Mixing Fair-Value and Historical-Cost Accounting: Predictable Other-Comprehensive-Income and Mispricing of Bank Stocks

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Abstract

Other comprehensive income (OCI) items are often considered to be transitory (Chambers et al. 2007; IASB 2013; CFA2014). In this paper we show that a significant portion of OCI, namely unrealized gains and losses (UGL) from available-for-sale securities (AFS), is non-transitory: a negative correlation between accumulated UGL in the current period and next period UGL is predicted and we show that this correlation is economically and statistically significant. This correlation is due to a mix of accounting methods of measurement of income from fixed-income securities: UGL are recognized based on fair values, whereas interest income is measured based on historical cost. We document that: (1) this negative correlation explains a previously unexplained negative correlation in other comprehensive income (OCI); and, (2) investors seem to price total UGL disregarding (or not realizing) the fact that reported UGL includes a predictable, accounting-driven component.

Keywords: Market mispricing; Bank risk factors; Holding gains and losses; Available-for-sale securities; Commercial banks; Fair value accounting; Other comprehensive income.

JEL Classifications: M41; G14; G21

1. Introduction

The current GAAP approach to incorporating fair value accounting information for available-for-sale (AFS) debt securities into an historical-cost-based accounting system involves the separation of two income concepts, net income and comprehensive income, as well as "recycling" from comprehensive income to regular income. Thus, two different income measures are reported in the same set of financial statements.

We show that this mix of accounting methods has two side-effects: (1) unrealized accounting holding gains and losses (UGL) differ from true economic holding gains and losses; and, (2) there is an induced, considerable negative correlation between UGL and accumulated unrealized holding gains and losses (AUGL) at the end of the previous fiscal year. This correlation varies systematically with the percentage of AFS securities that are invested in fixed-income securities, as well as with the relative amount of accumulated unrealized gains (AUG) versus unrealized losses (AUL). We document that: (1) the negative correlation between UGL and lagged AUGL explains the previously observed negative serial correlation in other comprehensive income; and, (2) investors seem to price the total amount of UGL as real economic gains and losses, disregarding (or not realizing) the fact that reported UGL includes a predictable, accounting-driven component.

Statement of Financial Accounting Standards 115: *Accounting for Certain Investments in Debt and Equity Securities* (SFAS 115) requires differential treatment of unrealized holding gains and losses based on management's intended strategy for the security.[1] For securities, which management intends to resell in the near term (labeled "trading" securities), unrealized

[1] The FASB Accounting Standards Codification codes SFAS 115 as ASC 320 *Investments, Debt and Equity Securities.* The issues we raise regarding SFAS 115 also apply to International Accounting Standard (IAS) 39: *Financial Instruments: Recognition and Measurement.*

holding gains and losses are recognized in earnings. For securities, which management intends to hold to maturity (labeled "held to maturity" securities), unrealized holding gains and losses typically are not recognized in net income or other comprehensive income (OCI). For all other securities, (labeled "available for sale" (AFS) securities) unrealized holding gains and losses are typically recognized in OCI.

Unrealized holding gains and losses from investment in AFS debt securities are measured based on fair value. In contrast, interest income from these securities, which is reported on the income statement, is measured based on their historical cost. This combination of accounting methods results in two components of unrealized holding gains and losses: (1) change in the fair value of debt securities due to changes in expected future cash flows and/or the discount rate; and, (2) change in the difference between fair value and the corresponding amortized cost due to the difference between the fair-value-based and historical-cost-based amortization. In an efficient market, the first component is not predictable. The second component, however, *is* predictable.[2] This is at odds with the pervasive notion in the literature that other comprehensive income items, which include UGL, are transitory (e.g., Linsmeier et al. 1997; Chambers et al. 2007; Bamber et al. 2010; Black 2015).[3] Such a feature may lead investors to misinterpret bank financial statements, which, in turn, could lead to mispricing of bank stocks.

We analyze reported UGL of all U.S. commercial banks traded on the NYSE, AMEX, and NASDAQ. Our sample period starts in 1998 when banks were first required to disclose, in detail, UGL under Statement of Financial Accounting Standards No. 130 *Reporting*

[2] We elaborate on and explain this predictability in section 3.1.
[3] Chambers et al. (2007), for instance, document that investors price other comprehensive income items almost dollar-for-dollar, consistent with the transitory nature of fair value changes.

Comprehensive Income (SFAS 130). We predict a negative correlation between reported UGL on AFS debt securities and AUGL on AFS debt securities at the beginning of the fiscal year and we show that this correlation is economically and statistically significant.

Since the predictable component of UGL results from the application of the effective yield method in the calculation of amortized cost, the effects of the mixed accounting methods apply to debt securities only. We show that, as the percentage of fixed-income AFS debt securities increases, both the magnitude and the significance of the negative correlation between UGL and lagged AUGL increases.

The predicted negative correlation of UGL and lagged AUGL will be observed only if the bank does not sell the AFS debt security; a sale will lead to a realized gain or loss and UGL on the security will be zero. Banks have incentive to hold AFS debt instruments with a value below par because realizing a loss lowers regulatory capital and earnings while holding the instruments to maturity (or until they return to par) is only a matter of time (Moyer 1990). On the other hand, selling securities with unrealized losses brings tax benefit to the banks (Scholes et al 1990; Warfield and Linsmeier 1992). Since these incentives for banks to hold securities with unrealized gains and unrealized losses are likely to be asymmetric, the correlation between UGL and lagged accumulated unrealized gains (AUG) is likely to be different from the correlation between UGL and lagged accumulated realized losses (AUL).

Another reason for an asymmetric relation between UGL and lagged AUG versus UGL and lagged AUL is that GAAP imposes a conservative bias on the treatment of unrealized gains versus unrealized losses associated with holding AFS securities. Unlike unrealized holding gains, unrealized holding losses are sometimes required to be recognized in the income statement even

though the underlying securities are not sold; equivalent recognition is not required for unrealized gains. This recognition of unrealized holding losses happens when there is significant doubt whether the bank can hold the security until the fair value recovers to amortized cost. The resulting income statement charge is called an "other-than-temporary impairment" (OTTI).[4] As a result of this asymmetric accounting, unrealized holding losses at the end of the fiscal year are more likely than unrealized holding gains to be associated with securities that banks plan to hold rather than to sell.[5] Since securities with unrealized losses are more likely to be held, the conservative accounting bias implies that the correlation with UGL in the following year is expected to be greater than the correlation between unrealized gains and next year's UGL.

Our analysis shows that the correlation between AUL with UGL in the following year is greater than the correlation between AUG and UGL in the following year.

It is commonly assumed that items in OCI are transitory as they relate to volatile changes in market value (Linsmeier et al. 1997; Chambers et al. 2007; Bamber et al. 2010; Black 2015). This perceived transitory and volatile nature of OCI is the primary reason given by standard setters for permitting items of OCI to bypass the income statement. Both the FASB and the IASB view the lack of persistence as a key characteristic of OCI items (IASB 2013). In its 2014 comment letter to the IASB, the Chartered Financial Analyst (CFA) Institute argues for using lack of persistence as the main criteria for the distinction between OCI and net income (CFA 2014). Nonetheless, Jones and Smith (2011) documented a puzzling negative serial correlation in OCI. Jones and Smith posited that this serial correlation may be due to price reversion in

[4] See SFAS 115, IAS 39 and IAS 36: *Impairment of Assets.*

[5] Very few banks in our sample (3 percent) recorded OTTIs prior to the global financial crises but 24 percent recorded OTTIs during the crisis and 28 percent have recorded OTTIs in the years post the crisis. This significant number of OTTIs suggests that managers take the recognition of OTTIs seriously and, hence, if an unrealized loss is not recorded as an OTTI (and, hence remains in AUL) it signals that the bank will not sell the security before maturity; no such signal exists for AUG.

securities investments (which seems to be at odds with the assumption of market efficiency) or to "recycling." They were, however, unable to provide evidence consistent with either explanation. In this paper we show that the negative correlation in OCI is due to the negative correlation between UGL and lagged AUGL, created by the accounting for UGL. When we control for this negative correlation, the serial correlation in UGL (and in OCI) disappears. This suggests that the serial correlation in OCI is not an indication of price reversion; instead, it is driven by the mix of fair value and historic cost accounting.

Sloan (1996) provides evidence suggesting that investors fail to understand the properties of the accrual and cash components of income. This casts doubt on their ability to appreciate the subtlety/nuances of the accounting, which we describe. Investors may, for example, price the total amount of UGL as real economic gains and losses, disregarding the fact that reported UGL includes a predictable, accounting-driven component.

In order to examine the market pricing of UGL, we isolate a predictable component of UGL based on a linear regression of UGL on variables that reflect information on AFS securities available at the end of the previous year. We conduct three sets of analyses based on this predictable component.

First, we regress next period stock return on predicted next year UGL and known risk factors. The estimated coefficient on predicted UGL is highly significant, consistent with investor misinterpretation of the information in UGL. Second, we form portfolios each year based on the magnitude of predicted UGL. We show that, for these portfolios, the magnitude of the mispricing is economically significant -- a hedged portfolio strategy yields significant annual excess return during the sample period. Third, for the same set of portfolios, we show significant excess

returns (alpha) in a Fama and French (1993) and Carhart (1997) four factor model, in which we regress monthly portfolio returns on the returns on four factors – the market premium, a book-to-market factor (HML), firm size (SMB), and momentum (UMD) -- as well as debt-specific risk factors (i.e., proxies for shocks to the yield curve (Viale et al. 2009)).[6]

Our paper makes the following contributions to the literature. First, we demonstrate how accounting for income from AFS securities may affect the dynamics of reported unrealized holding gains and losses. We explain the reason for the observed economically and statistically significant negative correlation between UGL and lagged AUGL, and we show how this correlation varies with the composition of AFS securities and with the composition of unrealized gains and losses. Second, we show that the negative autocorrelation in UGL, documented in prior research, is not an indication of price reversion. Instead, it is due to the combination of a negative correlation between UGL and lagged AUGL, and a positive correlation between current UGL and current AUGL. Third, we document evidence that the mix of historic cost and fair value accounting leads to market mispricing of bank stocks. This suggests that requiring separate disclosure of the amortization-driven component of unrealized gains and losses and the market-price-change-driven component may have informational benefits to investors.

