Market Pricing of Banks' Fair Value Assets Reported under SFAS 157 during the 2008 Economic Crisis

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Abstract

Our paper presents early evidence on how investors rely on the fair value estimates of assets reported by banks as required by Statement of Financial Accounting Standards No. 157 (SFAS 157) in 2008. We observe significant variation in the pricing of different levels of fair value assets, with the pricing being less for mark-to-model assets (i.e., assets with lower liquidity and greater information risk) than for mark-to-market assets. We also find that the pricing of mark-to-model assets declined over the course of 2008, consistent with increasing market concerns about illiquidity and information risk associated with these assets. In the cross-section, we find evidence that mark-to-model assets are priced higher by investors for banks with greater capital adequacy. We also find that the pricing of fair value assets, especially the mark-to-model assets, is higher when banks are audited by better auditors. Overall, our paper uses both time-series and cross-sectional analyses to provide insights on investors' valuation of the fair value estimates of assets as reported by banks during the economic crisis.

Keywords: SFAS 157, valuation, fair value, mark-to-market, liquidity, audit quality

JEL Classifications: G14, G21, M41, C21

"The suspension or elimination of current accounting fair value requirements would likely increase investor uncertainty and adversely impact investor confidence by removing access to information at a time when that information is likely most useful to investors."
Report and Recommendations Pursuant to Section 133 of the Emergency Economic Stabilization Act of 2008: Study on Mark-To-Market Accounting (30 December, 2008), United States Security and Exchange Commission (SEC).

1. Introduction

A central puzzle in the current economic crisis is why there is a lack of trading in many asset markets even through firms are able to provide fair value estimates of these assets (Easley and O'Hara 2008). In this paper, we examine how investors rely on these fair value estimates when valuing the assets of banks that are marked at fair value. We also provide evidence as to why investors might discount the values of some of these assets, in particular, assets that are marked-to-model. Our key finding is that there is a significant disparity between investors' valuation of the marked-to-model assets and the fair value estimates, a phenomenon that could at least be partially attributed to concerns about asset liquidity and information risk.[1]

The pricing of banks' assets has been a major concern during the economic crisis. An interesting and important feature of banks' assets is that a significant amount of these assets are marked to fair value in the balance sheet. As a result, many banks were very concerned about fair value accounting and they lobbied Congress to relax fair value accounting rules during the economic crisis. Specifically, the banks argued that marking-to-market assets that are inactively traded do not reflect the fair value of these instruments; hence, they advocated greater use of marking-to-model for financial instruments that are inactively traded. Apart from being associated with lower liquidity, mark-to-model assets are associated with greater information risk if the use of inaccurate models and inputs, as well as potential managerial biases, introduce significant measurement error in the reported fair values. Hence, the extent

[1] While not conclusive, this disparity suggests that one possible explanation for the lack of trading in some assets could be due to the disagreements over the underlying value of the assets.

to which investors' own assessments of the valuations of these assets differ from the fair value estimates supplied by banks is a potentially interesting and important empirical question.[2]

To address this question, we make use of the disclosures of fair value assets required under SFAS 157. SFAS 157 defines the fair value as the price between market participants in an orderly transaction. It states that firms should report the fair value of their assets and liabilities using a three-level fair value hierarchy based on the nature and observability of the inputs used to determine the fair value.[3] Level 1 fair value assets, also known as market-to-market assets, are traded in active markets. In contrast, Level 2 and Level 3 assets are illiquid assets that are marked-to-model.[4] The cross-sectional distinction among the three levels of fair value assets is important in our study because it enables us to examine whether investors price mark-to-model assets the same way as mark-to-market assets. As an aside, we note that the numbers in the banks' balance sheets are likely to be a good indicator of the financial position of the banks if fair values reflect underlying fundamental values. However, as the economic crisis unfolded in 2008, there were increasing market concerns that banks were in a weaker position than the position indicated by their balance sheets.[5]

For our empirical analysis, we examine the association between prices and the different levels of fair value assets of banks for fiscal quarters ending in the first nine calendar months of 2008. The results show that the coefficients on all the three levels of fair

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[2] In this paper, we generally refer to net assets (i.e., assets less liabilities) as assets for brevity.

[3] Level 1 inputs are quoted prices in active markets, Level 2 inputs are data adjusted for similar items traded in active markets, or from identical or similar items in markets that are not active, and Level 3 inputs are unobservable and generated by the entity itself.

[4] Mark-to-model means that the firm uses a valuation model to derive the fair value of the asset. This is unlike mark-to-market that uses market prices of an identical asset as the fair value of the asset. As an aside, we note that the so-called "toxic assets" of banks are almost always marked-to-model assets.

[5] For example, both Citibank and Bank of America apparently failed their stress tests despite balance sheets that appeared strong (WSJ, April 28 2009).

value assets are significantly different from zero, suggesting that investors price both mark-to-model and mark-to-market fair value assets positively. However, we find that the coefficients of all the three levels of fair value assets are significantly less than one, implying that investors are discounting the fair value estimates supplied by banks, especially with regard to mark-to-model assets. Specifically, investors price each dollar of Level 1, Level 2, and Level 3 assets at $0.85, $0.63, and $0.49, respectively. In addition, while the pricing of each dollar of Level 1 assets is significantly different from that of each dollar of Level 2 and Level 3 assets, the pricing of each dollar of Level 2 assets is not significantly different from the pricing of each dollar of Level 3 assets. These results support several recent papers that examine the pricing and economics of structured finance products (Coval, Jurek and Stafford 2008, 2009, Longstaff and Rajan 2008) which claim that these assets are overpriced. Our results substantiate their claims and provide a plausible explanation why there is little trading in these assets even through fair value estimates are generated for these instruments.

We next examine how market pricing of the reported fair values varied as the economic crisis worsened in 2008. We observe a pronounced decline in the pricing of each dollar of Level 2 and Level 3 assets from the first to the third quarter of 2008. In contrast, the pricing of each dollar of Level 1 assets remains relatively stable over the course of 2008. Specifically, for each dollar of Level 2 (Level 3) assets reported by the banks, the pricing by investors decreases by 30.6 (56.9) percent from $0.72 ($0.65) in the first quarter to $0.50 ($0.28) in the third quarter of 2008. In contrast, the pricing of each dollar of Level 1 assets increases by 19.6 percent from $0.84 in the first quarter to $1.01 in the third quarter of 2008. These results suggest that as the financial crisis worsened in 2008, it exacerbated investors' concerns over illiquidity and information risk of the mark-to-model assets.

We also investigate the role of capital adequacy and audit quality in influencing investors' pricing of the fair value assets. Banks with higher capital adequacy ratios are in a

stronger financial position. As a result, liquidity concerns are mitigated because these banks are more likely to be able to hold their assets to maturity.We also expect the presence of better auditors, specifically auditors from the Big 4 audit firms, to mitigate investors' concerns about the information risk inherent in mark-to-model assets.[6] Higher quality auditors are more likely to have greater expertise and stronger incentives to ensure that the financial reports issued by the banks are accurate.

We find that the cross-sectional variation in banks' capital adequacy ratios does not influence the pricing of Level 1 and Level 2 assets. However, Level 3 assets are priced higher for banks with higher capital adequacy ratios. This result is consistent with the notion that investors are relatively more concerned with asset illiquidity for Level 3 assets for the weaker banks. We also find evidence that investors price each dollar of Level 2 and Level 3 assets, and to a lesser extent, Level 1 assets, more for banks that are audited by better auditors. An interesting result is that the pricing of Level 3 assets is only significantly greater than zero for banks with higher capital adequacy and better auditors. Overall, these results suggest that liquidity and information risk are two factors driving investors' pricing of fair value assets. Furthermore, it appears that mark-to-model estimates as generated by banks' valuation models have not sufficiently accounted for both factors.

Our study contributes to the literature by providing early evidence on the cross-sectional and time-series variation in the pricing of the fair value assets of banks. We shed light on the factors that influence investors' perceptions toward the fair value estimates supplied by these banks. We find that the valuation of banks by investors is associated with the nature of the assets in their balance sheets. Specifically, our key finding is that while there is generally greater discounting of banks' fair value assets as the economic crisis unfolded in

[6] The Big 4 audit firms are PriceWaterhouseCoopers, Ernst & Young, KPMG, and Deloite & Touche. They are generally viewed as the market leaders in the auditing profession due to their size and their dominant market share of audit clients.

