

THE HIDDEN MESSAGE IN AFS SECURITIES OF US BANKS

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ABSTRACT

We examine US banks' use of available-for-sale ("AFS") securities to smooth their earnings during the most recent macroeconomic business cycle from 2001 to 2010. We contribute to the accounting literature by investigating the interaction between the macroeconomic environment and the income smoothing activities of US banks, and find four main results: First, our empirical results show evidence that US banks use AFS securities to smooth earnings. Second, we find that the realized gains and losses on AFS securities can predict the future core earnings of a bank, consistent with the signaling hypothesis of income smoothing (e.g. Barnea et al., 1975; Bartov, 1993). Third, we report evidence that US banks are more likely to smooth income when the general macroeconomic environment is favorable ("good times") than when it is unfavorable ("bad times"). Fourth, our tests demonstrate that the signaling power of AFS securities for future core earnings tend to be higher during bad times than good times.

JEL: M41, G21

KEYWORDS: Banks, Available-for-sale Securities, Signaling Theory, Income Smoothing

INTRODUCTION

Empirical studies in the early 1990s have shown that banks use realized gains and losses from sale of available-for-sale (AFS) securities to smooth their earnings; however this phenomenon has been largely ignored in the subsequent literature (Barth et al., 1990; Beatty et al., 1995; Beatty and Harris, 1998; Scholes et al., 1990; Collins et al., 1995). In this study, we re-examine the role of AFS securities as an income smoothing device based on the empirical data between 2001 and 2010 – a decade of extreme economic turbulence. We complement prior studies by examining how macroeconomic conditions influence banks' behavior with respect to the use of AFS sale to smooth income. In addition, our empirical results are more robust than those of the prior literature, as our tests are based on a large panel dataset of US bank-holding companies over a span of 10 years.

We focus on the 2001 to 2010 period primarily because this is a highly turbulent decade in which the US and the international economies went through a highly volatile economic cycle. From 2001 to 2006, the global economy saw a spectacular boom, fueled by a real estate bubble and the rapid expansion of credit available to consumers, corporations and governments (Cecchetti et al., 2009). However, in 2007, 2008 and 2009, the global economy fell into one of the worst financial crisis the world has ever seen since the Great Depression in the 1930s. Among many other repercussions of the financial crisis, the global economy experienced a real estate crash in the US and Europe, a liquidity crunch in the international financial market, and a major sovereign debt problem in certain countries of the European Union.

During these volatile economic times, the banking system collectively, as the world's biggest financial intermediary and a major creator of credits, has both contributed to, and suffered from, the global economic turmoil. From a research point of view, the economic cycle of the last decade presents itself as a unique setting for studying the operations of the banking system and its role within the economy. While prior studies examine the prevalence of the use of available-for-sale (AFS) securities to smooth income, there are no studies that explore the use and effectiveness of this income smoothing mechanism under

different stages of economic cycles. Thus, a gap appears to exist in the literature on the role of macroeconomic conditions on banks' use of AFS securities to smooth earnings.

This study attempts to fill this gap in the accounting literature. This study also builds on the prior research which documents banks' use of realized gain or loss from AFS securities to signal their future core earnings. We begin by examining whether banks continue to smooth current earnings using AFS securities in the 2000s, and whether they do so under different macroeconomic conditions. We then focus on the strength of such signaling during downturns relative to boom years. Boom years are generally characterized by appreciation of prices across most asset classes. Consequently, the cost of signaling using realized gain from AFS is likely to be lower during booms. We conjecture that rational managers signal future core earnings using AFS sales to the extent that the marginal benefit exceeds the marginal cost of realized gain or loss from sale of AFS securities. Therefore, we expect the signal through AFS sales to be stronger during downturns. More directly, we address the following research questions: (1) Are banks still using available-for-sale (AFS) securities to smooth their earnings? (2) If so, do banks use AFS securities to smooth earnings differently during economic booms and busts? (3) Do banks use AFS securities to signal their future earnings performance to investors? (4) Does the message, if any, differ during the boom and bust phases of an economic cycle? The current literature on bank accounting largely focuses on the use of Loan Loss Provisions (LLP) as the method of income smoothing.