Our paper proceeds as follows. Section 2 provides a brief review of the related literature. The main research questions and predictions are developed in Section 3. Section 4 describes the sample selection and the data gathering procedure, as well as providing selective descriptive statistics. Section 5 reports the test results. Section 6 concludes the paper with a discussion of sensitivity tests and a brief summary.

[6] The literature debates the usefulness/relevance of the Fama and French (1993) and Carhart (1997) risk factors in controlling for differences in risk of bank stocks (see, for example, Barber and Lyon (1997), Petkova (2006) and Viale et al. (2009)). This inconclusive debate leads us to include the Fama and French and Carhart factors as well as the Vaile et al. risk factors as controls for risk explanations for stock and portfolio returns.

2. Related Literature

Our study is primarily related to studies on the measurement of bank financial instruments based on amortized costs and fair values. More broadly, since unrealized fair value gains and losses are reported as part of OCI, our study also relates to the studies of the incremental and relative pricing implications of comprehensive income.

Studies investigating the pricing implications of items in OCI generally find that these implications strengthened after the effective date of SFAS 130, consistent with investors paying more attention to amounts recognized in financial statements rather than disclosed in footnotes. For a sample prior to the effective date of SFAS 130, Dhaliwal et al. (1999) find that the association of returns with comprehensive income is stronger than the association of returns with net income, except for financial firms. They also find that the AFS securities adjustment is the only component of other comprehensive income that improves the association of returns with income, again primarily for financial firms. O'Hanlon and Pope (1999) report similar results for other comprehensive income items for a sample of U.K. firms. For samples after the effective date of SFAS 130, Biddle and Choi (2006) find that comprehensive income dominates other income measures in explaining equity returns.

The main argument for allowing items of OCI to bypass the income statement is that they are often related to volatile fluctuations in market conditions and are viewed as transitory (Linsmeier et al. 1997; Barker 2004; Yen et al. 2007). In a market valuation study, Chambers et al. (2007) find that the association between returns and the components of OCI is approximately dollar-for-dollar, consistent with the market viewing these items as transitory.

Jones and Smith (2011) study the total amount of OCI, including additional minimum pension liability adjustments, foreign currency translation gains and losses, changes in the fair value of derivative instruments classified as cash flow hedges, as well as unrealized gains and losses from AFS securities of 236 companies from 1986 to 2005. They document a negative serial correlation in OCI, but they are unable to determine whether this correlation reflects reversion in market values or recycling.[7] Consistent with their finding, we document a negative serial correlation in UGL. Note, however, that there is an important difference between our measure of UGL and AFS gains and losses and the measures studied in Jones and Smith: our UGL *excludes* reclassified gains and losses (RECL) whereas Jones and Smith *include* RECL. Jones and Smith conjecture that the negative correlation they document might be due to reclassification. Our finding of negative serial correlation without RECL rules that out. We show that, once we control for the negative correlation between lagged AUGL and current UGL, the negative relation between lagged UGL and current UGL becomes insignificant. Our analysis further reveals that current UGL and current AUGL are significantly positively correlated, which is not surprising given that UGL of the current period makes up a significant portion of AUGL at the end of the current period. Thus, these findings provide an explanation for the negative serial correlation in UGL. It is not due to reversion of market values; instead, it is due to the combination of a negative correlation between lagged AUGL and current UGL and the positive correlation between current UGL and current AUGL.

[7] Jones and Smith (2011) explain the recycling scenario as follows. Consider a simple scenario where an available-for-sale security is purchased for $100, increases in value by $25 during the first year, holds that value for two more years, and then is sold for $125. In the first year, the $25 gain would be recorded as an OCI gain. However, OCI for years two and three would be zero, and so the $25 gain could be viewed as transitory. But, since the $25 is recycled out of accumulated OCI upon sale, and recognized as a gain in net income, the OCI amount for year three is a $25 loss. Thus, in this scenario, OCI would have zero persistence in the short run, but 100 percent negative persistence in the long run, i.e., the $25 gain in year one would reverse in year three.

Barth (1994) and Ahmed and Takeda (1995) examine the pricing implications of disclosures of unrealized and realized gains and losses on banks' investment securities.[8] Barth (1994) examines the pricing implications via market value (levels) and (raw) returns models in annual cross-sectional regressions and in pooled regressions with fixed effects. Estimation of the market-value-based model yields a significantly positive coefficient on the fair value of marketable securities, and an insignificant or significantly negative coefficient on the amortized cost of marketable securities. Barth concludes that the fair value of marketable securities provides significant explanatory power beyond amortized costs, but not vice versa. Barth's (1994) returns based model regresses returns on the level or change in net income before securities gains and losses, periodic realized gains and losses, and periodic total (realized plus unrealized) gains and losses. Estimation of this model yields a negative coefficient on realized gains and losses and a positive coefficient on total gains and losses, which generally is insignificant except for large banks holding liquid securities. Barth (1994) interprets the weaker results in the returns model as attributable to greater noise in the income statement variables.

Ahmed and Takeda (1995) estimate (raw) returns based models in pooled regressions. They argue that a weakness of Barth's (1994) returns based model results is the omission of changes in the value of other net assets resulting from interest rate movements during the year. After controlling for the joint effect of bank exposure to interest rates and the change in interest rates

[8] Barth (1994) hand collected the fair values of marketable securities for a sample of banks from 1970-1990, which appear to have disclosed the fair values of marketable securities in financial reports under industry GAAP or practice. Ahmed and Takeda (1995) obtained similar data from commercial bank holding companies' regulatory Y-9C filings from the second quarter of 1986 to the fourth quarter of 1991.

during the year, Ahmed and Takeda (1995) find significant increases in the pricing implications of both unrealized and realized gains and losses in their returns model.[9]

More recently, Dong et al. (2014) extend Barth (1994) and Ahmed and Takeda (1995) and find considerably stronger pricing implications for realized gains and losses than do either of these studies. Dong et al. (2014) attribute the stronger pricing implications to two factors. First, SFAS 115 and SFAS 130 require firms to report AFS securities at fair value and to report realized gains and losses prominently in financial reports. Hence, for almost two decades, investors have had highly visible information about fair values and related unrealized and realized gains and losses. This presumably has given them sufficient time to become accustomed to, and familiar with, how to use this information. Second, Dong et al. (2014) provide evidence that realized gains and losses measured based on historical cost help investors predict future bank performance.

Badertscher et al. (2014) examine the pricing implications of banks' other-than-temporary impairment (OTTI) of investment securities. They find that the component of OTTI impairment recorded in net income has significant pricing implications while the component that remains in OCI does not.

Related to the above studies, our analysis of market pricing focuses on the observation that there is a predictable component of UGL. We show that investors seem to price the total amount of UGL as real economic gains and losses, disregarding (or not realizing) the fact that reported UGL includes a predictable, accounting-driven component.

3. Research Questions and Research Design

[9] Ahmed and Takeda (1995) also examine the effects of income, capital, and tax management on the pricing implications of unrealized and realized gains and losses.

We begin by describing the accounting mechanism by which a negative correlation arises between current UGL and lagged AUGL. We present simple algebraic and numerical illustrations.

3.1 Predictive power of AUG and AUL for UGL

Let BV_t^C and BV_t^F denote the amortized cost and the fair value of an AFS debt security held by the bank. Let UGL_{t+1} denote unrealized gains and losses incurred in year *t+1*. Let $E_t[UGL_{t+1}]$ denote expected UGL_{t+1}, and ε_{t+1} denote the unexpected UGL_{t+1} due to change in market conditions.

Suppose that the market discount rate (r_t^F) exceeds the historical-cost-based discount rate (r^C) such that $BV_t^C > BV_t^F$. That is,

$$r_t^F > r^C$$

$$BV_t^C > BV_t^F.$$

Note that, by definition, accumulated unrealized gains and losses equals the difference between the fair value and the amortized cost:

$$AUGL_t = BV_t^F - BV_t^C.$$

Therefore, in this scenario, $AUGL_t$ is less than 0.

Interest expense reported on the income statement is calculated based on historical-cost-based interest rate (r^C). This interest expense exceeds the fair-value-based discount rate (r_t^F). As a result, the amortization expense, which is the difference between interest payment and interest expenses, would be larger under fair value accounting:

$$r_t^F * BV_t^F - E_t[c_{t+1}] > r_t^C * BV_t^C - E_t[c_{t+1}],$$

where c_{t+1} denotes the cash interest payment.