2008, we observe greater discounting of assets when these assets are marked-to-model instead of marked-to-market. In fact, we posit, based on this result, that one reason for the lack of trading in many asset markets is simply that market participants cannot agree on the price. In our study, banks appear to regard their assets as being worth more than what the market considers to be the appropriate price. Another implication of this result is that the market appears to view the financial positions of banks as being weaker than what were reflected in their balance sheets. We also contribute to the literature by exploring explanations for why investors are significantly discounting mark-to-model assets. Our battery of tests provides some empirical support for two reasons: asset illiquidity and information risk.

In section 2, we discuss related literature and develop our hypotheses. Section 3 describes our sample while Section 4 describes our empirical measures and research methodology, and discusses the test results. Section 5 concludes.

2. Literature review and hypotheses development

2.1 Literature review

2.1.1 Fair valuation when markets are disorderly

Fundamental economic principles provide a rationale for requiring financial institutions to use fair valuation for financial reporting (Heaton, Lucas and McDonald 2008).[7] A central puzzle in the current economic crisis is why there is a lack of trading in many asset markets even though banks are able to provide fair value estimates of these assets (Easley and O'Hara 2008). Easley and O'Hara note that there remain unanswered questions that are important in understanding the economic crisis. Specifically, they highlight the importance of

[7] Specifically, when markets are orderly, fundamental economic principles state that market prices are generally the best available measure of economic value because they are forward looking, not subject to managerial discretion and they aggregate private information.

seeking explanations for i) the non-trading of structured products and ii) what these financial assets are worth given that there is significant illiquidity. The main research question in this paper is in the spirit of the latter question. Specifically, we examine how investors assess the value of assets marked at fair value, especially illiquid mark-to-model assets, during the crisis in 2008.[8]

Addressing issues of fair value in disorderly markets is important for a number of reasons. First, Heaton et al. (2008) show that even when market prices always reflect fundamental values, contracting inefficiencies are created because capital adequacy ratios are measured based on fair value instead of adjusted book value. When markets are disorderly, these distortions are exacerbated and can cause firms to raise capital in a costly manner. In line with the economic importance of this issue, recent research has examined the impact of downward spiral of prices in a fair value accounting regime to understand the economic consequences of this accounting change (Allen and Carletti 2008, Plantin, Sapra and Shin 2008, Khan 2009).

Second, the stated objective of fair value accounting is to increase the transparency of asset valuation so that investors are better able to make financial decisions. While laudable as a goal, there are a variety of practical difficulties in implementing fair value accounting even under the best market conditions. A fundamental assumption for fair value accounting to work well is the notion of orderly trade transactions. Whether fair value accounting can still continue to provide fair value estimates that investors can rely upon in disorderly markets to price the banks' assets appears to be an important question.

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[8] To the best of our knowledge, there are several concurrent working papers that are examining issues related to the market pricing of fair value assets. They include Kolev (2009), Song, Thomas and Yi (2009) and Bhat (2009). These papers generally document evidence that indicates more discounting for mark-to-model assets. Reasons provided include corporate governance and reporting reliability.

2.1.2 Pricing of collateralized debt obligations

Our paper is also related to literature on the pricing of collateralized debt obligations (CDO). At the core of the financial market crisis has been the discovery that CDOs and other structured finance instruments are actually far riskier than what the market perceives. Several recent finance research provide some insights as to why firms' fair value estimates as provided by their valuation models might not be representative of true market pricing. Coval et al. (2008) show that many structured finance instruments can be characterized as economic catastrophe bonds, but are overpriced by issuers because they offer far less compensation than alternatives with comparable payoff profiles.[9] Coval et al. (2009) show how a slight imprecision in the parameters estimates to valuation models for the pricing of CDOs can lead to significant variation in the default risk of the structured finance securities that is sufficient to cause a security that is rated AAA to default with a certain reasonable likelihood. The implication from both papers is that fair value estimates provided by the banks might misstate, possibly even overstate, their fundamental value. For the perspective of the investors, there is significant information risk when using the estimates provided by banks.

2.2 Hypothesis development

2.2.1 Fair value hierarchy hypothesis

Our first hypothesis deals with whether are variations in the pricing of the fair value assets across the different levels of the fair value hierarchy. The requirement to report the three-level fair value hierarchy by SFAS 157 allows investors to identify the nature and the amounts of the fair value assets that banks have. Two key cross-sectional distinctions

[9] For example, the authors show that investors in senior CDO tranches appear to be grossly undercompensated for the highly systematic nature of the risks they bear. Specifically, they demonstrate that an investor willing to assume the economic risks inherent in senior CDOs can, with equivalent economic exposure, earn roughly four to five times more risk compensation by writing out-of-the-money put spreads on the markets.

between the different levels of fair value assets are i) the extent to which the assets are liquid and ii) the amount of information risk associated with the fair value of the assets. As noted earlier, Level 1 assets are mark-to-market assets whereas Level 2 and Level 3 assets are mark-to-model assets. Lower level assets are generally considered to be more illiquid because of the lack of an active market for these assets. Lower level assets might suffer from higher information risk because the use of models and input assumptions, as well as potential managerial biases in estimating fair value, could lead to significant measurement error in the reported fair values of these assets.

It is important for banks and other firms to hold liquid assets to cushion against liquidity shocks; hence liquid assets command a liquidity premia (Holmstrom and Tirole 1996, 1998, 2001). As noted in Holmtrom and Tirole (2001), the notion of liquidity premia can be traced to Hicks' (1967) notion of "liquidity preference" for monetary instruments and other close substitutes. Hick defines "reserve assets" as assets that are held to facilitate adjustments to changes in economic conditions and thus not only for their yield. Asset liquidity becomes extremely important in an economic crisis when assets might have to be sold to raise capital. Given the lack of liquidity in many asset markets during the economic crisis in 2008, investors might discount the reported fair value estimates if they believe that the reported fair value estimates of the mark-to-model assets have not sufficiently accounted for asset liquidity. In fact, this belief is likely given the reluctance of many banks to write down the value of their assets after many asset markets suffered sharp declines in liquidity during the crisis. If so, we expect investors to discount the fair value estimates of mark-to-model assets relatively more than mark-to-market assets due to the flexibility accorded to the fair value estimation of market-to-model assets.

As noted earlier, the information risk involving using the fair value estimates of financial assets can be substantial for mark-to-model assets. Fair value estimation for mark-

to-model assets is subjected to significant measurement error due to use of potentially inaccurate models and inputs, as well as due to the presence of managerial discretion.[10] Easley, Hvidkjaer and O'Hara (2002, 2004) show that investors apply a greater discount to asset prices when there is greater information risk. Epstein and Schneider (2008) conjecture that shocks to information quality can have persistent negative effects on prices even if fundamentals do not change. Specifically, ambiguous averse investors require compensation for holding an asset if there is low quality information about that asset. If information risk is not factored in firms' valuation models that are being used to generate mark-to-model estimates, we expect these estimates to be overstated relative to investors' assessments of the valuations of these assets.[11]

Based on the above considerations of liquidity and information risk, our first hypothesis is:

H1: Lower level fair value assets are priced less than higher level fair value assets.

2.2.2 Capital adequacy hypothesis

The capital adequacy of a bank is likely to be an important factor that investors consider when they assess the banks' reported fair values. This is because the fair value of an asset is based on the price that would be received when the asset is sold in an orderly fashion.

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[10] There is evidence in the literature that managers exercise their discretion when providing estimates. For example, Hodder, Mayew, McAnally and Weaver (2006) find that managers use their discretion to bias valuation model inputs when estimating employee stock options.

[11] The underlying forces that explain this phenomenon stems from the fact the ambiguity-averse agents fear the discomfort caused by future ambiguous signals and their anticipation of low quality information directly lowers their current utility. This is so even through the law of iterated expectations implies that conditional expected utility is not affected by changes in the precision of future signals about consumption, as pointed out by Epstein and Schneider (2008). Thus, persistent mispricing might occur when there are ambiguity-averse investors in the market (Caskey 2008).