However, the evidence that AFS securities are actually an equally preferred tool for managing earnings by banks has gradually emerged (e.g. Barth et al., 1990; Beatty et al., 1995; Beatty and Harris, 1998; Scholes et al., 1990; Collins et al., 1995). Scholes et al. (1990) suggest that earnings management using AFS securities is perhaps preferred to earnings management using LLP. As a transaction based (or real) earnings management tool, the former is less likely to attract scrutiny from auditors and regulators than does the latter (Scholes, Wilson, and Wolfson, 1990). Firms generally have incentive to mitigate mispricing of their stock induced by adverse selection by signaling future performance using the least costly method (Akerlof, 1970; Spence, 1973). Since banks face layers of oversight and scrutiny, their ability to use LLP to smooth earnings is more likely limited. In addition, evidence on the effectiveness of LLP for signaling is at best weak and mixed (Kanagaretnam, Lobo, and Young, 2004).

We posit that AFS sale, as a transaction based earnings management, is a more effective tool to signal future earnings. However, the pool of AFS securities with potential gains can vary with the general economic conditions. As we discussed above, boom years (downturns) are typically characterized by across-the-board increases (decreases) in securities prices. This suggests that boom years create the opportunity even for weaker firms to signal future earnings using realized AFS gains and losses. However, the supply of AFS securities with potentially realizeable gain is limited during downturns. Thus, banks that signal during downturns are those who gain more than the cost of signaling. We hypothesize that banks smooth current earnings using AFS sale to signal future core earnings during both favorable and unfavorable economic times. We also hypothesize that AFS sale-based signals are stronger during downturns. Our results show that banks use realized gains and losses from sale of AFS securities to smooth earnings and thereby to signal future core earnings in both boom and bust years. More interestingly, the results show that signals from realized gains or losses from sale of AFS securities are stronger during downturns. We contribute to the literature in several ways. First, we investigate the effects of macroeconomic conditions – booms and busts – on banks' use of AFS securities to smooth their earnings. To the best of our knowledge, this study is the first in the literature to present empirical evidence that banks' income smoothing activities are influenced by the general economic environment.

Consistent with the signaling theory of income smoothing, we find that banks smooth income using AFS securities in order to signal future core earnings (Akerlof, 1970; Barnea et al., 1975; Beatty and Harris, 1998; Bartov, 1993; Warfield et al., 1995). We test our hypotheses using both levels and change specifications, and our results are robust in both specifications. Moreover, we hypothesize and find that

while banks smooth income under upturns and downturns, the signals are even stronger during downturns. Second, we examine the use of AFS securities for signaling during a reporting regime in which unrealized gains or losses on AFS securities are recognized and prominently disclosed on financial statements. The propensity of banks to use realized gains or losses on AFS sale suggests that there is an additional dimension to the debate regarding the efficacy of recognition versus disclosure. Third, we use a unique dataset that includes data for both private and public banks over a decade. The consistency of our results based on broader dataset increases our confidence on results in prior studies, which are generally based on shorter time series or smaller sample sizes. From practical standpoint, this research has the potential to help investors not only better understand the motives for income smoothing by banks, but also better interpret the hidden information conveyed by such income smoothing activities. The rest of this study follows the following structure: Section 2 discusses the prior literature and develops our hypotheses. Section 3 describes our data collection procedure and the descriptive statistics. Section 4 discusses the empirical results. Lastly, Section 5 summarizes the main findings and present possible future research ideas.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Prior research attributes motives for income smoothing to signaling or agency cost theories. Studies that rely on the signaling theory argue that income smoothing is motivated by managers' desire to reveal their private information to outside investors (Bartov, 1993; Barnea et al., 1975; Warfield et al., 1995; Scholes et al., 1990). For example, Barnea et al. (1975) contend that income smoothing is a signaling device that conveys information about the firm's permanent earnings to outside investors. Further, firms can reduce perceived earnings volatility and thereby cost of capital through income smoothing (Trueman and Titman, 1998). On the other hand, studies premised on the agency cost theory suggest that income smoothing is motivated primarily by the personal gains of the senior managers of the firm, which usually comes at a cost to the shareholders. For instance, Fudenberg and Tirole (1995) contend that managers engage in income smoothing in order to increase their own job security. They argue that senior managers are typically evaluated using short-term financial performance, such as earnings. By smoothing this key performance metric, senior managers may extend their tenure with the firm. Therefore, this strand of literature implies that managers realize AFS gains and losses to maximize their private gain at the expense of shareholders. The existence and cause of income smoothing using AFS securities by banks was investigated heavily by accounting researchers during the 1990s.¹ For example, Scholes et al. (1990) argue that banks can lower their cost of capital by using income smoothing to convey their private information to investors (i.e. the signaling hypothesis). Along the same lines, Barth et al. (1990) find empirical evidence that US banks strategically sell investment securities to smooth their earnings.