That is:

$$E_t[BV_{t+1}^F] - BV_t^F > E_t[BV_{t+1}^C] - BV_t^C.$$

Therefore,

$$BV_t^C - BV_t^F > E_t[BV_{t+1}^C] - E_t[BV_{t+1}^F].$$

That is, over time, the expected difference between amortized cost of the fixed-income security and the market value of the security will gradually reduce to zero as the bond approaches its maturity. Since the difference between the amortized cost and the fair value is expected to decrease in the following year, that is, $E_t[BV_{t+1}^C - BV_{t+1}^F] < [BV_t^C - BV_t^F]$, this expected decrease will be captured in UGL_{t+1}. As a result,

$$E_t[UGL_{t+1}] = E[BV_{t+1}^F - BV_{t+1}^C] - [BV_t^F - BV_t^C] > 0.$$

That is, conditioning on $AUGL_t$ being less than 0, $E_t[UGL_{t+1}]$ will be greater than 0. Similar logic can be applied to show that $AUGL_t$ greater than 0 implies $E_t[UGL_{t+1}]$ will be less than 0 when $BV_t^C < BV_t^F$.

We also illustrate the above effects via a numerical example, summarized in Figure 1. Suppose a bank purchased a $100 corporate bond and classified the investment as AFS. The bond, which was a 3-year, 10 percent annual coupon bond, was issued at par on 12/31/x0. Assume that, due to unfavorable news, the market discount rate increased to 12 percent on 12/31/x1. The fair value of the bond would decrease to $96.62 and, under SFAS 115, an accumulated unrealized holding loss of $3.38 would be recorded in year 1. In year 2, the fair value of the bond would be $98.21 while the amortized cost of the bond would remain at $100. The reduction of AUGL to $1.79 (i.e., $100 - $98.21) causes the recognition of an unrealized

holding gain of $1.59 (i.e., $98.21 - $96.62). Similarly a $1.79 unrealized holding gain would be recognized in year 3.

In contrast, if true mark-to-market accounting were applied in the sense that interest expenses are also recognized based on the market interest rate as opposed to the historical rate, then in year 2 interest income would be $11.59 as opposed to $10 under SFAS 115. As a result, the amortized cost of the bond would be $98.21, equal to its fair market value. Therefore, no unrealized holding gains or losses would be recognized in year 2. Similarly, no unrealized holding gains and losses would be recognized in year 3.

The key insight from the above example is that under true fair value accounting, UGL in year 2 is equal to UGL in year 3, which represents the economic reality that the market discount rate did not change in years 2 and 3. That is, there was no economic holding gain or loss in these years. Under SFAS 115, however, the company shows unrealized holding gains in both years, with UGL of $1.59 and $1.79 in years 2 and 3. Such gains, however, are simply due to the fact that interest income, which is measured based on historical cost, was $1.59 and $1.79 less than the economic interest income in these years. Note that the example illustrates the negative correlation, which is due to the mix of historic cost and fair value accounting; an accumulated unrealized *loss* of $3.38 at the end of year 1 is associated with an unrealized *gain* of $1.59 in year 2 and an accumulated unrealized *loss* of $1.79 at the end of year 2 is associated with an unrealized *gain* of $1.79 in year 3.

An alternative scenario is that the discount rate drops to 8 percent. There will be an unrealized gain of $3.57. This will be followed by a predictable unrealized loss in the next year of $1.62 because the fair value will decrease to $101.85 (and we would, again, predict a negative

correlation between UGL and lagged AUGL). But unlike the scenario where the fair value drops below par, in this scenario where the fair value is above par the bank may choose to sell the security at the beginning of year 2, in which case the UGL in year 2 will be zero and hence there will be no correlation between UGL in year 2 and AUGL at the beginning of year 2.

Our algebraic and numerical examples are based on a single debt security. When a bank has a portfolio with thousands of securities, with some having unrealized holding losses and some having unrealized holdings gains, it is unclear whether the accounting illustrated via these examples will lead to a detectable pattern in the time-series properties of the *aggregated* unrealized holding gains and losses from both debt and equity securities. Nevertheless, our empirical results show that the negative correlation is statistically and economically significant.

A key assumption underlying the predictability of UGL is that the AFS security will continue to be held by the bank. As we discussed in the introduction, a bank's incentive to hold securities with unrealized gains versus unrealized losses may be asymmetric. In addition, due to the conservative bias in accounting, unrealized holding losses are sometimes required to be recognized in the income statement even though the underlying securities are not sold. As a result of the possible asymmetry in banks' security holdings, as well as the conservatism in accounting, accumulated unrealized holding losses at the end of the fiscal year may have different predictive power with respect to UGL compared to accumulated unrealized gains. Therefore, we also estimate the following regression to assess the statistical significance of the relation between UGL and lagged AUG and AUL:

$$UGL_{jt} = \alpha_0 + \alpha_1 AUG_{jt-1} + \alpha_2 AUL_{jt-1} + e_{jt} \quad (1)$$

Another feature of the predicted negative correlation between UGL and lagged AUG and AUL is that the argument only applies to fixed-income security investments. Therefore, we expect the correlation between UGL and lagged AUG and AUL to increase with the percentage of AFS securities invested in fixed-income securities. We estimate the percentage of fixed-income AFS securities as follows:

$$FI_{jt} = \frac{TB_{jt}+MBS_{jt}+BOND_{jt}+MUNI_{jt}}{COSTAFS_{jt}}$$

where TB_{jt}, MBS_{jt}, $BOND_{jt}$, and $MUNI_{jt}$ are the amortized cost of AFS securities invested in Treasury bills, mortgage-backed securities, corporate bonds, and municipal obligations for bank j and the end of year t. The denominator, $COSTAFS_{jt}$ is the amortized cost of all AFS securities for bank j at the end of year t. Each year we sort firms based on the relative amount of FI into portfolios; as expected, the magnitude and significance of the negative correlation between UGL and lagged AUGL increases in the portion of debt securities in the AFS portfolio.

3.2 Negative serial correlation in OCI

Jones and Smith (2011) examine the time series properties of OCI (including additional minimum pension liability adjustments, foreign currency translation gains and losses, changes in the fair value of derivative instruments classified as cash flow hedges, and UGL) of 236 companies from 1986 to 2005. They document a negative serial correlation in OCI, which is inconsistent with the notion that OCI is transitory. They are unable to determine whether this correlation reflects reversion in market values or recycling.

Unlike Jones and Smith (2011), who include both the recycled component of OCI as well as new UGL arising during the year in their measure of AUGL, our hand collected data separates

the recycling component of OCI (i.e., the income that is recycled out of accumulated OCI upon sale, and recognized as a gain or loss in net income) from the UGL that arise during the period. This enables us to explore the true cause of the unexplained negative serial correlation of UGL via the following regressions:

$$OCI_{jt} = \beta_0 + \beta_1 OCI_{jt-1} + e'_{jt} \quad (2a)$$

$$OCI_{jt} = \gamma_0 + \gamma_1 AUG_{jt-1} + \gamma_2 AUL_{jt-1} + e''_{jt} \quad (2b)$$

$$OCI_{jt} = \delta_0 + \delta_1 OCI_{jt-1} + \delta_2 AUG_{jt-1} + \delta_3 AUL_{jt-1} + e'''_{jt} \quad (2c)$$

The observation of a negative estimate of $\beta_1$confirms the negative correlation documented by Jones and Smith (2011). The observation of negative estimates of the coefficients $\gamma_1$and γ_2 suggests that the negative correlation observed by Jones and Smith (2011) may be due to the combination of historic cost and fair value accounting discussed in section 3.1. And an estimate of the coefficient $\delta_1$that is not significantly different from zero suggests that this accounting effect is the explanation for the observed negative serial correlation in OCI.

3.3. *Market Mispricing*

As discussed in Section 2, prior studies have provided ample evidence on the value relevance of OCI items. Chambers et al. (2007) show that investors value the components of OCI approximately dollar-for-dollar. Our analysis in Section 3.1 reveals, however, that UGL has two components: (1) change in the fair value of debt securities due to changes in expected future cash flows and/or the discount rate; and, (2) change in the difference between fair value and the corresponding amortized cost due to the difference between the fair-value-based and historical-cost-based amortization. Unlike the first component that reflects real economic changes, the

second component is purely accounting-driven. In an efficient market, the first component should be priced approximately dollar-for-dollar, but the second components should *not*.[10]

We conduct three sets of analyses to seek evidence regarding investor consideration of the negative correlation between UGL and lagged AUGL when pricing bank equity (investors may, for example, fail to understand the complexity of the accounting, which we describe, and price the entire UGL as an economic gain or loss. First, we regress next period abnormal stock return on known risk factors as well as predicted next year UGL, based on banks' currently reported AUG and AUL. Second, each year we form portfolios based on the magnitude of predicted UGL and show that the magnitude of the mispricing is economically significant. Third, we show that there are significant excess returns over and above that explained by the Fama and French (1993) and Carhart (1997) four factor model, as well as by proxies for shocks to the yield curve (Viale et al. 2009), which have been posited as indicators of bank risk.

4. Sample and Descriptive Statistics

Our initial sample includes all U.S. commercial banks traded on the NYSE, NASDAQ, and AMEX during 1998-2012. We choose commercial banks because they often hold significant portfolios of AFS securities with unrealized gains and losses representing an important portion of the reported comprehensive income. We hand-collect data on AFS securities, including UGL, the amount of reclassified gains and losses, AUG, and AUL, from bank 10-K filings. The sample period begins in 1999, which is one year after SFAS 115 became effective (this requirement is necessary because we require a beginning balance of AUGL). The sample consists of 4,066 observations covering 546 banks.

[10] Although UGL are measured on an after-tax basis, it is conceivable that factors such as tax can cause market valuation of UGL to deviate from the benchmark case of dollar-for-dollar.