However, banks with lower capital adequacy are less likely to be able to absorb losses and are consequently more likely to be forced to liquidate their positions, even at fire-sale prices. Hence, we conjecture that the capital adequacy of banks results in cross-sectional variation in the extent to which banks can sell their assets in an orderly fashion. Investors are more likely to discount the fair value of banks' assets that face a greater likelihood of a forced sale due to concerns that these assets might be liquidated at unfavourable prices. Evidence that investors price fair value assets higher when there is greater capital adequacy will provide support for the argument that liquidity concerns is one factor driving investors' pricing of the fair value reported by the banks.

Banks have a capital regulatory requirement to ensure risk-adjusted capital adequacy. Simply stated, a bank's capital is the "cushion" for potential losses, which protect the bank's depositors or other lenders. Bank regulators track a bank's capital adequacy to ensure that it can absorb a reasonable amount of losses and are complying with their statutory capital requirements. Tier 1 capital is the core measure of a bank's financial strength. It is composed of core capital, which consists primarily of equity capital and cash reserves, but may also include irredeemable non-cumulative preferred stock and retained earnings.

Hence, our second hypothesis, which focuses on the issue of asset liquidity, is:

H2: The market pricing of fair value assets is higher for banks with higher Tier 1 capital.

2.2.3 Audit quality hypothesis

An audit is the examination of the financial report of a firm by someone independent of that organisation. The objective of audit is to ensure that the numbers reported in the financial report reflects the financial position of the firm as at a specific date. We argue that the presence of better auditors can mitigate investors' concerns of information risk. This is

because a better auditor is more likely to have the incentives and ability to i) monitor and assist the firm to reduce the measurement error in the fair value estimates and ii) curb any potential biases that managers might want to introduce in the fair value estimates.

In this study, we follow the literature and assume that a Big 4 auditor is more likely to be better auditors than a non-Big 4 auditor. First, the Big 4 auditors have stronger incentives to conduct more comprehensive audits to detect misrepresentations by the firms because they have more to lose, compared to small auditors, in the event of an audit failure (DeAngelo 1981). Second, the Big 4 auditors are likely to devote more resources to staff training, invest in information technology, and use state of the art auditing techniques (e.g., Craswell, Francis, and Taylor 1995).

Hence, our third hypothesis, which focuses on the issue of information risk, is:

H3: The market pricing of fair value assets is higher for banks that are audited by Big 4 auditors.

3. Sample construction and descriptive statistics

3.1 Sample selection

To construct our sample, we first obtain all firms on Compustat Quarterly with fiscal quarter end dates in the first 9 months of 2008. This gives us an initial sample of 20,305 observations. Because our study focuses on U.S. banks and depository institutions (hereafter termed as banks for brevity), we retain 1,993 banks with 2-digit SIC codes of 60 or 61. Thereafter, we remove banks with no filing dates available from Compustat. We then retain only banks with ordinary shares listed on NYSE, AMEX, and NASDAQ as at the filing date. The share type and exchange listing are obtained from the CRSP database. Next, we remove banks with missing Compustat data on Tier 1 capital ratio (*CAP1*) and auditor type (*BIG4*). We also remove banks without closing price information from the CRSP database on the date

immediately after the filing of the financial reports with the SEC (*PRICE*). The above steps result in a final sample of 1,462 observations from 516 unique banks over the first three quarters of 2008. Panel A of Table 1 summarizes the sample selection procedure and Panel B shows the sample composition by exchange listing. We note that the majority of our observations come from banks listed on NASDAQ, which is not surprising because of the significant number of relatively small regional banks and depository institutions listed on NASDAQ in the United States.

For each bank in each quarter (hereafter known as bank-quarter), we obtain the reported Level 1 assets, Level 2 assets, and Level 3 assets and liabilities. We then compute *FVA1* (*FVA2*, *FVA3*) as the fair values of Level 1 (Level 2, Level 3) assets minus Level 1 (Level 2, Level 3) liabilities. In other words, *FVA1* (*FVA2*, *FVA3*) is net assets at Level 1 (Level 2, Level 3). We compute the total net fair value assets (*FVA*) by summing *FVA1*, *FVA2*, and *FVA3*. We examine the pricing of net fair value assets instead of fair value assets and liabilities separately because many banks report little or no liabilities that are marked at fair value and there is little cross-sectional variation in these liabilities.

In addition, we compute the net assets that are not marked at fair value (*NETBE*). To do so, we subtract the total net assets by *FVA*. In other words, book value of equity (*BE*), which is also known as net assets, is equal to the net assets at fair value (*FVA*) plus the net assets not marked at fair value (*NETBE*). From here onwards, to ease exposition, we use the term "assets" to refer to "net assets"; Level 1 (Level 2, Level 3) assets refer to Level 1 (Level 2, Level 3) net assets and fair value assets refer to net fair value assets. Since we are using the price immediately after the filing date to examine the pricing of banks' assets, all the above variables are scaled by the total number of outstanding shares immediately after the filing

date.[12] For our regression analyses, this means that we are examining how price per share is associated with different types of net assets per share, some of which are marked at fair value based on market prices, some of which are marked at fair value based on models, and some of which are not marked at fair value.

3.2 Descriptive statistics

Table 2 Panel A provides the descriptive statistics of the main variables in our regression analyses. The mean share price is $15.65. The mean (median) Level 1, Level 2, and Level 3 assets are $2.35 ($0.001), $18.95 ($13.84), and $0.92 ($0.00) per share, respectively. Hence, most of the fair value assets in our sample are classified as Level 2 assets. The mean book value of equity per share is $14.87 and it consists of mean net assets per share at fair value of $22.21 and mean net assets not at fair value of -$7.34. Note that the negative value for mean net assets not at fair value indicates that banks, on the average, have more liabilities not at fair value than assets not at fair value.

The mean Tier 1 capital ratio is 10.6 percent. While this ratio is above the regulatory requirements of 4 percent for adequate capitalization, it is important to note that this ratio is only a basic requirement to reduce the likelihood of regulatory action. Even among banks that meet this requirement, banks with relatively lower Tier 1 capital ratio are likely to be in a weaker liquidity position and might have to raise additional capital. Finally, the banks are audited by a Big 4 auditor in 35.1 percent of the bank-quarters. The low percentage of banks in our sample that are audited by a Big 4 auditor could be due to the fact that there are many relatively smaller regional banks and depository institutions in our sample.

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[12] The sample firms, on average, take 39 days to file their quarterly reports from the quarter end date. The numbers of days taken to file the reports in Q1, Q2, and Q3 of 2008 are 40, 40, and 38 days, respectively. Hence, the SFAS 157 requirements did not appear to delay firms' filing of quarterly reports as the economic crisis developed in 2008.

Panel B of Table 2 presents the Pearson and Spearman correlations among the variables. The table indicates that the correlation between *PRICE* and *FVA3* is lower than the correlations between *PRICE* and *FVA1* and between *PRICE* and *FVA2*. Specifically, *PRICE* has Pearson (Spearman) correlations with *FVA1*, *FVA2*, and *FVA3* of 0.49 (0.16), 0.42 (0.38) and 0.17 (0.08), respectively. These correlations provide preliminary evidence that the market valuation of banks is positively associated with the amount of fair value assets that has, and that the association appears to be weaker for Level 3 assets.

Since Level 1, Level 2, and Level 3 assets are the key independent variables in all our regression analyses, we provide some analyses of the time-series patterns of these assets scaled by outstanding shares, market capitalization of equity, and total assets in Table 3. *FVA1_mv* (*FVA2_mv*, *FVA3_mv*) refers to Level 1 (Level 2, Level 3) assets scaled by market capitalization of equity. *FVA1_ta* (*FVA2_ta*, *FVA3_ta*) refers to Level 1 (Level 2, Level 3) assets scaled by total assets. We also provide some analyses of the trends in market capitalization (*SIZE*) and book-to-market of equity of the banks (*BOOK-MARKET*) to explore how valuation per se and valuation relative to the book value of equity evolved during the economic crisis. Table 3 presents the means of these variables in each quarter from the first to the third quarter of 2008.