In another study, Beatty and Harris (1998) investigate the motives for income smoothing by banks and base their research on the theory proposed by Warfield et al. (1995). Beatty and Harris (1998) contend that banks smooth their income using AFS sale primarily (1) to circumvent accounting-based contracts that are designed to mitigate agency problems or (2) to reduce information asymmetry. They conclude that the second incentive (reducing information asymmetry) appears to be supported with their empirical evidence. In contrast, Kanagaretnam et al. (2010) fail to find supporting evidence for the signaling effect of Loan Loss Provisions (LLP). Due to the attendant scrutiny, banks lack the flexibility to signal future earnings using accrual based smoothing (LLP). On the other hand, sale of AFS securities attracts minimal scrutiny. Therefore, we presume that banks prefer to use real transactions, such as AFS securities, as their primary tool to signal future earnings.

Goel and Thakor (2003) recently proposed a different motive for income smoothing: in a firm characterized by high information asymmetry, the inside investors ("insiders") have greater informational advantage over the outsiders. In such information environments, insiders can generate abnormal returns by betting on future earnings growth and declines when income is volatile. They argue that outsiders

could reduce this informational disadvantage by requiring insiders to smooth earnings. Collectively, theory and empirical research suggest that managers smooth earnings to reveal their private information or to satisfy external demand for predictable income. In addition, empirical evidence shows that managers choose a smoothing device that offers them flexibility and that withstands scrutiny. Based on the above discussion, we hypothesize that US banks use AFS securities to smooth their earnings, as follows:

Hypothesis 1: Banks use realized gains and losses from AFS securities to smooth core earnings.

We explore how the macroeconomic conditions in general may affect US banks' decisions to smooth earnings. The banking industry is typically sensitive to the cyclical movements of the economy because cyclical movements of the economy affect both the market for bank credits and the probability and amount of loan losses (Albertazzi and Gambacorta, 2009). As discussed below, the signaling hypothesis of income smoothing suggests that the costs of using AFS securities to signal future earnings significantly increase during downturns (i.e. busts). Therefore, we expect a lower degree of income smoothing during such periods. Signaling costs of income smoothing via realized gains or losses from sale of AFS securities increase during downturns for several reasons. First, during bad economic times, bank earnings tend to be depressed for extended periods of time, primarily due to higher credit losses. Under such adverse conditions, boosting reported earnings by selling AFS securities over an extended period of time would rapidly deplete the bank's pool of profitable AFS security holdings². If all profit-making AFS securities are sold prior to the recovery of the economy, future realized gains of banks would then be lower, triggering a major decline in earnings and stock price.

Therefore, the bank's senior managers would exercise extra caution when deciding on selling AFS securities as a way of temporarily increasing earnings during a bad economic time. Conversely, during good economic times, any negative earnings shock can dissipate rather quickly. As a result, bank managers would find it easier to smooth earnings by strategically selling AFS securities. Second, banks' supply of AFS securities with unrealized gains are more limited during downturns, as prices fall in nearly all major asset classes, except for highly rated government bonds³. During the 2007-2010 financial crisis, most classes of financial assets that made up a typical US bank's AFS investment portfolio, e.g. corporate bonds, municipal bonds, bonds issued by most foreign governments and mortgage backed securities (MBS), have all fallen in price (Cecchetti et al., 2009). We argue that such across the board price declines impose an upper limit on how much profit-making AFS securities a bank can sell.

Third, in order to increase reported earnings during bad economic times, banks may have to sell AFS securities at suboptimal prices. If banks could hold onto the AFS securities until the economy recovers, they normally would be able to sell them at much higher prices. Hence, selling AFS securities during downturns often imposes a significant opportunity cost to the bank in the form of forgoing potential future value appreciations. In contrast, this opportunity cost is far lower during good economic times, as security prices generally increase during a boom. In short, banks generally prefer to sell AFS securities in order to smooth income with a view to signal their future performance. However, economic downturns increase the cost of signaling through AFS sales. The general model of costly signaling from information economics states that as signaling costs increase, less and less firms would carry out the signaling activity, and vice versa (Akerlof, 1970; Fudenberg and Tirole, 1991). Considering that signaling costs substantially increase during economic downturns, we propose the following hypothesis regarding banks' AFS securities:

Hypothesis 2: The degree of income smoothing using AFS securities in US banks is lower during bad economic times than good economic times. We develop our third hypothesis on the information content of realized gains/losses from sale of AFS securities based on the signaling theory of income smoothing (Beatty and Harris, 1998; Warfield et al., 1995; Barnea et al., 1975; Bartov, 1993). Our motivation is to examine whether banks' current-year income smoothing is indeed motivated by signaling of future

performance. Specifically, we pose the following question: *do banks' realized gains from AFS sale provide predictive information about those banks' future performance?* Beatty and Harris (1998) provide some of the earliest empirical evidence on this issue for a sample of US bank-holding companies in 1990 and 1991. They find that realized AFS security gains/losses have some predictive power for banks' future earnings. In other words, high realized AFS security gains in one year can predict higher core earnings in the following year, and high realized AFS security losses in one year can predict low core earnings in the following year. Based on this evidence, Beatty and Harris (1998) conclude that banks' AFS are motivated by signaling hypothesis of income smoothing. Following Beatty and Harris (1998), we propose the following hypothesis:

Hypothesis 3: Banks' realized gains/losses from AFS securities have a positive association with future core earnings. We predict that the signaling quality of AFS securities during bad economic times is stronger than that during good times. Our prediction is founded on the premise that the signaling cost of AFS sale during downturns imposes an insurmountable hurdle on firms that use AFS securities to smooth earnings. However, banks that decide to smooth earnings in this manner are likely to be those that have comparatively lower signaling costs and/or higher economic benefits to be gained from smoother incomes. Those banks are likely to be high-quality banks that have stronger than usual financial performance and conditions, such as lower risks, lower earnings volatility, and stronger risk-adjusted capital ratios. In other words, they are the ones who can "afford" to smooth earnings, even in an adverse economic environment. In comparison, good economic times bring in lower signaling costs, which lead to more banks of lower-to-average quality to engage in income smoothing activities. The influx of lower-to-average banks into the pool of all income smoothing banks tend to decrease the average quality of the AFS signals sent by banks during good economic times. Thus, we propose the fourth hypothesis below.

Hypothesis 4: During bad economic times, the realized AFS gains and losses in banks have a greater positive association with future core earnings than they do during good times.

Data

We use a sample of panel data of 12,052 firm-year observations to test our income-smoothing hypotheses within the US banking industry. In contrast to Beatty and Harris (1998), who rely on a small sample of 850 banks over 2 years, we collected a longer and larger panel dataset from the *Federal Reserve Y-9C* reports, spanning 10 years and between 774 and 2146 bank-holding companies in each year. The sample period between 2001 and 2010 covers both economic downturns and upturns, allowing us to examine the income smoothing characteristics of bank-holding companies during different stages of the economic cycle. Our panel data was collected from the *Federal Reserve Y-9C - Consolidated Bank-holding Company Call Reports*. We downloaded the *annual* financial statement data for all available US bank-holding companies from the Federal Reserve database between 2001 and 2010. To reduce the survivorship bias, our sample includes all current and historical bank-holding companies in the designated sample period. Furthermore, both public and private bank-holding companies are included in our sample. However, the first-order time-differencing results in the observations from the year 2001 being dropped from the final sample as it is the base year for time-differencing.

To eliminate outliers, we use *Studentized residuals* to identify and remove extreme observations. First, we estimate the following pilot pooled-OLS regression on the raw sample: $AFS.GAIN_{it} = \alpha + \beta CORE_{it} + \epsilon_{it}$; then we trim any observation that has a *Studentized residual* greater than 2 or less than -2. The trimming procedure results in a loss of approximately 300 firm-year observations from the raw sample. The final, trimmed sample consists of 12,052 firm-years. The first-order time-difference of key variables – the change variables – are denoted by prefixing a Δ symbol in front of each variable. For example $\Delta AFS.GAIN_{it}$ denotes the $AFS.GAIN_{it}$ minus $AFS.GAIN_{it-1}$. To control for size, we scale necessary variables by the average total asset in each firm-year. The macroeconomic business cycle is proxied by two well-

known variables from the economics literature: the annual GDP growth rate (*GDP.GROWTH*) and the credit default premiums (*DEF.PREM*) (Bernanke, 1990; Stock and Watson, 1993).