Table 1 reports statistics describing our sample. Because our sample period includes the years of the global financial crisis, we provide descriptive statistics for the entire sample and two sub-periods (viz., 2007 to 2009, which are the years when the crisis likely affected variables key to our analyses (UGL for 2008 and 2009 and lagged UGL, AUG, AUL, and AUGL for 2007 and 2008); and 1999 to 2006 and 2010 to 2012, which are non-crisis years). Differences between the crisis- and the non-crisis years can be seen in the distribution of AUGL; the average AUGL, as a percentage of total assets, is 0.06 in the non-crisis years and -0.06 in the crisis years.[11]

For the whole sample and for each of the sub-samples, it is evident that the variables at the core of our study may be large relative to the net income and the total assets of the banks. For example, for the full sample, the median absolute value of UGL is 14 percent of net income. Similarly, the fifth percentile of AUGL is -0.42 percent of total assets and the 95th percentile is 0.50 percent. The average cost of the available-for-sale securities equals 19 percent of total assets.

5. Results

Table 2 reports the cross sectional correlations among the variables at the core of our analyses: UGL_t, UGL_{t-1}, $AUGL_{t-1}$, AUG_{t-1}, and AUL_{t-1}. The Pearson correlation between UGL_t and UGL_{t-1} is negative and significant (-0.12 in the whole sample, for example), consistent with the negative serial correlation documented in Jones and Smith (2011).[12] The correlations between UGL_{t-1} and $AUGL_{t-1}$ are high and significant; for example, for the full sample the Pearson (Spearman) correlation is 0.58 (0.49), which is not surprising in light of the fact that

[11] Similar differences are not observed between the crisis- and the non-crisis years for UGL due to the significant increase in other-than-temporary impairments during the crisis years. Impairment became permanent due to a decrease in credit quality during the financial crisis and a significant portion of AUGL was realized via OTTI. Evidence on the increase in OTTI is provided by Badertscher et al., (2012).

[12] The Spearman correlation is, however, significantly positive; this correlation appears to be driven by observations in the crisis years.

UGL of the current period makes up a considerable portion of AUGL at the end of the current period. Also, consistent with the prediction from our analyses in section 3.1, we observe a significant negative correlation between UGL_t and $AUGL_{t-1}$ in every sub-sample.

The asymmetry in the relation between UGL_t and AUG_{t-1} vs. UGL_t and AUL_{t-1} is also evident in Table 2; for example, the Pearson and Spearman correlation between UGL_t and AUL_{t-1} in the non-crises years -0.39 (see Panel B), whereas these correlations between UGL_t and AUG_{t-1} are 0.05 and 0.02.[13]

5.1. Predictive power of AUG_t and AUL_t with respect to UGL_{t+1}

We begin with simple regressions of UGL_t on UGL_{t-1} and UGL_t on $AUGL_{t-1}$. Following Petersen (2009), we include year dummies in these regressions, with t-statistics adjusted for clustering by firm.[14] The results are reported in Table 3. In Model 1 of Table 3, Panel A, we first report the results of regressing UGL_t on UGL_{t-1}. The estimated coefficient on UGL_{t-1} is significantly negative, -0.11, consistent with the finding of Jones and Smith (2011). Consistent with our prediction in section 3.1, in the regression of UGL_t on $AUGL_{t-1}$, the estimated coefficient on $AUGL_{t-1}$ is negative and highly significant (-0.16). We see that, in the multiple regression, when we control for the correlation between UGL_t and $AUGL_{t-1}$, the relation between UGL_t and UGL_{t-1} is no longer significant but the estimate of the coefficient on $AUGL_{t-1}$ remains significantly negative.[15]

To further assess the possibility that the negative correlation reported in Table 3 might be due to factors other than the accounting reason stated in Section 3, we conduct a placebo test in

[13] The correlation between AUL_{t-1} and AUG_{t-1} is very high (for example in the non-crisis years, the Pearson correlation is 0.71) and, therefore we do not put much weight on these simple correlations but rather focus on the results from our multiple regression, which includes both of these variables. These results are reported in Table 5.
[14] In all regressions we remove the top and bottom one percent of observations to avoid the effects of outliers.
[15] As shown in Table 2, UGL_{t-1} and $AUGL_{t-1}$ are significantly and positively correlated.

which we replace UGL with reported unrealized gains and losses from comprehensive income items other than AFS securities (including additional minimum pension liability adjustments, foreign currency translation gains and losses and changes in the fair value of derivative instruments classified as cash flow hedges) as well as with the accumulated amount of these items of OCI. The result is shown in Table 4. In contrast to UGL and lagged AUGL, the sum of these other items of OCI in the current year is not correlated with the accumulated total of the items in the prior year. This is consistent with the common belief that these other comprehensive income items, which result from changes in market value of the underlying instruments, are transitory and unpredictable in nature.

5.2. Investment Composition

As shown in Table 1, the distribution of FI is clustered between 70 and 100 percent. Hence, in order to obtain a meaningful separation, we group banks based on their quintile ranks of FI. Each year, banks in the lowest quintile are designated as the Low-FI group. Banks in the highest quintile are included in the High-FI group. All remaining banks are included in the Medium-FI group. We then regress UGL_t on $AUGL_{t-1}$ for observations in each FI group, and report the results in Table 5. The estimated coefficients on $AUGL_{t-1}$ are negative for all three sub-sample groups and they become increasingly negative as the percentage of AFS securities, which are fixed-income, increases (-0.08, -0.19, and -0.28 for the full sample). This finding supports our conjecture: as the percentage of debt securities increases, the portion of UGL_t that is related to $AUGL_{t-1}$ increases. We note that, for the sub-sample of observations during the crisis years, the estimates of the coefficient relating UGL_t to $AUGL_{t-1}$ are not significantly different from zero in each of the fixed-income sub-samples. This is not surprising because of two things that happened during the financial crisis: (1) impairment became permanent due to a decrease in

credit quality and some of the AUGL was realized via OTTI; and, (2) firms were forced to sell, perhaps due to a liquidity crunch. Both factors serve to weaken, or eliminate, the negative correlation between AUGL and UGL.[16] Therefore, we would expect the correlation to be weaker during crisis years, compared to non-crisis years.

5.3. Accumulated unrealized gains versus accumulated unrealized losses

In Table 6 we show that the relation between UGL_t and $AUGL_{t-1}$ varies with the amount of unrealized gains (AUG_{t-1}) versus unrealized losses (AUL_{t-1}). We repeat the analysis in Tables 3 and 5, replacing $AUGL_{t-1}$ with AUG_{t-1} and AUL_{t-1}.[17]

Panel A shows that, for the full sample, the estimated coefficient on unrealized losses is -0.17. In comparison, the estimated coefficient on AUG is less negative, -0.07. The difference between the two coefficient estimates is highly significant. That is, the asymmetry due to either the tendency to hold securities with unrealized losses to a greater extent than those with unrealized gains and/or the conservative bias in accounting recognition of unrealized gains and losses is evident in the data.

5.3.1. Explaining negative correlation in OCI

To examine the extent to which the negative correlation between UGL and lagged AUG and lagged AUL contributes to the previously documented negative correlation in OCI, we conduct a series of regression analyses. The results are reported in Table 7 and Table 8. First, to confirm that we find the same results as Jones and Smith (2011) for our sample, we regress OCI_t on OCI_{t-1}. As shown in the first column of Panel A, OCI exhibits strong negative serial correlation, consistent with the finding of Jones and Smith (2011). Second, we regress OCI_t on AUG_{t-1} and

[16] Evidence of these two effects during the crisis is provided by Badertscher et al., 2012.
[17] We do not repeat the analyses with lagged UGL as another independent variable because its effects are subsumed by AUGL, AUG and AUL.

$AUL_{t-1,}$ and show that OCI is significantly negatively correlated with AUG_{t-1} and AUL_{t-1}, consistent with the finding of Table 5. Third, we include lagged OCI and total accumulated other comprehensive income (AOCI, consisting of the accumulated gains and losses from foreign currency translation, pensions, and derivatives but excluding AUGL) in the regression. The result shows that the estimated coefficients on OCI_{t-1} and $AOCI_{t-1}$ are not significantly different from zero, suggesting that the negative correlation with lagged AUG and lagged AUL completely explains the negative serial correlation in OCI.

In panel B we repeat the above analysis for firms within each of the FI index portfolios. Consistent with the findings reported in Tables 5 and 6, the coefficients on lagged AUG and lagged AUL vary systematically across different FI groups. More importantly, the estimated coefficient on OCI_{t-1} loses its significance once lagged AUG and lagged AUL are included in the regression.

In Table 8 we explicitly test the extent to which the negative correlations documented in Table 3 are due to the reclassification of available-for-sale gains and losses (i.e., "recycling"). Jones and Smith (2011) study the autocorrelation of the combined amount of UGL and reclassification (RECL). They conjecture that the negative autocorrelation they document might be due to reclassification. However, because of a lack of data on UGL and RECL, the issue was left unresolved; we examine UGL and RECL separately. As shown in Panel A, the correlation between the recycled gains and losses (RECL) and OCI_{t-1} is not significantly different from zero. In addition, as shown in Panel B, RECL has a marginally significant positive, not negative, autocorrelation. These findings suggest that reclassification is not the cause for the observed negative serial correlation in OCI.

5.4. Market pricing of the predictable component of UGL[18]

To examine the market pricing of the predictable component of UGL, we first isolate a predictable component based on current accounting information. We do this via a regression of reported UGL on lagged AUG and lagged AUL within each of the FI groups.[19] Then we apply the average estimated coefficients from each of the available past years to AUG and AUL in the current year to form a predicted value for next year UGL.[20] We denote this predicted amount as $PUGL_{t+1}$. To avoid potential look-ahead bias in estimating model coefficients using data from banks with different fiscal-year-ends, we restrict our analysis to December fiscal-year-end banks in the remainder of the paper. This restriction affects less than 2 percent of the observations since the majority of banks have a December fiscal-year-end.