Not surprisingly, the mean market capitalization of banks declined in 2008. The mean book-to-market of equity increases from 1.058 in the first quarter to the 1.304 in the second quarter, and then to 1.74 in the third quarter. This indicates that on the average, the market was valuing the equity of the bank at less than what was reported on the balance sheet. More importantly, it appears that the market was increasingly concerned that the financial positions of the banks were weaker than what was reflected in their balance sheets.

The mean Level 1, Level 2, and Level 3 assets per share are \$3.00, \$17.96, and \$0.80, respectively, in the first quarter and \$1.86, \$19.88, and \$1.07, respectively, in the third

quarter of 2008. While we use per share numbers in our regression analyses, it is common to examine the economic significance of certain assets of a firm relative to its market capitalization and total assets. We observe from Table 3 that the amount of net assets marked at fair value, relative to market capitalization and total assets, has increased across the three quarters. Total net assets marked at fair value increase from 134 percent (12.6 percent) of market capitalization in the first quarter to 271 percent (13 percent) of market capitalization (total assets) in the third quarter of 2008. Hence, the net assets that the banks have marked at fair value appear to be an economically significant in understanding the fundamental value of the banks.

4. Empirical results

4.1 Pricing of fair value estimates of assets reported under SFAS 157

Our regression specification, which follows the structure of standard empirical models commonly used to test the pricing of numbers reported in the balance sheet (Barth, Beaver and Landsman 2001), is as follows:[13]

$$PRICE_{i,t} = \alpha_0 + \alpha_1 NYSE_{i,t} + \alpha_2 AMEX_{i,t} + \alpha_3 EPS_{i,t} + \alpha_4 NETBE_{i,t} + \alpha_5 FVA_{i,t} + e_{i,t} \qquad (1)$$

where the dependent variable (*PRICE*) is the closing share price on the date immediately after the filing of the financial reports, *FVA* is the net assets marked at fair value, and *NETBE* is the net assets not marketed at fair value. We further control for earnings per share (*EPS*) because Nelson (1996) contends that it is important to control for profitability when examining the relationship between stock price and book value of equity (note that book value of equity is also known as net assets). Finally, we control for the possibility that the

[13] We note that typical econometric limitations (e.g., possibility of omitted correlated variables and imposition of linearity in the regression specification) might lead to biases in the coefficient (Holthausen and Watts, 2001). We address some of these concerns though the inclusion of control variables and additional regression tests in section 4.4 that specifies the variables as changes rather than levels.

stock prices of the banks may be sensitive to the exchanges they are listed on. *NYSE* (*AMEX*) is a dummy variable equaling one if the bank is listed on NYSE (AMEX), and zero otherwise. To mitigate the effects of outliers, we winsorize all continuous variables (i.e., *PRICE, FVA,* and *EPS*) at the 1st and 99th percentile.

If investors consider fair value assets of the banks to be of value, we would expect the coefficient on *FVA* to be positive and significantly different from zero. We also test whether the coefficient on FVA is significantly different from one. Given that both prices and fair value assets have been scaled by the same number of outstanding shares, a coefficient of one suggests that investors price each dollar of reported fair value asset at a dollar. Stated differently, the investors are not discounting the fair values of the assets reported by the banks when they value the banks. As discussed earlier, some reasons that investors might discount the assets are concerns of the illiquidity and information risk associated with the assets.

Column (I) of Table 3 reports the results of the regression based on Eq. (1). We run ordinary least square regressions with calendar quarter fixed effects since the same bank might appear in each quarter. Later in Table 4, we also present the results of the regression analyses by calendar quarter. Consistent with the notion that the fair value of assets is priced by investors, the coefficient on *FVA* is 0.785 and statistically significant (t-statistic: 26.39). The economic interpretation of this coefficient is that on the average, investors are pricing the fair value assets at $0.785 for each dollar reported by the banks. Further, while the coefficient indicates that investors' pricing of the bank's equity is positively associated with the amount of fair value assets reported by the bank, this coefficient is significantly different from one (t-statistics: 54.43). This result suggests that investors price each dollar of fair value assets at significantly less than one dollar per share. Hence, although investors are placing a

positive value on the fair value assets reported by the banks, they appear to be discounting the assets due to concerns of liquidity and information risk, among other reasons.

To explore liquidity and information risk as possible explanations for the discounting of fair value assets, we first rely on the cross-sectional variation in liquidity and information risk among the three different levels of fair value assets based on the fair value hierarchy reported as required by SFAS 157. In other words, we formally test H1 by examining whether the three levels of fair value assets are priced the same way by investors. Specifically, we investigate whether mark-to-model assets (i.e., Level 2 and Level 3 assets) are priced the same way as mark-to-market assets (i.e., Level 1 assets). Even within the category of mark-to-model assets, we allow for the possibility that there might be differential pricing of Level 2 and Level 3 assets because of differences in liquidity of the assets and the inputs used in deriving fair values. The fair value of Level 2 assets is based on market-based inputs whereas the fair value of Level 3 assets is based on internally generated inputs that potentially result in higher information risk.

To test for the cross-sectional variation in the pricing of the different levels of fair value assets, we extend Eq. (1) as follows:

$$PRICE_{i,t} = \beta_0 + \beta_1 NYSE_{i,t} + \beta_2 AMEX_{i,t} + \beta_3 EPS_{i,t} + \beta_4 NETBE_{i,t} + \beta_5 FVA1_{i,t} + \beta_6 FVA2_{i,t} + \beta_7 FVA3_{i,t} + e_{i,t} \quad (2)$$

where *FVA1* (*FVA2*, *FVA3*) are Level 1 (Level 2, Level 3) assets. The other variables are defined in Eq. (1). To mitigate the effects of outliers, we winsorize *PRICE*, *FVA1*, *FVA2*, *FVA3,* and *EPS* at the 1st and 99th percentile.

Column (II) of Table 4 reports the regression results based on Eq. (2). We find that the coefficients on *FVA1*, *FVA2*, and *FVA3* are 0.849 (t-statistic: 16.75), 0.626 (t-statistic: 20.71), and 0.489 (t-statistic: 5.30), respectively, and they are all significantly different from zero. The economic interpretation of these coefficients is that on the average, investors price

Level 1 (Level 2, Level 3) assets at \$0.849 (\$0.626, \$0.489) for each dollar reported by the banks. In addition, the table shows that each of these coefficients is significantly different from one. This result suggests that although investors price the different levels of fair value assets, there appears to be some discounting of these assets, regardless of whether they are Level 1, Level 2, or Level 3 assets.

More importantly, there appears to be significant cross-sectional variation in the discounting. The coefficients on *FVA1*, *FVA2* and *FVA3* are significantly different from one another (F-statistics: 15.99). The coefficient on *FVA1* is significantly different from that of *FVA2* (F-statistics: 30.55), and that of *FVA3* (F-statistics: 12.6). However, the coefficient on *FVA2* is not significantly different from that of *FVA3* (F-statistics: 2.25). These results indicate that Level 2 and Level 3 assets are priced significantly less than Level 1, that is, mark-to-model estimates are priced less than mark-to-market estimates. While we are unable to document a statistically significant difference in the pricing of Level 2 and Level 3 assets, we note that the difference in the coefficients (0.626 versus 0.489) appear to be economically significant.

Hence, in relation to our first hypothesis, we conclude that mark-to-model fair value assets are priced less than mark-to-market assets. Given that mark-to-model assets are inherently less liquid and carry higher information risk compared to mark-to-market assets, it appears that investors are pricing these assets less because of concerns about asset liquidity and information risk. To probe further, we investigate whether investors' pricing of these assets decreases as the economic crisis worsens in 2008. What was apparent in 2008 is that the worsening economic crisis led to increasing concerns about asset liquidity and information risk, especially for banks.

4.2 Effect of economic crisis on fair value measurements reported under SFAS 157

Table 5 reports the results of our tests when we run the regressions separately for each calendar quarter in 2008. Panel A reports the regressions based on Eq. (1). The results show that the coefficient on *FVA* increases from 0.789 (t-statistic: 17.53) in the first quarter to 0.810 (t-statistic: 14.98) in the second quarter, and then declines to 0.677 (t-statistic: 12.89) in the third quarter. However, the change in the pricing of fair value assets from the first to the second quarter and from the first to the third quarter are both not statistically significant (t-statistic: -0.29, -1.57).

