BHCK2170). 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.

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