Table 1: Key Descriptive Statistics by Year

Year	Net Realized Gains/Losses from AFS Securities scaled by average total assets (<i>AFS_GAIN</i>)			Net Income Before realized AFS gains/losses scaled by average total assets (<i>CORE</i>)			N
	Mean	Median	Change	Mean	Median	Change	
2002	0.00039	0.00010	0.00000	0.01542	0.01537	0.00130	1727
2003	0.00045	0.00012	0.00010	0.01475	0.01458	-0.00040	1884
2004	0.00023	0.00004	-0.00020	0.01471	0.01447	0.00020	1997
2005	0.00003	0.00000	-0.00020	0.01516	0.01481	0.00070	2146
2006	-0.00001	0.00000	0.00000	0.01550	0.01469	-0.00030	956
2007	0.00000	0.00000	0.00000	0.01182	0.01237	-0.00370	905
2008	-0.00011	0.00001	-0.00010	0.00155	0.00684	-0.01100	803
2009	0.00045	0.00017	0.00060	-0.00517	0.00253	-0.00840	774
2010	0.00060	0.00020	0.00010	0.00126	0.00582	0.00380	860

Both the GDP growth rate and credit default premium variables were collected from the Federal Reserve St. Louis Website. The credit default premium is calculated as the average of the monthly spread between Moody’s AAA-rated and BAA-rated corporate bonds in a given year. Table 1 provides the descriptive statistics by year of annual realized AFS gains and losses scaled by average total assets (*AFS.GAIN*) and net income before AFS gains and losses scaled by average total assets (*CORE*). As expected, the average scaled AFS gain or loss is generally small because banks have a large asset base and relatively small returns per dollar of asset. What is interesting in Table 1 is that in all except two years, the average *AFS.GAIN* moves in the opposite direction to the movement of average *CORE*. Despite the crude nature of this statistical table, the relationship depicted here suggests that banks use AFS securities to smooth earnings. Table 2 presents the summary statistics of all variables used in this paper.

Table 2: Descriptive Statistics

Variable	N	Mean	Std. Dev.	Min.	Max.
<i>AFS_GAIN</i>	12052	0.0002327	0.00079	-0.0046748	0.0047307
<i>CORE</i>	12052	0.0116308	0.0147776	-0.1564394	0.2669833
<i>AFS_GAIN</i> –Unscaled	12052	1,904,271	81,032.68	-3,334,210	2,987,317
<i>CORE</i> –Unscaled	12052	90,728.29	1,144,206	-5.10E+07	3.18E+07
<i>NI</i>	12052	64,158.17	796,790.1	-2.77E+07	2.46E+07
<i>TA</i>	12052	8,911,551	8.41E+07	39,816	2.27E+09
<i>TL</i>	12052	8,136,097	7.72E+07	13,829	2.07E+09
<i>TE</i>	12052	745,743	6,883,309	-1,375,000	2.28E+08
<i>DEF_PREM</i>	12052	1.10%	0.36%	0.77%	1.98%
<i>GDP_GROWTH</i>	12052	2.19%	1.54%	-2.60%	3.60%

FS_GAIN: Realized AFS security gains/losses recognized in net income, divided by average total assets.

CORE: Net Income minus *AFS_GAIN*, divided by average total assets.

$\Delta AFS_GAIN(t)$: = *AFS_GAIN*(*t*) – *AFS_GAIN*(*t*-1).

$\Delta CORE(t)$: = *CORE*(*t*) – *CORE*(*t*-1).

TA: Total assets at the fiscal year end.

TL: Total Liabilities at the fiscal year end.

TE: Total Equity at the fiscal year end.

DEF_PREM: Moody’s BAA corporate bond yield minus AAA corporate bond yield, averaged over the year.

GDP_GROWTH: GDP growth rate over the year, collected from Federal Reserve St. Louis website

EMPIRICAL RESULTS AND DISCUSSIONS

The Existence and Degree of Income Smoothing Using AFS Securities

To test whether US banks smooth income using AFS securities (H1), we conduct the following two panel data regressions (using the First-Difference, or “FD”, estimator) based on our sample of all available public and private bank-holding companies between 2002 and 2010 inclusive. The Hausman’s specification test (unreported) has rejected the null that the regressors and the individual effects are

uncorrelated, thus the fixed effect panel model is used throughout this paper. Among fixed effect estimators, we select the FD estimator for its superior efficiency. All standard errors are robust standard errors clustered by individual bank-holding companies.

$$AFS_GAIN_{it} = \alpha_{0i} + \alpha_1 CORE_{it} + \epsilon_{it} \quad (1)$$

$$\Delta AFS_GAIN_{it} = \alpha_{0i} + \alpha_1 \Delta CORE_{it} + \epsilon_{it} \quad (2)$$