Next, we examine whether the decline in the pricing of the financial assets is more pronounced for mark-to-model assets. We expect deteriorating market conditions in the later part of 2008 to have minimal impact on the pricing of Level 1 assets because Level 1 assets are associated with high liquidity and low information risk. In contrast, the valuation of the less liquid Level 2 and Level 3 assets are based on valuation models that might not have accounted for the increasing illiquidity in many asset markets. There could also be a lack of reliable models and input parameters, as well as potential managerial biases, in the estimation of fair value when markets are disorderly.

Table 5 Panel B reports the regression results of the pricing tests when we decompose *FVA* into its components of *FVA1*, *FVA2*, and *FVA3*. Consistent with our conjecture, we find that the pricing of Level 1 assets was relatively unaffected by the disorderly market conditions that existed in 2008. The pricing of Level 1 assets remains relatively stable as market conditions worsen. Specifically, the coefficient on Level 1 assets increases from 0.841 (t-statistic: 13.35) in the first quarter, to 1.030 (t-statistic: 9.61) in the second quarter, and to 1.005 (t-statistic: 7.10) in the third quarter. The t-tests, however, indicate that the changes in the coefficient on Level 1 assets from the first to the second quarter (t-statistics: 1.54,) and from the first to the third quarter (t-statistics: 1.06) are not statistically significant at the conventional levels. Interestingly, the coefficient on *FVA1* is significantly different from one

in the first quarter, but not significantly different from one in the second and third quarters. This result suggests that investors are no longer discounting the value of Level 1 assets in the second and third quarters, possibly because of increased importance of assets associated with higher liquidity and lower information risk during the economic crisis.

In stark contrast, we find that the pricing of Level 2 and Level 3 assets decline significantly since the first quarter of 2008. Specifically, the coefficient on *FVA2* is 0.722 (t-statistic: 15.13) in the first quarter, 0.634 (t-statistic: 11.45) in the second quarter, and 0.502 (t-statistic: 10.04) in the third quarter. The coefficient on *FVA3* declines from 0.651 (t-statistic: 4.25) in the first quarter to 0.37 (t-statistic: 2.21) in the second quarter, and then to 0.282 (t-statistic: 1.92) in the third quarter. In dollar terms, this means that investors price each dollar of Level 2 (Level 3) assets at $0.72 ($0.65) in the first quarter and $0.50 ($0.28) in the third quarter. In percentage terms, the pricing of Level 2 and Level 3 assets decrease by 30.6% and 56.9%, respectively, from the first to the third quarter of 2008. Furthermore, the decline in the pricing of Level 2 assets from the first to the third quarter is statistically significant (t-statistic: -3.03) and the decline in the pricing of Level 3 assets from the first to the third quarter is marginally significant (t-statistic: -1.65). An interesting finding is that the coefficient on *FVA3* change from being significantly different from zero in the first quarter (t-statistic: 4.25) to only marginally significantly different from zero in the third quarter (t-statistics: 1.92). Taken together, the above results suggest that investors had increasing concerns over the asset liquidity and information risk of the mark-to-model assets as market conditions worsened in 2008.

An advantage of running the pricing regressions by calendar quarters is that we can examine whether the difference in pricing between mark-to-market and mark-to-model assets is robust across calendar quarters. The F-tests of the difference in the coefficients on *FVA1* and *FVA2* show that the difference in pricing is significantly different in all the three quarters.

The F-statistics are 5.19, 14.14 and 23.82 for the first, second, and third quarters, respectively. Further, the F-test of the difference in the coefficients on *FVA1* and *FVA3* show that the difference in pricing is significantly different in the second and third quarters. The F-statistics are 11.17 and 13.28 for the second and third quarters, respectively.

4.3 Effect of the capital adequacy and audit quality on the pricing of fair value assets reported under SFAS 157

To further examine whether liquidity concerns and information risk are factors driving investors' pricing of the fair value estimates reported by the banks, we conduct additional cross-sectional tests of the effect of capital adequacy and audit quality on the pricing of the fair value estimates. We partition our sample based on the median values of the banks' Tier 1 capital adequacy ratios and audit quality. The dummy variable *CAP1_IND* equals 1 if the bank's Tier 1 capital adequacy ratio is greater than the median bank's Tier 1 capital adequacy ratio in the same calendar quarter and 0 otherwise. The dummy variable *BIG4* equals one if the firm is audited by a Big 4 auditor in the calendar quarter and zero otherwise. Thereafter, we interact *CAP1_IND* and *BIG4* with *NETBE* and *FVA1*, *FVA2*, and *FVA3* as shown in Eq. (3) below. Following our second hypothesis that the market pricing of fair value assets is higher for banks with greater capital adequacy, we expect the coefficients on the interaction terms between fair value assets and *CAP1_IND* to be positive. As noted earlier, liquidity concerns are likely to be mitigated when firms have high capital adequacy. Following our third hypothesis that the market pricing of fair value assets is higher for banks that are audited by the Big 4 auditors, we expect the coefficients on the interaction terms between the fair value assets and *BIG4* to be positive because information risk is likely to be reduced by better auditors.

The regression specification that we use to examine the cross-sectional effects of capital adequacy and audit quality on the pricing of bank's fair value assets is as follows:

$$PRICE_{i,t} = \gamma_0 + \gamma_1 NYSE_{i,t} + \gamma_2 AMEX_{i,t} + \gamma_3 EPS_{i,t} + \gamma_4 NETBE_{i,t} + \gamma_5 FVA1_{i,t} + \gamma_6 FVA2_{i,t} + \gamma_7 FVA3_{i,t} + \gamma_8 CAP1\_IND_{i,t} + \gamma_9 BIG4_{i,t} + \gamma_{10} NETBE_{i,t} \, x \, CAP1\_IND_{i,t} + \gamma_{11} FVA1_{i,t} \text{ x } \text{CAP1\_IND}_{i,t} + \gamma_{12} FVA2_{i,t} \, x \, CAP1\_IND_{i,t} + \gamma_{13} FVA3_{i,t} \, x \, CAP1\_IND_{i,t} + \gamma_{14} NETBE_{i,t} \, x \, BIG4_{i,t} + \gamma_{15} FVA1_{i,t} \, x \, BIG4_{i,t} + \gamma_{16} FVA2_{i,t} \, x \, BIG4_{i,t} + \gamma_{17} FVA3_{i,t} \, x \, BIG4_{i,t} + e_{i,t} \quad (3)$$

Table 6 reports the regression results. The coefficient on the interaction term between *FVA3* and *CAP1_IND* is positive and statistically significant (t-statistic: 1.79), indicating that higher capital adequacy improves the valuation of Level 3 assets. However, the coefficients on the interaction terms between *FVA1* and *CAP1_IND* and between *FVA2* and *CAP1_IND* are not statistically significant. Furthermore, we find that investors price each dollar of Level 1, Level 2, and Level 3 assets at \$0.791, \$0.474, and \$0.348, respectively, for banks with capital adequacy equal or above that for the median bank, and at \$0.652, \$0.524, and \$0.019, respectively, for banks with capital adequacy below that for the median bank. In fact, the pricing of Level 3 assets is \$0.019 and insignificantly different from zero when there is low capital adequacy but is \$0.348 and significantly greater than zero when there is high capital adequacy. These results highlight the importance of capital adequacy when investors price Level 3 assets.

To the extent that investors regard banks with high capital adequacy as being less likely to sell their illiquid assets in a disorderly fashion at unfavourable prices, the evidence supports the argument that asset liquidity is one factor that can affect the pricing of the fair value assets.

With regard to the effect of audit quality on the pricing of the fair value assets, Table 6 reveals that the coefficient on the interaction term between *BIG4* and *FVA1* is marginally

significant (t-statistics: 1.64), whereas the coefficients on the interaction terms of *BIG4* with *FVA2* and *FVA3* are highly significant (t-statistics: 3.47, 2.99). These results show that the presence of a Big 4 auditor influences investors' perceptions towards the pricing of mark-to-model assets (i.e., Level 2 and Level 3 assets) and, to a less extent, the mark-to-market assets (i.e., Level 1 assets). This result supports our hypothesis that investors are likely to perceive the fair value estimates of banks audited by a Big 4 auditor to have lower information risk. Specifically, because the fair value estimates of mark-to-model assets are likely to be subjected to greater measurement error and managerial discretion, the external auditor plays an important role in reducing the information risk of these assets. Recognizing that better auditors are likely to be more effective in reducing information risk, investors price the assets of these banks with better auditors higher.