We conduct three sets of analyses of the relation between PUGL and future returns: (1) we regress next period abnormal stock return on known risk factors as well as predicted next year UGL, based on banks' currently reported AUG and AUL; (2) we examine the future returns from

[18] The focus of all of our analyses are on mis-pricing of the predictable component of UGL. Nevertheless, following Barth (1994), Ahmed and Takeda (1995), Dong et al. (2014), and Badertscher et al. (2014), we assessed the market pricing of total UGL, the predicted component of UGL and the unpredicted component of UGL via a regression of contemporaneous returns on change in net interest income, change in net non-interest income, comprehensive non-interest income and: (1) UGL; and, separately (2) the predicted and the unpredicted components of UGL. The estimates of the coefficients on UGL, and on each of the components of UGL are significantly different from zero but not significantly different from one, suggesting that the market prices the total amount of UGL disregarding (or not realizing) the fact that reported UGL includes a predictable, accounting-driven component. Because it is possible that all that our prediction model is doing is randomly breaking UGL into two components, which would yield similar coefficient estimates on those components, we focus our analyses on the relation between predicted UGL and future returns.

[19] We limit the variables in the prediction model to lagged AUL, lagged AUG and partitions on FI because we found that other variables designed to capture bank characteristics, such as size, book-to market and proxies for CAMELS characteristics provide little incremental predictive power with respect UGL beyond these three variables. Nonetheless, as a sensitivity check, we repeat our analysis with these additional variables included, and calculate the predicted component based on AUG, AUL, FI. Our results are robust to this variation in research design.

[20] For example, the predictions of UGL for 2006 are based on regression of UGL on lagged AUG and AUL for each of the years 1999 to 2005. For the entire sample, this continues to be the case for all years; the predictions for 2011 are based on regression parameters from 1999 to 2010. In the sub-sample where we remove the crisis years (2007 to 2009), the forecasts for 2011 are based on parameters estimated for years 1999-2006 and 2010. Note that the prediction is formed after the announcement of AUG and AUL; i.e., the prediction is formed 12 months before the actual UGL is known.

hedge-portfolios formed on the basis of PUGL; and, (3) we examine the monthly excess returns on portfolios based on PUGL over and above the Fama and French (1993) and Carhart (1997) four factors, as well as estimated shocks to the yield curve (Viale et al. 2009).

5.4.1 Prediction of future stock returns

We regress one-year-ahead, bank-specific buy-and-hold stock returns (R_{jt+1}), minus the risk-free rate of return for the year, on PUGL for next year, together with common risk factors including size, book-to-market, CAPM-beta, and momentum as well as interest rate sensitivity and provision for loan losses. That is,

$$R_{jt+1} - RF_{t+1} = \alpha_t + \beta_1 PUGL_{jt+1} + \beta_2 BETA_{jt} + \beta_3 BM_{jt} + \beta_4 SIZE_{jt} + \beta_5 MOMENTUM_{jt} + \beta_6 GAP_{jt} + \beta_7 PCL_{jt} + e_t \quad (3)$$

where $BETA_{jt}$ is estimated via a regression of the difference between the monthly return on the stock of bank j and the corresponding return on 3 month T-bills on the difference between the CRSP value-weighted market return and the corresponding risk free rate for the 60 months prior to the end of the third month of fiscal year t, $SIZE_{jt}$ is the logarithm of the market capitalization of bank j at the end of the third month after the fiscal year end t-1, the book-to-market ratio (BM_{jt}) is calculated as the book value of equity of bank j divided by the market value of equity of bank j at the end of the third month after fiscal year end t-1, and $MOMENTUM_{jt}$ is the return on the equity of bank j for the year ending at the third month of fiscal year t. Following Viale et al. (2009), we use GAP_{jt} to estimate the interest rate sensitivity of net short-term assets, which is measured as the difference between short-term investments and short-term liabilities for bank j at the end of year t-1, deflated by total assets at the end of year t-1. PCL_{jt} is the provision for credit and loan losses for bank j as a percentage of the bank's total interest income. A positive estimate

of the coefficient on PUGL, i.e., $\beta_{1,}$ indicates that investors do not fully understand the predictability of UGL.

The results from the estimation of regression (3) are reported in Table 9. The estimated coefficient on PUGL is 0.006, significant at the one percent level. This suggests market mispricing. However, the result may also suggest that PUGL captures certain aspects of risk in banks operations. We address this suggestion next.

First, we note that accumulated unrealized gains and losses reflect changes in interest rates; that is, AUGL captures changes in expected returns on the stocks and bonds held by the bank. If such changes in expected returns on AFS securities somehow affect the overall expected return on bank equity and debt, perhaps due to the fact that such holdings represent a significant portion of bank assets, we may expect AUGL to be correlated with the value of bank total assets and total equity, as well as expected return on bank equity. Such an argument was first put forward to explain the negative correlation between SIZE and future stock return (Berk, 1995).

In Panel B of Table 9 we include AUGL in the regression where future stock returns is the dependent variable. If any relation between AUGL and future stock return is due to changes in expected return of AFS securities, we would expect SIZE, BM, and MOMENTUM to subsume the correlation between AUGL and future stock return, since change in equity value captures the overall effect on the expected return on bank equity due to changes in the expected return of the bank AFS security holdings. As shown in model 1, this is not the case. Consistent with market mispricing, AUGL has a significant negative correlation with future stock returns when all common proxies for risk factors are included in the regression. To further differentiate the market mispricing explanation and the change in expected return argument, we decompose

AUGL into AUG and AUL. The results are reported as Model 2 of Panel B. Since both AUG and AUL capture changes in the interest rates, we would expect them to have a similar relation with future stock return based on the change-in-expected-return argument. In contrast, our analysis predicts an asymmetric relation between AUG and AUL and future UGL and it follows that the market mispricing notion would suggest an asymmetric relation with future stock returns after controlling for known risk factors; this asymmetric relation is seen in the results for Model 2 in Panel B.

In Model 3, we include PUGL, AUG, and AUL in the same return regression. With PUGL included in the regression, the estimated coefficients on AUG and AUL become insignificantly different from zero. This indicates that PUGL captures the predictive power of AUG and AUL with respect of future stock return.

Panel C of Table 9 repeats the tests for the crisis years (2007-2009) as well as the non-crisis years. We observe similar coefficient estimates for crisis and non-crisis sample years.

5.4.2. The economic significance of the market mispricing

In Table 10 we assess the economic significance of market mispricing by documenting the average return on portfolios based on PUGL. More specifically, each year, banks are sorted into three equal-sized portfolios based on PUGL for the next year. Then, we calculate the portfolio average one-year-ahead, buy-and-hold return for each portfolio. Table 10 reports the average portfolio return for all three PUGL portfolios, over all sample years. As shown in the first column, the average annual return for the high-PUGL portfolio is 13.23 percent. The average return for the low-PUGL group is 7.98 percent. The difference, 5.25 percent, represents a significant return to a hedged portfolio that shorts the low-PUGL banks and goes long in the

high-PUGL banks. The difference is even greater (5.77 percent) if we remove the crisis years from the analysis.

To further tie the mispricing to the predictability of UGL, we repeat the portfolio return analysis for the three sub-sample groups based on the FI index. As discussed in Section 2, the level of predictability of UGL_t, based on $AUGL_{t-1}$, increases with the percentage of fixed-income investments. It follows that, if the predictability of UGL is the driving force behind the documented mispricing, we would expect to see more significant hedge portfolio returns as we move from the low-FI sub-sample to the high-FI sub-sample.

As shown in Panel A of Table 10, both the statistical significance and the magnitude of the hedge-portfolio return, increases as the percentage of fixed-income investment increases. For the low-FI group, the hedge portfolio return is 1.71 percent, which is not significant at the 10 percent level. In contrast, for the medium- and the high-FI groups of banks, the hedged-portfolio returns increase to a significant 5.60 percent and 7.97 percent respectively.

The results are similar, but the hedge-portfolio returns are greater, when the crisis years are removed from the analyses. This is expected in light of the fact that, during the financial crisis, banks were forced to write down a significant portion of their investment holdings. Badertscher et al. (2014) document that the top U.S. commercial banks recorded roughly 5.5 percent of their 2008 total market capitalization as other-than-temporary impairments during the financial-crisis years, 2008 and 2009. Such recognition of OTTI, as discussed in Section 3, reduces the negative correlation between $AUGL_t$ and UGL_{t+1}. As shown in Table 2, Panel C, during the crisis years, the average annual correlation between UGL_t and $AUGL_{t-1}$ is -0.03, which is not significantly

different from zero, whereas, for the entire sample this correlation is -0.25 and significant at the one percent level.

We also repeat the portfolio return analysis for large and small banks, defined as banks with market capitalization above vs. below the sample median market capitalization. Un-tabulated results show that the average hedge portfolio return is significantly larger for large banks. This suggests that the excess hedge-portfolio return is more likely due to mispricing as opposed to trading/transactions costs, as these costs are, on average, lower for larger banks.