We hypothesize that because firms use AFS gains and losses to offset the changes in core earnings. As a result, we expect a negative relationship between realized gains and losses from AFS securities and core earnings (i.e. net income before AFS gains and losses), Table 3 – Panel A shows the results of Panel Regressions 1 and 2. In both regressions, the coefficient α_1 are negative. In Regression 1, we find that core earnings, *CORE*, has a statistically significant negative regression coefficient ($\alpha_1 = -0.0071$, t-stat = -9.3098) with the realized gains/losses of AFS securities, *AFS.GAIN*. In Regression 2, the first-order changes are used instead of levels, and the result is similar ($\alpha_1 = -0.0056$, t-stat = -6.66). These two regression results support H1 and provide initial evidence that banks use AFS securities to smooth earnings. Hypotheses 2 (H2) is tested by Panel Data (FE) Regressions 3 and 4 below and the results are presented in Table 3 – Panel B. H2 stipulates that macroeconomic conditions can influence the degree in which a bank uses AFS securities to smooth its earnings. Regression 3 uses GDP growth as a positive proxy for macroeconomic conditions, while Regression 4 uses credit default premiums as a negative proxy for macroeconomic conditions. The higher the credit default premium, the worse the economic climate in general (Bernanke, 1990). Also note that Regressions 3 and 4 are based on first-order changes rather than levels.

$$\Delta AFS_GAIN_{it} = \beta_{0i} + \beta_1 \Delta CORE_{it} + \beta_2 GDP_GROWTH_{it} + \beta_3 \Delta CORE_{it} * GDP_GROWTH_{it} + \epsilon_{it} \quad (3)$$

$$\Delta AFS_GAIN_{it} = \gamma_{0i} + \gamma_1 \Delta CORE_{it} + \gamma_2 DEF_PREM_{it} + \gamma_3 \Delta CORE_{it} * DEF_PREM_{it} + \epsilon_{it} \quad (4)$$

In Regression 3 of Table 3 – Panel B, β_3 , the interaction coefficient between core earnings and GDP growth is significantly negative ($\beta_3 = -0.0009$, t-stat = 2.08). This indicates that when GDP growth is high, banks tend to more aggressively use realized AFS gains and losses to offset the changes in core earnings, as consistent with H2. This finding is further supported by Regression 4, which shows that the interaction term of $\Delta CORE$ and *DEF.PREM* has a positive coefficient $\gamma_3 = 0.008$ (t-stat = 4.00). A positive term γ_3 suggests that if when the default premium increases – a signal of worsening economy – the offsetting effect between *AFS.GAIN* and *CORE* becomes weaker. In other words, in an economic downturn, banks do less income smoothing activities, which is predicted by Hypothesis 2. On the other hand, if the default premium decreases, a signal of improving economic condition, the level of income smoothing activity increases in these banks.

The results in Table 3 provide evidence that US banks indeed used AFS securities to smooth their earnings in between 2002 and 2010 - a time period characterized by one of the greatest booms and one of the deepest recessions in modern history. We also find that the magnitude of such income smoothing depends on the macroeconomic environment of the time. During booms, banks appear to conduct income smoothing more aggressively; but during busts, banks seems to engage in much less income smoothing.

The Predictive Power of AFS Signals in Good and Bad Times

We test hypotheses 3 and 4 using the following three dynamic panel regressions, applying the generalized method of moment (GMM) estimator proposed by Arellano and Bond (1991).

$$CORE_{it+1} = \delta_{0i} + \delta_1 CORE_{it} + \delta_1 AFS_GAIN_{it} + \epsilon_{it} \quad (5)$$

Table 3: Univariate Panel Regressions (First Difference Estimator)

Panel A: Univariate Panel Regressions (First Difference Estimator)		
Dependent Variables	(1) AFS_GAIN(t)	(2) ΔAFS_GAIN(t)
Intercept	-0.0000*** (-3.81)	0.0000 (-0.05)
CORE(t)	-0.0071*** (-9.31)	
ΔCORE(t)		-0.0056*** (-6.66)
Adj. R-Sq.	1.12%	0.30%
F-statistic	136.45***	36.82***
Panel B: Multiple Panel Regressions (First Difference Estimator)		
Dependent Variable:	(3) ΔAFS_GAIN(t)	(4) ΔAFS_GAIN(t)
Intercept	0.000 (1.19)	0.000 (1.28)
ΔCORE(t)	-0.0029*** (-3.33)	-0.016*** (-5.19)
GDP_GROWTH(t)	-0.0001*** (-13.87)	
ΔCORE(t)*GDP_GROWTH(t)	-0.0009** (-2.08)	
DEF_PREM(t)		0.0003*** (9.2239)
ΔCORE(t)*DEF_PREM(t)		0.008*** (4.00)
Adj. R-sq.	0.31%	0.31%
F-statistic	18.45***	18.56***