4.4 Robustness analysis - changes in price and changes in fair value assets

To address potential econometric concerns that omitted correlated variables could be driving some of our earlier results, we conduct additional analyses by regressing changes in price on changes in fair value assets. As an aside, we note that regression analyses involving change measures might result in noisy measures due to the difficulties in measuring the changes when the changes actually occurred and complexities in specifying the lead-lag structure of the dependent and independent variables. There might also be reduced statistical paper due to the lack of cross-sectional variation in changes. The regression specification for the analysis is as follows:

$$ch\_PRICE_{i,t} = \omega_0 + \omega_1 NYSE_{i,t} + \omega_2 AMEX_{i,t} + \omega_3 ch\_EPS_{i,t} + \omega_4 ch\_NETBE_{i,t} + \omega_5 ch\_FVA_{i,t} + e_{i,t} \quad (4)$$

$$ch\_PRICE_{i,t} = \omega_0 + \omega_1 NYSE_{i,t} + \omega_2 AMEX_{i,t} + \omega_3 ch\_EPS_{i,t} + \omega_4 ch\_NETBE_{i,t} + \omega_5 ch\_FVA1_{i,t} + \omega_6 ch\_FVA2_{i,t} + \omega_7 ch\_FVA3_{i,t} + e_{i,t} \quad (5)$$

where *ch_PRICE* is the change in *PRICE*, *ch_FVA* (*ch_FVA1*, *ch_FVA2*, *ch_FVA3*) is the change in *FVA* (*FVA1*, *FVA2*, *FVA3*). *ch_NETBE* is the change in *NETBE* and *ch_EPS* is the change in *EPS*. All the change variables are measured by subtracting the previous quarter's numbers from the current quarter's numbers. As a result, our analyses based on the changes specification for restricted to observations from the second and third quarters of 2008. All the other variables in the above equations are defined in Eq. (1) and Eq. (2).

Table 7 presents the regression results. Column (I) provides evidence that the changes in price are significantly associated with the changes in fair value assets (t-statistic: 2.82). Column (II) shows that while changes in prices are significantly and positively associated with changes in Level 1 and Level 2 assets, they are not significantly associated with changes in Level 3 assets. These results are generally consistent with the earlier results that suggest that concerns about asset liquidity and information risk could be driving investors to discount the assets of banks.

4.5 Robustness analysis - use of constant sample to examine the pricing of fair value assets by calendar quarter

To alleviate concerns about banks entering and exiting the sample when we analyze how the pricing of fair value assets varies across the first three quarters of 2008, we use a constant sample of banks across the three quarters. To be included in this sample, a bank must be present in the sample in each of the three quarters. The restriction reduces the sample size from 1,462 to 1,383 bank-quarters observations. In other words, there are 461 firms that are present in each of the calendar quarter in the constant sample.

Table 8 presents the results by replicating the analyses in Table 5 with the constant sample. The results of the analyses of the trends in pricing of the fair value assets are generally consistent with those in Table 5. There appears to be no significant decline in the

pricing of total fair value assets. However, while the pricing of Level 1 assets increases from the first quarter to the third quarter, the pricing of Level 2 and Level 3 assets decline over the same period. In terms of statistical significance, the increase in the pricing of Level 1 assets is now statistically significant, whereas it is not in Table 5. The decline in the pricing of Level 3 assets is now not statistically significant where it is in Table 5.

5. Conclusion

Our paper uses a combination of time-series and cross-sectional analyses to present early evidence on how investors price the fair value of assets reported by the banks under SFAS 157. An important feature of SFAS 157 is the three-level fair value hierarchy based on the inputs available to estimate fair value. This feature enables us to examine how investors differentially price mark-to-model and market-to-market assets relative to the fair value estimates reported by the banks.

We find that mark-to-model assets are priced less than mark-to-market assets. Given that mark-to-model assets suffer from greater illiquidity and information risk, we conclude that the fair value estimates for mark-to-model assets have not sufficiently factored these considerations. We also find that the pricing of mark-to-model assets declines over the course of 2008, consistent with increasing market concerns about liquidity and information risk associated with these assets.

In the cross-section, we find some evidence that mark-to-model assets are priced higher by investors for banks with higher capital adequacy. Since higher capital adequacy mitigates concerns that banks will be forced to sell their assets at unfavorable prices, especially for less liquid assets, we conclude that this evidence supports the argument that asset liquidity is an important consideration when investors price the banks' assets. We also find that the pricing of fair value assets, especially the mark-to-model assets, is higher when

the bank is audited by better auditors. To the extent that better auditors reduce information risk, we conclude that this evidence supports the role of information risk when investors price banks' assets.

Overall, our paper contributes to the literature by addressing the question of whether the investors consider the fair value estimates provided by the banks to realistically reflect the underlying value of the assets when the markets are disorderly. Perhaps more importantly, we explore the factors that contribute towards the disparity between the valuation by investors and the fair value estimates provided by the banks. Our results suggest that increasing the capital adequacy of banks can help improve investors' valuation of banks' assets for Level 3 mark-to-model assets. In addition, steps taken to reduce information risk (e.g., engagement of better auditors) serve to reduce the disparity between the valuation and the fair value estimates, especially for Level 2 and Level 3 mark-to-model assets.

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TABLE 1 Sample construction

This table provides details of our sample construction. Panel A shows the steps involved in the selection of the sample. Panel B shows the distribution of observations by exchange listing.

Panel A: Sample selection

Steps	Observations
All firms on Compustat Quarterly with fiscal quarter end dates in the first 9 months of 2008	20,305
Retain all firms with 2-digit SIC codes of 60 or 61	1,993
Retain firms with filing dates (available from Compustat)	1,839
Retain all firms with ordinary shares listed on NYSE, AMEX, and NASDAQ at filing date	1,791
Retain all firms with data on Tier 1 capital ratio and auditor (available from Compustat)	1,467
Retain all firms with price immediately after the filing date	1,462

Panel B: Sample composition by exchange listing

Exchange	Observations
NYSE	145
AMEX	45
NASDAQ	1,272

TABLE 2 Descriptive statistics

This table provides some descriptive statistics of the variables that are used in this study. The number of observations for each variable is 1,462. Panel A shows the means, standard deviations, and quartiles of the variables. Panel B shows the Pearson (above the diagonal) and Spearman (below the diagonal) correlations between the variables. *PRICE* is the price immediately after the filing date. *BE* is the book value of equity (also known as book value of net assets) per share. *FVA*, which is the net fair value assets per share, is the sum of *FVA1*, *FVA2*, and *FVA3*. *FVA1*, *FVA2*, and *FVA3* are the fair values of the Level 1, Level 2, and Level 3 net assets (i.e., assets minus liabilities) per share, respectively. *NETBE* is the book value of equity minus the net assets that are marked at fair value, scaled by outstanding shares. *CAP1* is Tier 1 capital ratio. *BIG4* is a dummy variable equalling one if the bank is audited by a Big 4 auditor and zero otherwise. *SIZE* is the market capitalization immediately after the filing date. *BOOK-MARKET* is the book-to-market of equity, with the book value of equity measured at the fiscal quarter end date and the market value of equity measured immediately after the filing date.