5.4.3. Controlling for the Fama, French, Carhart four factors and shocks to the yield curve

As a final test of market mispricing, we examine the returns on portfolios based on PUGL after controlling for the Fama and French (1993) and Carhart (1997) four factors. In addition, we also include estimates of shocks to the yield curve. Viale et al. (2009) show that these estimates of shocks to the yield curve, based on the ICAPM, perform better in capturing the time-series return variation in bank stocks. Specifically, each year, we divide banks into three, equal-size groups based on the magnitude of PUGL. We run the following regression of monthly portfolio returns on the risk factors:

$$R_{pt} = \alpha_0 + \beta_1(R_{Mt} - RF_t) + \beta_2 HML_t + \beta_3 SMB_t + \beta_4 UMB_t$$
$$\beta_5 TB3M_t + \beta_6 GS10Y_t + \beta_7 CB10Y_t + e_5 \quad (4)$$

where R_{pt} is the return on a portfolio formed by going long stocks with high PUGL and short stocks with low PUGL. R_{Mt} is the monthly return on the CRSP value-weighted index, RF_t is the monthly return on a 3-month T-bill, HML_t is the monthly return on a portfolio which is long in stocks with high book value-to-market value and short in stocks with low book-to-market, SMB_t is the monthly return on a portfolio which is long in small stocks and short in large stocks, and

UMB_t is the monthly return on a portfolio that is long in stocks with high past returns and short in stocks with low past returns. The latter three variables are obtained from Ken French's data library.[21] *TB3M, GS10Y,* and *CB10Y* are the residuals from a vector-autoregression using the 3-month treasury constant maturity, 10-year treasury constant maturity, and 10-year Moody's AAA corporate bond yields over the 10-year treasury yield, respectively. These interest rate data are obtained from the Federal Reserve's on-line FRED database.[22]

Table 11 is a summary of the results from estimation of regression (4). Again, we see evidence of market mispricing. For example, for the sub-sample of observations that excludes the crisis years, the intercept is significantly positive (0.003) indicating a risk-adjusted return of 0.3 percent per month. The loadings on various risk factor returns change as the percentage of fixed-income securities change. The intercept is highly significant for the two-thirds of the observations that contain the most fixed-income debt securities.

Collectively, our results presented in this section indicate that investors misinterpret the financial information regarding UGL, leading to mispricing of bank stocks.[23]

5.5. Robustness tests

We performed an array of sensitivity tests to assess the robustness of our results, including: (1) replacing the deflator (total assets) with the number of shares; (2) increasing the horizon from one year to three years in conducting the portfolio return analysis of Section 5; (3) using the level of net interest income and non-interest income, as opposed to the change, in the return

[21] http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

[22] The three bank-risk factors in regression (4) are time-specific factors and, therefore, appropriate for time-series regression (4); whereas the two variables, GAP and PCL used in regression (3) are firm-specific variables and, therefore, appropriate for that cross-sectional regression.

[23] Alternatively, the predictive component of UGL may be viewed as a proxy for a bank risk factor that is not captured by the known control factors.

regressions in Section 4; (4) replacing the cost of investment securities with the fair value of the securities in calculating the FI index. Our results are robust to these changes in test design.

6. Conclusions

The introduction of fair value accounting has significantly transformed our accounting system, which is primarily based on historical cost. Changes in the fair value of assets and liabilities, as reported in the Shareholders' Equity Statement, or in the newly introduced Statement of Comprehensive Income, provide potentially highly value-relevant information to investors. Prior studies have provided ample evidence on investor pricing of such information. Chambers et al. (2007), for instance, document that investors price other comprehensive income items almost dollar-for-dollar, consistent with the transitory nature of fair value changes.

In this paper we show that a significant portion of OCI, namely the unrealized gains and losses (UGL) from available-for-sale securities (AFS), is non-transitory: a negative correlation between accumulated UGL in the current period and next period UGL is predictable and economically and statistically significant. This is caused by a mixture of fair value and historic cost accounting with respect to the measure of income from fixed-income securities: UGL are recognized based on fair values, whereas interest income is measured based on historical cost accounting. We show that the predictable component varies systematically with the amount of fixed-income investment and the relative amount of unrealized gains versus unrealized losses. This predictable component seems to be overlooked by investors, leading to mispricing of bank stocks.

A potential policy implication of our findings is that a change to disclosure rules to mandate separation of the amortization-driven component of UGL from the remainder of UGL, which

would reflect true holding gains and losses due to changes in market prices, may be useful to investors. These two components capture different economic forces, and, hence, have different implications regarding banks' future comprehensive income.

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APPENDIX: VARIABLE DEFINTIONS

AOCI: Other comprehensive income items, excluding unrealized gains and losses from available-for-sale securities. This is the sum of foreign currency gains and losses (Compustat item CICURR), derivative gains and losses (Compustat item CIDERGL), pension gains and losses (Compustat item CIPEN), and other (Compustat item CIOTHER).

AUGL: Accumulated unrealized holding gains and losses from available-for-sale securities. Data are hand-collected from sample banks' annual reports.

AUG (AUL): Accumulated unrealized holding gains (losses) from available-for-sale securities. Data are hand-collected from sample banks' annual reports.

BETA: CAPM beta estimated using 60 monthly return data up to the third month after fiscal year end.

BM: Book-to-market ratio, calculated as book value (Compustat item CEQ) divided by the total CRSP market capitalization at the end of the third month after fiscal year end.

COSTAFS: Accumulated cost of all AFS securities

CB10Y: Residual from a vector-autoregression of 10 year Moody's AAA corporate bonds yield over the yield of 10 year treasury securities, together with 3 month Treasury bill and 10 year treasury securities. Data are obtained from the Federal Reserve's on-line FRED database.

GAP: Difference between short-term investment (Compustat item IST) and short-term liabilities (Compustat item DLC), deflated by the amount of total assets (Compustat item AT).

GS10Y: Residual from a vector-autoregression of 10 year treasury securities, together with 3 month treasury bill and 10 year Moody's AAA corporate bonds. Data obtained from the Federal Reserve's on-line FRED database.

NI: Net income (Compustat item IBCOM).

OTTI: Other-than-temporary impairment from AFS securities. Data are hand-collected from sample banks' annual reports.

PCL: Provision for credit and loan loss (Compustat item PCL), as a percentage of total interest income (Compustat item IDIT).

SIZE: The logarithm of the equity market value on the last trading date in the third month after the fiscal year-end. Price and number of shares outstanding are obtained from the CRSP.

TA: Total assets (Compustat item AT).

TB3M: Residual from a vector-autoregression of 3 month Treasury bill, together with 10 year treasury securities and 10 year Moody's AAA corporate bonds. Data obtained from the Federal Reserve's on-line FRED database.

Figure 1: Numerical example of the accounting mechanism leading to negative autocorrelation in unrealized gains and losses

$100 invested in AFS, 3-year, 10 percent annual coupon debt security

Scenario 1:
Discount rate increases to 12% at end of year 1; bank holds the AFS debt security

	Post SFAS 115				Pre SFAS 115	
Date	Fair Value	AUGL	UGL	Interest	UGL	Interest
12/31/x0	$100.00					
12/31/x1	$96.62	($3.38)	($3.38)	$10.00	($3.38)	$10.00
12/31/x2	$98.21	($1.79)	$1.59	$10.00	$0.00	$11.59
12/31/x3	$100.00	$0.00	$1.79	$10.00	$0.00	$11.79

Scenario 2:
Discount rate decreases to 8% at end of year 1; bank sells the AFS debt security

	Post SFAS 115				Pre SFAS 115	
Date	Fair Value	AUGL	UGL	Interest	UGL	Interest
12/31/x0	$100.00					
12/31/x1	$103.57	$3.57	$3.57	$10.00	$3.57	$10.00
12/31/x2	$0.00	$0.00	$0.00	$10.00	$0.00	$0.00
12/31/x3	$0.00	$0.00	$0.00	$10.00	$0.00	$0.00

TABLE 1
Descriptive Statistics

The initial sample includes all U.S. commercial banks traded on the NYSE, AMEX and NASDAQ during 1998-2012. We restrict our analysis to banks with required return and financial data on CRSP and COMPSTAT, as well as non-missing data on unrealized gains and losses (UGL) and accumulated unrealized gains and losses (AUGL) from available-for-sale securities. The final sample contains 4,066 observations from 546 banks from 1999 to 2012. NI is net income before extraordinary items. FI measures the percentage of AFS invested in fixed-income securities. It is calculated as the sum of amortized costs of AFS securities invested in Treasury bills, mortgage-backed securities, corporate bonds, as well as municipal obligations, divided by the amortized cost of all AFS securities (i.e., COSTAFS). MC is the equity market capitalization of the bank on the last trading day of the third month after the fiscal year-end. TA is total assets at year end.