Panel A shows the panel data regression estimates of the equation $AFS_GAIN_{it} = \alpha_{0i} + \alpha_1 CORE_{it} + \epsilon_{it}$ and the equation $\Delta AFS_GAIN_{it} = \alpha_{0i} + \alpha_1 \Delta CORE_{it} + \epsilon_{it}$. *AFS_GAIN* is the realized gain/loss from available for sale securities scaled by average total assets; *CORE* is net income minus the gain/loss from available for sale securities scaled by average total assets. $\Delta CORE$ is current year *CORE* minus previous year's *CORE*. The regression coefficients are indicated without parenthesis. one-way clustered robust standard errors (by firm) are reported in parenthesis. The significance code for this table is as follows: '***' for 1%, '**' for 5%, and '*' for 10%.

Panel B shows the panel data regression estimates of the equation $AFS_GAIN_{it} = \alpha_{0i} + \alpha_1 CORE_{it} + \epsilon_{it}$ and the equation $\Delta AFS_GAIN_{it} = \alpha_{0i} + \alpha_1 \Delta CORE_{it} + \epsilon_{it}$. *GDP_GROWTH* is the current year's *GPD* divided by previous year's *GDP* minus 1. *DEF_PREM* is the default premium as measured by the yield of Moody's *BAA* corporate bonds minus the yield of *AAA* corporate bonds. The regression coefficients are indicated without parenthesis. one-way clustered robust standard errors (by firm) are reported in parenthesis. The significance code for this table is as follows: '***' for 1%, '**' for 5%, and '*' for 10%.

In this regression, the current year's $CORE_{it}$ and AFS_GAIN_{it} are used to predict the subsequent year's core earnings ($CORE_{it+1}$). The current year's core earnings ($CORE_{it}$) are also used to one-year ahead core earnings ($CORE_{t+1}$), because earnings typically demonstrate strong persistence in a time-series (Feltham and Ohlson, 1995; Ohlson, 1999). The GMM is employed for this dynamic panel regression. When *CORE* appears on both the right-hand side and left-hand side of the regression formula, although in different time lags, the ordinary panel data estimators will result in biased estimates of the regression coefficients. Hence we use GMM to produce unbiased estimates (Arellano and Bond, 1991, Greene, 2002). We show the results of the regression in Table 4. Consistent with H3, we find statistically significant positive correlation between *AFS gains* and losses during the current year and the following year's core earnings. Column 1 of Table 4 shows that the coefficient of AFS_GAIN_{it} is positive and significant ($\delta_2 = 1.365$ and significant at the 1% level). This result suggests that one year's realized *AFS gains/losses* can signal future years' core earnings.

$$CORE_{it+1} = \delta_{0i} + \delta_1 \Delta CORE_{it} + \eta_2 AFS_GAIN_{it} + \delta_3 GDP_GROWTH_{it} + \delta_4 AFS_GAIN_{it} * GDP_GROWTH_{it} + \epsilon_{it+1} \tag{6}$$

$$CORE_{it+1} = \eta_{0i} + \eta_1 \Delta CORE_{it} + \eta_2 AFS_GAIN_{it} + \eta_3 DEF_PREM_{it} + \eta_4 AFS_GAIN_{it} * DEF_PREM_{it} + \epsilon_{it+1} \tag{7}$$

Finally, we test H4 by estimating Dynamic Panel Regressions 6 and 7 also using Arellano and Bond's (1991) GMM. The results are also shown in Table 4. The Wald Chi-squared statistics are reported for all three regression models, and are all statistically significant. Thus, it can be argued that these models provide meaningful predictions for future core earnings of a bank. For Equation 6, the interaction coefficient between realized AFS gains/losses and GDP growth is negative ($\delta_4 = -0.666$, t-stat= -3.31) and statistically significant, indicating that the signaling power is weakened during good economic times but strengthened during bad times. For Equation 7, where we use default premium (*DEF.PREM*) to proxy for state of the macro-economy, we find that the coefficient of the interaction term between AFS gains and losses and default premium is positive and statistically significant ($\eta_4 = 2.074$, t-stat= 2.27). Because default premium is a negative proxy for the macroeconomic conditions, this result should be interpreted as follows: when the default premium (macro-economy) is high (bad), the signaling power is high; when the default premium (macro-economy) is low (good), the signaling power is low. Therefore, both GDP growth and default premium proxies for the macroeconomic condition yield consistent results that are supportive of H4