Panel A: Means, standard deviations, and quartiles

Variable	Mean	Std Dev	P25	Median	P75
PRICE	15.652	13.208	8.144	12.005	19.125
BE	14.871	10.393	9.246	12.846	17.573
FVA	22.213	27.575	5.432	15.862	28.109
FVA1	2.351	16.394	0.000	0.001	0.504
FVA2	18.946	21.442	3.003	13.839	25.543
FVA3	0.916	3.021	0.000	0.000	0.312
NETBE	-7.342	21.941	-13.183	-3.164	5.928
CAP1	10.640	2.882	8.910	9.995	11.680
BIG4	0.351	0.477	0.000	0.000	1.000
SIZE	1757.07	10,912.48	48.25	106.97	406.22
BOOK-MARKET	1.365	2.051	0.724	1.001	1.435

TABLE 2 (continued)

Panel B: Correlations

	PRICE	*BE*	*FVA*	*FVA1*	*FVA2*	*FVA3*	*OTH*	*CAP1*	*BIG4*	*SIZE*	*BOOK-MARKET*
PRICE		0.730	0.633	0.490	0.415	0.173	-0.450	0.042	0.240	0.223	-0.247
BE	0.576		0.675	0.682	0.312	0.245	-0.375	-0.067	0.140	0.187	0.054
FVA	0.371	0.418		0.586	0.786	0.362	-0.937	0.041	0.196	0.253	-0.048
FVA1	0.155	0.174	0.344		-0.028	0.121	-0.414	0.030	-0.016	0.111	0.025
FVA2	0.378	0.356	0.934	0.196		0.232	-0.841	0.036	0.244	0.194	-0.090
FVA3	0.075	0.172	0.364	0.189	0.286		-0.339	-0.048	0.146	0.334	0.066
NETBE	-0.227	-0.100	-0.916	-0.298	-0.865	-0.318		-0.083	-0.180	-0.229	0.085
CAP1	0.133	-0.077	0.004	-0.042	-0.001	-0.104	-0.052		-0.128	-0.098	-0.133
BIG4	0.244	0.178	0.244	0.253	0.250	0.264	-0.193	-0.138		0.201	0.021
SIZE	0.610	0.283	0.301	0.255	0.303	0.267	-0.222	-0.024	0.549		-0.040
BOOK-MARKET	-0.716	0.082	-0.140	-0.085	-0.185	0.014	0.219	-0.232	-0.198	-0.545	

TABLE 3 Time-series trends

This table presents the time-series trends of some characteristics of the banks. *SIZE* is the market capitalization of the bank immediately after the filing date. *BOOK-MARKET* is the book-to-market of equity of the bank, with the book value of equity measured at the fiscal quarter end date and the market value of equity measured immediately after the filing date. *FVA*, which is the net fair value assets per share, is the sum of *FVA1*, *FVA2*, and *FVA3*. *FVA1*, *FVA2*, and *FVA3* are the fair values of Level 1, Level 2, and Level 3 net assets per share, respectively. *FVA_mv* is the sum of *FVA1_mv*, *FVA2_mv*, and *FVA3_mv*. *FVA1_mv*, *FVA2_mv*, and *FVA3_mv* are the fair values of the Level 1, Level 2, and Level 3 net assets scaled by market capitalization immediately after the filing date, respectively. *FVA_ta* is the sum of *FVA1_ta*, *FVA2_ta*, and *FVA3_ta*. *FVA1_ta*, *FVA2_ta*, and *FVA3_ta* are the fair values of the Level 1, Level 2, and Level 3 net assets scaled by total assets, respectively.

	2008 Q1	2008 Q2	2008 Q3
SIZE	1968.86	1762.64	1535.73
BOOK-MARKET	1.058	1.304	1.740
Fair value assets per share			
FVA	21.772	22.065	22.810
FVA1	3.006	2.175	1.861
FVA2	17.963	19.014	19.878
FVA3	0.802	0.876	1.071
Fair value assets per dollar of equity			
FVA_mv	1.348	1.692	2.711
FVA1_mv	0.162	0.170	0.221
FVA2_mv	1.130	1.441	2.298
FVA3_mv	0.056	0.081	0.192
Fair value assets per dollar of assets			
FVA_ta	0.126	0.127	0.130
FVA1_ta	0.014	0.008	0.007
FVA2_ta	0.109	0.114	0.118
FVA3_ta	0.004	0.004	0.005

TABLE 4 Pricing of net assets marked at fair value

This table presents the results of the regression analyses of how investors value net assets marked at fair value. The dependent variable is *PRICE*, which is the price immediately after the filing date. Column (I) presents the results of regressing *PRICE* on net fair value assets per share (*FVA*). Column (II) presents the regression results of breaking down *FVA* into *FVA1*, *FVA2*, and *FVA3*. *FVA1*, *FVA2*, and *FVA3* are the fair values of Level 1, Level 2, and Level 3 net assets per share, respectively. *NYSE* (*AMEX*) is a dummy variable equalling one if the bank is listed on NYSE (AMEX) stock exchange, and zero otherwise. *EPS* is earnings per share and *NETBE* is the book value of equity minus the net assets that are marked at fair value. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

	(I)		(II)	
	estimate	t-stat	estimate	t-stat
Intercept	3.706	6.78***	5.315	9.22***
NYSE	0.592	0.79	2.403	2.93***
AMEX	4.852	3.95***	4.845	3.70***
EPS	3.638	14.88***	4.011	15.55***
NETBE	0.672	19.80***	0.451	14.15***
FVA	0.785	26.39***		
FVA1			0.849	16.75***
FVA2			0.626	20.71***
FVA3			0.489	5.30***
Quarter fixed effects	Yes		Yes	
Adjusted R-square	0.5327		0.4741	
F-tests (F-stat)				
FVA = 1	54.43***			
FVA1 = 1			8.85***	
FVA2 = 1			153.67***	
FVA3 = 1			30.56***	
FVA1 = *FVA2*			30.55***	
FVA1 = *FVA3*			12.6***	
FVA2 = *FVA3*			2.25	
FVA1 = *FVA2* = *FVA3*			15.99***	

TABLE 5 Pricing of net assets marked at fair value by calendar quarter

This table presents the results of the regression analyses of how investors' pricing of net fair value assets changes across each of the first three calendar quarters in 2008. The dependent variable is *PRICE*, which is the price immediately after the filing date. Panel A presents the results by regressing *PRICE* on the net fair value assets per share, *FVA*. Panel B presents the regression results by further breaking down *FVA* into *FVA1*, *FVA2*, and *FVA3*. *FVA1*, *FVA2*, and *FVA3* are the fair values of Level 1, Level 2, and Level 3 net assets per share, respectively. *EPS* is earnings per share and *NETBE* is the book value of equity minus the net assets that are marked at fair value. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Pricing of *FVA*

	2008 Q1 (I)		2008 Q2 (II)		2008 Q3 (III)	
	estimate	t-stat	estimate	t-stat	estimate	t-stat
Intercept	2.679	3.87***	2.641	3.20***	3.284	4.15***
NYSE	1.111	0.98	1.116	0.82	-0.037	-0.03
AMEX	3.026	1.62	4.873	2.27**	6.416	2.90***
EPS	9.616	13.83***	3.366	8.18***	2.768	8.00***
NETBE	0.715	14.31***	0.690	11.11***	0.561	9.26***
FVA	0.789	17.53***	0.810	14.98***	0.677	12.89***
Adjusted R-square	0.6475		0.5229		0.4593	
F-tests (F-stat)						
FVA = 1	22.01***		12.39***		37.93***	

T-tests of differences across quarters

	estimate	t-stat
Q1 *FVA* vs Q2 *FVA*	0.021	-0.29
Q1 *FVA* vs Q3 *FVA*	-0.112	-1.57

TABLE 5 (continued)

Panel B: Pricing of *FVA1, FVA2,* and *FVA3*

	2008 Q1 (I)		2008 Q2 (II)		2008 Q3 (III)	
	estimate	t-stat	estimate	t-stat	estimate	t-stat
Intercept	3.264	4.45***	4.573	5.29***	5.093	6.35***
NYSE	2.073	1.68*	3.131	2.10**	1.710	1.21
AMEX	4.916	2.51**	4.791	2.09**	5.822	2.48**
EPS	10.267	14.30***	3.790	8.70***	3.066	8.49***
NETBE	0.614	12.36***	0.450	7.68***	0.315	5.93***
FVA1	0.841	13.35***	1.030	9.61***	1.005	7.10***
FVA2	0.722	15.13***	0.634	11.45***	0.502	10.04***
FVA3	0.651	4.25***	0.370	2.21**	0.282	1.92*
Adjusted R-square	0.6169		0.4630		0.4041	
F-tests (F-stat)						
FVA1 = 1	6.33**		0.08		0.00	
FVA2 = 1	33.86***		43.81***		98.84***	
FVA3 = 1	5.19**		14.14***		23.82***	
FVA1 = *FVA2*	7.56***		19.28***		15.84***	
FVA1 = *FVA3*	1.40		11.17***		13.28***	
FVA2 = *FVA3*	0.21		2.58		2.40	
FVA1 = *FVA2* = *FVA3*	3.87**		10.18***		8.64***	