Panel A: Full sample statistics (4,066 observations)

Variable	*Mean*	*5%*	*Q1*	*Median*	*Q3*	*95%*
UGL_t/TA_{t-1} (%)	0.02	-0.52	-0.10	0.03	0.17	0.52
$\|UGL_t\|/\|NI_t\|$	0.46	0.01	0.05	0.14	0.31	1.03
$AUGL_{t-1}/TA_{t-1}$ (%)	0.04	-0.42	-0.08	0.02	0.16	0.50
AUG_{t-1}/TA_{t-1} (%)	0.28	0.03	0.10	0.19	0.33	0.67
$\|AUL_{t-1}\|/TA_{t-1}$ (%)	0.24	0.00	0.04	0.11	0.27	0.80
$COSTAFS_{t-1}/TA_{t-1}$	0.19	0.04	0.11	0.17	0.25	0.38
FI	0.93	0.71	0.92	0.97	0.99	1.00
MC_{t-1} ($B)	2.66	0.02	0.06	0.17	0.65	9.22
TA_{t-1} ($B)	19.23	0.23	0.57	1.35	4.32	46.21

Panel B: 1999-2006 and 2010-2012 (3,262 observations)

Variable	*Mean*	*5%*	*Q1*	*Median*	*Q3*	*95%*
UGL_t/TA_{t-1} (%)	0.02	-0.50	-0.12	0.02	0.18	0.53
$\|UGL_t\|/\|NI_t\|$	0.45	0.01	0.05	0.14	0.30	0.86
$AUGL_{t-1}/TA_{t-1}$ (%)	0.06	-0.42	-0.07	0.04	0.19	0.54
AUG_{t-1}/TA_{t-1} (%)	0.30	0.03	0.11	0.20	0.35	0.69
$\|AUL_{t-1}\|/TA_{t-1}$ (%)	0.24	0.00	0.03	0.11	0.26	0.79
$COSTAFS_{t-1}/TA_{t-1}$	0.20	0.04	0.12	0.18	0.26	0.39
FI	0.93	0.70	0.92	0.97	0.99	1.00
MC_{t-1} ($B)	2.66	0.02	0.06	0.17	0.66	9.44
TA_{t-1} ($B)	17.82	0.22	0.54	1.27	4.20	43.69

Panel C: 2007-2009 (804 observations)

Variable	*Mean*	*5%*	*Q1*	*Median*	*Q3*	*95%*
UGL_t/TA_{t-1} (%)	0.01	-0.60	-0.02	0.07	0.15	0.46
$\|UGL_t\|/\|NI_t\|$	0.50	0.01	0.06	0.14	0.38	1.95
$AUGL_{t-1}/TA_{t-1}$ (%)	-0.06	-0.39	-0.11	-0.02	0.05	0.23
AUG_{t-1}/TA_{t-1} (%)	0.20	0.02	0.08	0.13	0.24	0.58
$\|AUL_{t-1}\|/TA_{t-1}$ (%)	0.26	0.01	0.05	0.14	0.29	0.83
$COSTAFS_{t-1}/TA_{t-1}$	0.16	0.04	0.10	0.14	0.20	0.34
FI	0.93	0.72	0.93	0.98	0.99	1.00
MC_{t-1} ($B)	2.68	0.02	0.06	0.17	0.57	5.22
TA_{t-1} ($B)	24.95	0.29	0.74	1.64	4.80	57.06

TABLE 2
Correlations among Key Variables

This table reports the cross-sectional correlations among unrealized gains and losses (UGL), lagged UGL, accumulated unrealized holding gains and losses (AUGL), accumulated unrealized holding gains (AUG), and accumulated unrealized holding losses (AUL). All variables are deflated by lagged total assets. Pearson (Spearman) correlation coefficients are shown above (below) the diagonal.

Panel A: Full sample

	UGL_t	UGL_{t-1}	$AUGL_{t-1}$	AUG_{t-1}	AUL_{t-1}
UGL_t		-0.12***	-0.25***	0.06***	-0.27***
UGL_{t-1}	0.03*		0.58***	0.04**	0.55***
$AUGL_{t-1}$	-0.31***	0.49***		0.36***	0.71***
AUG_{t-1}	0.07***	0.12***	0.37***		-0.35***
AUL_{t-1}	-0.36***	0.40***	0.64***	-0.32***	

Panel B: 1999-2006 and 2010-2012

	UGL_t	UGL_{t-1}	$AUGL_{t-1}$	AUG_{t-1}	AUL_{t-1}
UGL_t		-0.17***	-0.35***	0.05**	-0.39***
UGL_{t-1}	-0.03*		0.58***	0.06***	0.57***
$AUGL_{t-1}$	-0.40***	0.53***		0.42***	0.71***
AUG_{t-1}	0.02	0.11***	0.40***		-0.30***
AUL_{t-1}	-0.39***	0.45***	0.63***	-0.30***	

Panel C: 2007-2009

	UGL_t	UGL_{t-1}	$AUGL_{t-1}$	AUG_{t-1}	AUL_{t-1}
UGL_t		-0.07**	-0.03	0.00	-0.02
UGL_{t-1}	0.03		0.61***	-0.43***	0.67***
$AUGL_{t-1}$	-0.18***	0.42***		0.32***	0.88***
AUG_{t-1}	0.12***	-0.04	-0.01		-0.71***
AUL_{t-1}	-0.22***	0.34***	0.75***	-0.56***	

TABLE 3
Autocorrelation in Unrealized Holding Gains and Losses

This table reports results from regressions of unrealized holding gains and losses in year t (UGL) on lagged UGL and accumulated unrealized gains and losses of available-for-sale securities (AUGL). All variables are deflated by lagged total assets. Independent variables are trimmed at the top and the bottom 1 percentile. Year dummies are included in all regressions with t-statistics adjusted for clustering by bank. *, **, and *** indicate two-tailed statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Panel A: Full sample

	Dependent variable: UGL_t		
Intercept (%)	0.11^{***}	0.13^{***}	0.15^{***}
UGL_{t-1}	-0.11^{***}		-0.02
$AUGL_{t-1}$		-0.16^{***}	-0.21^{***}
N	3,929	3,996	3,880
R-square	0.37	0.38	0.40

Panel B: 1999-2006 & 2010-2012

	Dependent variable: UGL_t		
Intercept (%)	0.12^{***}	0.14^{***}	0.16^{***}
UGL_{t-1}	-0.15^{***}		-0.04
$AUGL_{t-1}$		-0.21^{***}	-0.23^{***}
N	3,147	3,206	3,108
R-square	0.50	0.50	0.52

Panel C: 2007-2009

	Dependent variable: UGL_t		
Intercept (%)	0.12^{***}	0.12^{***}	0.12^{***}
UGL_{t-1}	-0.02		0.01
$AUGL_{t-1}$		0.00	-0.17^{*}
N	782	790	772
R-square	0.07	0.07	0.08

TABLE 4
Non-AFS Other-Comprehensive-Income

In the regression summarized in this table, Non-AFS other comprehensive income (Non-AFS AOCI) represents the total amount of OCI items other than unrealized gains and losses from AFS securities, including gains and losses from foreign currency translation, pension, derivative, etc. Non-AFS AOCI is the accumulated amount of non-AFS other comprehensive income items. All variables are deflated by lagged total assets. Independent variables are trimmed at the top and the bottom 1 percentile. Year dummies are included in all regressions. t-statistics are adjusted for clustering by bank. *, **, and *** indicate two-tailed statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Panel A: Full sample

	Dependent variable: Non-AFS OCI_t,
Intercept (%)	-0.01
Non-AFS $AOCI_{t-1}$	0.03
N	3,992
R-square	0.10

Panel B: Subsample analysis

	Dependent variable: Non-AFS OCI_t,	
	1999-2006 & 2010-2012	2007-2009
Intercept (%)	0.00	0.01
Non-AFS $AOCI_{t-1}$	0.09	-0.08
N	3,202	790
R-square	0.10	0.13

TABLE 5
Percentage of Fixed-income Available-for-sale Securities and the Correlation between UGL_{t+1} and $AUGL_t$

The dependent variable in the regressions reported in this table is UGL_t deflated by lagged total assets. Each year banks are divided into quintiles based on the relative percentage of available-for-securities that are invested in fixed-income securities, calculated as the book value of fixed-income AFS securities divided by the book value of total AFS securities. Banks in the top (bottom) quintile are designated as the High-FI (Low-FI) group. The remaining banks are in denoted as the Medium-FI group. Regressions analyses are conducted for banks within each of the fixed-income-investment (FI) groups. $AUGL_{t-1}$ is deflated by lagged total assets, and trimmed at the top and bottom 1 percent. Year dummies are included in all regressions. t-statistics adjusted for clustering by bank. *, **, and *** indicate two-tailed statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Panel A: Full sample

	Percentage of Fixed-income Available-for-sale Securities		
	Low	*Medium*	*High*
Intercept (%)	0.13**	0.14***	0.14***
$AUGL_{t-1}$	-0.08	-0.19***	-0.28***
N	742	2,275	787
R-square	0.26	0.47	0.51

Panel B: 1999-2006 & 2010-2012

	Percentage of Fixed-income Available-for-sale Securities		
	Low	*Medium*	*High*
Intercept	0.14**	0.15***	0.14***
$AUGL_{t-1}$	-0.12*	-0.23***	-0.28***
N	598	1,835	636
R-square	0.31	0.56	0.55

Panel C: 2007-2009

	Percentage of Fixed-income Available-for-sale Securities		
	Low	*Medium*	*High*
Intercept (%)	0.15**	0.12***	0.10***
$AUGL_{t-1}$	0.02	-0.02	-0.21
N	142	440	151
R-square	0.19	0.08	0.05

TABLE 6
Decomposing AUGL

The dependent variable in the regressions reported in this table is unrealized gains and losses UGL_{t+1}. AUG_t is unrealized gains from AFS securities. AUL_t is unrealized losses. All variables are deflated by lagged total assets. In each of the Panels, the first column reports the full sample regression results and the last three columns reports the results for sub-samples where banks are sorted into FI groups, each year, based on their relative amount of AFS securities invested in fixed-income securities (Treasury bills, corporate bonds, mortgage backed securities, municipal bonds). Year dummies are included in all regressions. t-statistics are adjusted for clustering by bank. *, **, and *** indicate two-tailed statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Panel A: Full sample

		Percentage of Fixed-income Available-for-sale Securities		
	Full sample	*Low*	*Medium*	*High*
Intercept (%)	0.09***	0.12***	0.09***	0.06*
AUG_{t-1}	-0.07***	-0.05*	-0.07**	-0.09***
AUL_{t-1}	-0.17***	-0.04	-0.22***	-0.39***
N	3,966	723	2,272	777
R-square	0.38	0.27	0.48	0.54
AUL_{t-1}-AUG_{t-1}	-0.10***	0.01	-0.15***	-0.30***