Table 4: Dynamic Panel Regressions (Arellano-Bond's Two-Steps GMM Estimator)

Dependent variable:	(5) CORE(t+1)	(6) CORE(t+1)	(7) CORE(t+1)
CORE(t)	0.955*** (13.68)	0.792*** (8.86)	0.822*** (10.94)
AFS_GAIN(t)	1.365*** (3.97)	2.778*** (4.98)	-1.021 (-1.02)
GDP_GROWTH(t)		0.000543*** (3.55)	
AFS_GAIN(t)*GDP_GROWTH(t)		-0.666*** (-3.31)	
DEF_PREM(t)			-0.00216*** (-4.35)
AFS_GAIN(t)*DEF_PREM(t)			2.074** (2.27)
Wald's Chi-sq. test	189.83***	139.61***	196.44***
Adjusted R-sq.	49.72%	49.52%	49.72%

*this table reports the results of arellano-bond's gmm estimators for the three dynamic panel regressions (5), (6) and (7). . afs_gain is the realized gain/loss from available for sale securities scaled by average total assets; core is net income minus the gain/loss from available for sale securities scaled by average total assets. delta_core is current year core minus previous year's core. gdp_growth is the current year's gpd divided by previous year's gdp minus 1. def_prem is the default premium as measured by the yield of moody's baa corporate bonds minus the yield of aaa corporate bonds. all independent variables lag the dependent variables by one year. the two-steps procedure is applied for all three regressions, and the wc-robust t statistics are reported in parentheses. the significance code for this table is as follows: '***' for 1%, '**' for 5%, and '*' for 10%.*

CONCLUDING REMARKS

Managers smooth income to convey their private information about firms' future earnings or to reduce perceived earnings volatility (Barnea et., 1975; Truema and Titman, 1998). In doing so, they choose a signaling method that allows them to achieve the objective with lower costs and more flexibility. We build on prior research and posit that US banks use realize gains or losses from the sale of AFS securities to smooth income. Accordingly, we hypothesize that managers smooth earning using realized gain or loss from sale of AFS securities during both boom and bust years. We also presume that rational managers choose a signaling method to the extent that the marginal benefit from the effort is greater than the marginal cost. Because the cost of signaling using realized gains or losses from sales of AFS securities increases during downturns, we expect that only stronger banks will signal in such a manner during downturns. Therefore, we hypothesize that signals from sales of AFS securities is stronger during downturns. We test our hypotheses using a panel data of US banks between 2001 and 2010. Our results

show that US banks indeed use realized AFS gains/losses to smooth reported earnings. Our empirical evidence in this regard is consistent with that of the earlier research, which used the data from late 1980s and early 1990s (e.g. Barth et al., 1990; Beatty and Harris, 1998; Beatty et al., 1995; Scholes et al., 1990). Our unique contribution is to show US banks' proclivity to smooth income more aggressively during economic booms, and much less aggressively during economic busts.

The empirical results, collectively, show that banks actively time the sale of AFS securities in order to signal future earnings in both boom and bust years. But the signaling effect of such sales is more pronounced during downturns. Consequently, realized AFS security gains and losses have a stronger signaling power for future core earnings under adverse macroeconomic conditions (a bust) than under favorable ones (a boom). From a practical standpoint, the study shows that AFS securities can help investors and financial analysts to better predict future core earnings of a bank. We suggest that investors and analysts place more emphasis on realized AFS securities gains/losses during bad economic times but less so during good economic times.

Future academic research could extend this line of study in the following three directions: (1) Analyze if any abnormal returns can be made by adopting investment strategies that simultaneously long bank stocks reporting large realized AFS gains and short bank stocks reporting large realized AFS losses. (2) Compare and contrast AFS securities and Loan Loss Provisions (LLP) as two alternative methods of managing bank earnings. This would highlight the advantages and disadvantages of each method of income smoothing in banks: the former is transactions-based and the latter is accruals-based. (3) Examine income smoothing in a different country or region, say Europe or Asia, and see whether the same findings would be obtained under a different financial-regulatory system, culture and legal environments.

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