T-tests of differences across quarters

	estimate	t-stat
Q1 *FVA1* vs Q2 *FVA1*	0.189	1.54
Q1 *FVA1* vs Q3 *FVA1*	0.164	1.06
Q1 *FVA2* vs Q2 *FVA2*	-0.088	-1.19
Q1 *FVA2* vs Q3 *FVA2*	-0.220	-3.03
Q1 *FVA3* vs Q2 *FVA3*	-0.281	-1.21
Q1 *FVA3* vs Q3 *FVA3*	-0.369	-1.65

TABLE 6 Cross-sectional analyses of capital adequacy and audit quality

This paper presents the results of the joint cross-sectional analyses of the effect of capital adequacy and audit quality on how investors price fair value assets. The dependent variable is *PRICE*, which is the price immediately after the filing date. In Panel A (Panel B), *CAP_IND* is a dummy variable equaling one if *CAP1* is above the median in the calendar quarter and zero otherwise. *CAP1* is Tier 1 capital ratio. *BIG4* is a dummy variable equalling one if the bank is audited by a Big 4 auditor and zero otherwise. *NYSE* (*AMEX*) is a dummy variable equalling one if the bank is listed on NYSE (AMEX) stock exchange, and zero otherwise. *EPS* is earnings per share and *NETBE* is the book value of equity minus the net assets that are marked at fair value. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

	estimate	t-stat
Intercept	4.770	5.47***
NYSE	0.080	0.09
AMEX	5.389	4.20***
EPS	4.015	15.98***
NETBE	0.357	5.87***
FVA1	0.652	7.35***
FVA2	0.524	9.02***
FVA3	0.019	0.11
CAP1_IND	1.386	1.38
BIG4	0.419	0.40
NETBE x CAP1_IND	-0.015	-0.22
FVA1 x CAP1_IND	0.139	1.34
FVA2 x CAP1_IND	-0.050	-0.77
FVA3 x CAP1_IND	0.329	1.79*
NETBE x BIG4	0.215	3.16***
FVA1 x BIG4	0.171	1.64*
FVA2 x BIG4	0.225	3.47***
FVA3 x BIG4	0.557	2.99***
Quarter fixed effects	Yes	
Adjusted R-square	0.5019	
When *CAP1_IND* = 1		
FVA1	0.791	9.35***
FVA2	0.474	9.46***
FVA3	0.348	2.38**
When *BIG4* = 1		
FVA1	0.823	8.98***
FVA2	0.749	16.47***
FVA3	0.576	4.09***

TABLE 7 Price changes and changes in assets marked at fair value

This table presents the results of the regression analyses of the association between price changes and changes in net assets marked at fair value. All the change variables are measured by subtracting the previous quarter's number from the current quarter's number. The dependent variable is change in price immediately after the filing date, *ch_PRICE*. Column (I) presents the results of regressing *ch_PRICE* on change in net fair value assets per share (*ch_FVA*). Column (II) presents the regression results of breaking down *ch_FVA* into *ch_FVA1*, *ch_FVA2*, and *ch_FVA3*. *ch_FVA1*, *ch_FVA2*, and *ch_FVA3* are the changes in the fair values of Level 1, Level 2, and Level 3 net assets per share, respectively. *NYSE* (*AMEX*) is a dummy variable equalling one if the bank is listed on NYSE (AMEX) stock exchange, and zero otherwise. *ch_EPS* is the change in earnings per share and *ch_NETBE* is the change in book value of equity minus the net assets that are marked at fair value. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

	(I)		(II)	
	estimate	t-stat	estimate	t-stat
Intercept	-1.730	-11.70***	-1.722	-11.60***
NYSE	-1.407	-4.24***	-1.356	-4.08***
AMEX	0.093	0.16	-0.136	-0.23
ch_EPS	0.583	5.22***	0.641	6.12***
ch_NETBE	0.177	2.92***	0.117	3.23***
ch_FVA	0.164	2.82***		
ch_FVA1			0.121	2.98***
ch_FVA2			0.114	3.33***
ch_FVA3			0.037	0.53
Quarter fixed effects	Yes		Yes	
Adjusted R-square	0.0786		0.0809	

TABLE 8 Pricing of net assets marked at fair value by calendar quarter – constant sample

This table presents the results of the regression analyses of how investors' pricing of net fair value assets changes across each of the first three calendar quarters in 2008. A bank must exist for each of the three quarters to be included in the sample. This reduces the sample size to 1,383 observations, i.e., 461 banks per quarter. The dependent variable is *PRICE*, which is the price immediately after the filing date. Panel A presents the results by regressing *PRICE* on the net fair value assets per share, *FVA*. Panel B presents the regression results by further breaking down *FVA* into *FVA1*, *FVA2*, and *FVA3*. *FVA1*, *FVA2*, and *FVA3* are the fair values of Level 1, Level 2, and Level 3 net assets per share, respectively. *EPS* is earnings per share and *NETBE* is the book value of equity minus the net assets that are marked at fair value. *, **, and *** indicate significance at the 10, 5, and 1 percent levels, respectively.

Panel A: Valuation of *FVA*

	2008 Q1 (I)		2008 Q2 (II)		2008 Q3 (III)	
	estimate	t-stat	estimate	t-stat	estimate	t-stat
Intercept	2.960	4.32***	2.902	3.43***	3.416	4.17***
NYSE	0.696	0.62	1.443	1.04	0.083	0.06
AMEX	2.851	1.42	5.471	2.20**	6.309	2.60***
EPS	12.883	15.40***	3.912	7.85***	2.723	7.66***
OTH	0.650	12.97***	0.675	10.69***	0.558	8.97***
FVA	0.717	15.80***	0.789	14.28***	0.675	12.54***
Adjusted R-square	0.6753		0.5205		0.4589	
F-tests (F-stat)						
FVA = 1	38.99***		14.61***		36.30***	

T-tests of differences across quarters		
	estimate	t-stat
Q1 *FVA* vs Q2 *FVA*	0.072	0.98
Q1 *FVA* vs Q3 *FVA*	-0.041	-0.56

TABLE 8 (continued)

Panel B: Valuation of *FVA1*, *FVA2*, and *FVA3*

	2008 Q1 (I)		2008 Q2 (II)		2008 Q3 (III)	
	estimate	t-stat	estimate	t-stat	estimate	t-stat
Intercept	3.521	4.86***	5.102	5.72***	5.022	6.07***
NYSE	1.570	1.30	3.856	2.52**	1.865	1.30
AMEX	4.931	2.33**	5.496	2.05**	5.832	2.28**
EPS	13.805	16.09***	4.284	8.06***	2.948	7.99***
NETBE	0.547	11.14***	0.406	6.87***	0.326	6.02***
FVA1	0.743	11.89***	1.086	8.46***	1.153	7.49***
FVA2	0.650	13.68***	0.586	10.45***	0.512	10.04***
FVA3	0.583	3.87***	0.296	1.71*	0.254	1.70*
Adjusted R-square	0.6484		0.4630		0.4041	
F-tests (F-stat)						
FVA1 = 1	16.95***		0.45		0.99	
FVA2 = 1	54.49***		54.56***		91.37***	
FVA3 = 1	7.67***		16.52***		24.90***	
FVA1 = *FVA2*	4.92**		20.78***		21.64***	
FVA1 = *FVA3*	1.03		13.21***		18.20***	
FVA2 = *FVA3*	0.20		2.90*		3.17*	
FVA1 = *FVA2* = *FVA3*	2.54*		10.84***		11.63***	

T-tests of differences across quarters

	estimate	t-stat
Q1 *FVA1* vs Q2 *FVA1*	0.344	2.48**
Q1 *FVA1* vs Q3 *FVA1*	0.410	2.48**
Q1 *FVA2* vs Q2 *FVA2*	-0.064	-0.84
Q1 *FVA2* vs Q3 *FVA2*	-0.137	-1.85*
Q1 *FVA3* vs Q2 *FVA3*	-0.287	-1.21
Q1 *FVA3* vs Q3 *FVA3*	-0.329	-1.44