Panel B: 1999-2006 & 2010-2012

		Percentage of Fixed-income Available-for-sale Securities		
	Full sample	*Low*	*Medium*	*High*
Intercept (%)	0.04***	0.07*	0.09***	0.07**
AUG_{t-1}	-0.04*	-0.02	-0.08***	-0.11**
AUL_{t-1}	-0.26***	-0.17**	-0.31***	-0.39***
N	3,181	581	1,835	629
R-square	0.50	0.33	0.57	0.57
AUL_{t-1}-AUG_{t-1}	-0.22***	-0.15***	-0.23***	-0.28***

Panel C: 2007-2009

		Percentage of Fixed-income Available-for-sale Securities		
	Full sample	*Low*	*Medium*	*High*
Intercept	0.17***	0.37**	0.11***	-0.00
AUG_{t-1}	-0.22	-0.93*	0.03	0.20
AUL_{t-1}	-0.02	-0.16	-0.01	-0.32***
N	785	142	437	148
R-square	0.07	0.22	0.08	0.15
AUL_{t-1}-AUG_{t-1}	0.20*	0.77**	-0.04	-0.52***

TABLE 7
Explaining the Negative Autocorrelation in OCI

In the regressions summarized in this table, OCI_t, Non-AFS OCI_t, AUG_t, AUL_t, are other comprehensive income, OCI excluding unrealized gains and losses on AFS securities, accumulated unrealized gains, accumulated unrealized, respectively. All variables are deflated by lagged total assets. Independent variables are trimmed at the top and the bottom 1 percentile. Year dummies are included in all regressions. t-statistics are adjusted for clustering by bank. *, **, and *** indicate two-tailed statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Panel A: Explaining negative autocorrelation in OCI

	Dependent variable: OCI_t			
Intercept (%)	0.07***	0.07***	0.07***	0.09***
OCI_{t-1}	-0.15***		-0.00	-0.00
Non-AFS $AOCI_{t-1}$				0.00
AUG_{t-1}		-0.16***	-0.16***	-0.22***
AUL_{t-1}		-0.28***	-0.28***	-0.34***
N	4,044	3,996	3,946	3,919
R-square	0.32	0.37	0.37	0.37

Panel B: *Dependent variable: OCI_t*

	Percentage of Fixed-income AFS Securities		
	Low	*Medium*	*High*
Intercept (%)	0.12**	0.07**	0.05
OCI_{t-1}	-0.10	0.04	-0.04
AUG_{t-1}	-0.12	-0.19***	-0.12**
AUL_{t-1}	-0.06	-0.40***	-0.39***
N	719	2,258	776
R-square	0.28	0.45	0.43

Panel C: Subsample analysis

	Dependent variable: OCI_t	
	1999-2006 & 2010-2012	2007-2009
Intercept (%)	0.07***	0.12***
OCI_{t-1}	-0.04	0.07
AUG	-0.15***	-0.29*
AUL_{t-1}	-0.30***	-0.30**
N	3,161	785
R-square	0.49	0.10

TABLE 8
Reclassification

In the regressions reported in this table, OCI_t, and $RECL_t$ are other comprehensive income and available-for-sale reclassification, respectively. All variables are deflated by lagged total assets. Independent variables are trimmed at the top and the bottom 1 percentile. Year dummies are included in all regressions. t-statistics are adjusted for clustering by bank. *, **, and *** indicate two-tailed statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Panel A: $Reclassification_t$ and OCI_{t-1}

	Dependent variable: $RECL_t$
Intercept (%)	-0.02**
OCI_{t-1}	-0.07
N	3,970
R-square	0.02

Panel B: Autocorrelation in reclassification

	Dependent variable: $RECL_t$
Intercept (%)	-0.03***
$RECL_{t-1}$	0.22*
N	3,931
R-square	0.06

TABLE 9
Predictable Component of UGL and Future Stock Returns

The dependent variable in the regressions reported in this table is the one-year-ahead buy-and-hold stock return minus the corresponding risk-free rate (the return period begins 3 months after the fiscal year end). PUGL is predicted UGL for year *t+1*, deflated by total assets. Stock beta is estimated based on past 60 monthly stock returns. SIZE is the logarithm of the market capitalization at the end of the third month after fiscal-year-end. BM is the book-to-market ratio, calculated as book value divided by the market value at the end of the third month after fiscal-year-end. MOMENTUM is calculated based on the past 12 month stock return. GAP is the difference between short-term investment assets and short-term liabilities, deflated by total assets. PCL is the provision for credit and loan loss, as a percentage of total interest income. We restrict these analyses to banks with December fiscal year ends to avoid look-ahead bias during portfolios formation. To reduce the effect of outliers, the decile ranks of all independent variables are used in the regressions. Year dummies are included in all regression. t-statistics are adjusted for clustering by bank. *, **, and *** indicate two-tailed statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Panel A: PUGL and future stock return

	Model 1	*Model 2*	*Model 3*
Intercept	0.012	-0.017	-0.013
PUGL		0.006***	0.006***
BETA	-0.001	-0.001	-0.001
BM	0.008***	0.008***	0.010***
SIZE	-0.002	-0.002	-0.001
MOMENTUM	0.003	0.003*	0.003
GAP			0.002
PCL			-0.006***
N	3,185	3,185	3,136
R-square	0.395	0.398	0.400

Panel B: AUGL, AUG, AUL and future stock return

	Model 1	*Model 2*	*Model 3*
Intercept	0.037	0.054	-0.014
AUGL	-0.006***		
AUG		-0.002	0.001
AUL		-0.007***	-0.000
PUGL			0.006*
BETA	-0.001	-0.000	-0.000
BM	0.011***	0.010***	0.010***
SIZE	0.001	-0.001	-0.001
MOMENTUM	0.003	0.003	0.003
GAP	0.002	0.002	0.002
PCL	-0.007***	-0.006***	-0.006***
N	3,342	3,136	3,136
R-square	0.388	0.399	0.400

Panel C: Subsample analysis

	1999-2006 & 2010-2012	*2007-2009*
Intercept	0.016	-0.167*
PUGL	0.007***	0.001
BETA	0.003	0.003
BM	0.010***	0.013
SIZE	-0.008***	0.020***
MOMENTUM	-0.003	0.017***
GAP	0.001	0.004
PCL	-0.003	-0.014**
N	2,469	667
R-square	0.374	0.375

TABLE 10
Portfolio Return Analysis

Each year banks are divided into three equal-size portfolios based on the relative magnitude of PUGL, which is the predicted unrealized gains and losses to be reported next year, deflated by total assets. This table reports the average portfolio return across all sample years, with t-statistics based on the time-series standard deviations of annual portfolio average returns. The last three columns report the test results for banks with high, medium, and low percentage of AFS securities invested in fixed-income securities (FI). In Panel B, we report the results based on a sample which excludes the years of financial crisis (2007-2009).

Panel A: Mean stock return of portfolios formed based on forecasted $PUGL_{t+1}$

	Full Sample	*Percentage of Fixed-Income Available-for-sale Securities*		
		Low	*Medium*	*High*
Low	7.98	8.18	7.65	7.15
Medium	9.85	6.87	8.80	13.36
High	13.23*	9.89	13.24	15.12
High – Low	5.25***	1.71	5.60***	7.97**

Panel B: Subsample analysis

	1999-2006 & 2010-2012	*2007-2009*
Low	12.47	-5.89
Medium	15.62	-9.94
High	18.24	-3.99
High – Low	5.77***	1.90

TABLE 11
Predictable Component of UGL and Future Stock Returns

Each year banks are divided into three equal-size portfolios based on the relative magnitude of PUGL, which is the predicted unrealized gains and losses to be reported next year, deflated by total assets. This table reports the regression of monthly portfolio returns on the return of four factors, including market premium (MARKET-RF), the book-to-market factor (HML), the firm size factor (SMB), as well as a momentum factor (UMD). TB3M, GS10Y, CB10Y are the residual from an vector autoregressive estimated using the monthly yield of 3 month treasury bills, the yield of 10 year treasuries, and the 10 year yield on Moody's AAA corporate bonds over the 10 year treasury yield, respectively. The last three columns report the test results for banks with high, medium, and low percentage of AFS securities invested in fixed-income securities (FI). In Panel B, we report the portfolio results based on a sub-sample of observations which excludes the years of financial crisis (2007-2009). *, **, and *** indicate two-tailed statistical significance at the 10 percent, 5 percent, and 1 percent levels, respectively.

Panel A: Full sample

	Full Sample	*Percentage of Fixed-Income Available-for-sale Securities*		
		Low	*Medium*	*High*
Intercept	0.003**	-0.002	0.004*	0.004*
Market-RF	0.018	0.143	-0.023	-0.01
HML	0.090	0.235	0.007	0.112
SMB	-0.039	0.098	0.040	-0.355**
UMD	-0.005	0.062	-0.023	0.094
TB3M	-0.007	-0.004	-0.012	0.002
GS10Y	0.005	0.046	-0.001	-0.014
CB10Y	0.009	0.049	0.009	-0.035

Panel B: Subsample analysis

	1999-2006 & 2010-2012	*2007-2009*
Intercept	0.004***	-0.001
Market-RF	-0.022	-0.009
HML	0.012	0.192
SMB	-0.059	0.086
UMD	0.001	-0.033
TB3M	-0.012	0.022
GS10Y	0.001	0.018
CB10Y	0.002	0.028