

SFAS 157 & the Market's Assessment of Fair Valued Assets:
An Examination of Fair Valued Assets Held by Financial Firms
During and Following the Financial Crisis

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Abstract

Introduced in late-2007, SFAS 157 redefined existing accounting standards concerning fair value accounting and significantly impacted financial reporting for financial institutions. Prior studies, using larger samples of financial firms, have concluded that Level 3 fair values (the most opaque and subjective fair values) were heavily discounted by the market. Consistent with prior studies, this analysis, which examined only the largest and most systemically important financial institutions during the crisis and post-crisis periods, shows that the market did indeed ascribed a discount to Level 3 fair values, both during the financial crisis and following the financial crisis. Adding to the literature, this paper also observes that Level 2 fair values were discounted by the market during both the crisis and post-crisis periods, although the discount was significantly greater during the crisis, a feature not observed for Level 1 or Level 3 fair values or examined in prior studies.

Introduction

Since the Financial Accounting Standards Board (FASB) announced a sweeping overhaul and standardization of fair value accounting rules on September 15, 2006, the requirements and framework specified under Statement of Financial Accounting Standards No. 157 (SFAS 157) have been a source of controversy and debate. Prior to SFAS 157, which took effect for all quarterly and annual statements filed during fiscal years beginning after November 15, 2007, fair value accounting standards varied widely in practice. Regulators intended that the fair value standards prescribed by SFAS 157 would lead to greater clarity and diminished complexity within financial statements, while also ensuring greater comparability of financial statements across firms. As FASB noted in regards to the then-new standards, “A single definition of fair value, together with a framework for measuring fair value, should result in increased consistency and comparability in fair value measurements” (Financial Accounting Standards Board, 57).

Beyond FASB's stated motivations for SFAS 157, a number of other considerations support a broad and standardized implementation of fair value accounting. First, fair value accounting should reduce information asymmetries between the preparers of financial statements and users of financial statements. Further, fair value accounting reduces the real option that exists for bank managers (and managers more generally) that often runs counter to shareholder interests (Milbradt, 56). Without fair value accounting provisions, managers are incentivized to sell assets which have appreciated in value, thus allowing the firm to recognize a realized gain. Conversely, absent fair value requirements, managers are implicitly encouraged to hold assets whose value has fallen below cost, as losses will only affect the financial statements upon sale of the asset¹. More importantly, empirical research has shown that increased disclosure and greater transparency are associated with lower costs of capital and thus higher valuations. Lambert, Leuz, and Verrecchia noted that higher quality information and disclosure (which SFAS 157 is presumed to encourage) reduces costs of capital by reducing the variation of estimates of future cash flows. Likewise, Bhattacharya, Daouk, and Welker found that the cost of capital was approximately 3% higher for opaque financial firms relative to more transparent firms (669). Finally, Wallace notes that SFAS 157 is consistent with regulatory and supervisory objectives, noting that "the key measure that is used to gauge the risk of default within a firm under this system is the sufficiency of the firm's current (market) value of assets to cover the current (fair) value of the firm's liabilities or debt" (13).

¹ Although this real option can exist in any industry, it is most prominent in the financial industry due to capital requirements. Because regulatory capital is based off of accounting data, the ability to sell an asset whose value has appreciated (thus raising regulatory capital), while being able to defer the recognition of losses on an asset whose value has fallen below acquisition cost (thus avoiding a decline in regulatory capital) is a particularly valuable option for bank managers.

Despite evidence and theory supporting a more standardized approach to fair value accounting standards, the most recent empirical research on the subject of fair value accounting concerns the role of fair value during the financial crisis. Critics of SFAS 157 contend that the requirements exacerbated the crisis by introducing a downward spiral in asset prices. Specifically, critics contend that declines in assets held at fair value caused banks to sell assets to raise capital and comply with regulatory capital requirements. This forced selling led to further price declines, which led to further sales in response to the need to raise additional regulatory capital, with this cycle repeating itself and resulting in a downward price spiral². To date, though, empirical research indicates that SFAS 157 did not exacerbate the financial crisis in any meaningful way. Specifically, as mandated by Congress, the Securities and Exchange Commission examined the role of SFAS 157 during the crisis and concluded that fair value disclosure requirements “did not play a meaningful role in the failures” of 50 financial institutions sampled during from the crisis (Badertscher, Burks, & Easton, 65). Badertscher, Burks, and Easton further noted that bad debt expense, not fair value adjustments, drove the decline in regulatory capital for financial institutions during the crisis. Summarizing their findings, they noted:

...industry- and firm-level sales of AFS and HTM securities during the crisis were similar to levels before the crisis... We also find no evidence that banks increasingly sold securities at losses during the crisis, providing no support for claims that fair value accounting caused “fire-sales” of assets.... our evidence suggests that if accounting-

² According to SFAS 157, forced sales to raise regulatory capital should have been classified as distressed sales and such transactions should not have been used in the determination of fair value. In practice, determining whether a transaction is in fact distressed in nature is often a challenging task for auditors.

based depletions of regulatory capital played a role in the crisis, the main culprit was bad debt expense... (87-88)

While so-called price spirals and their relationship with SFAS 157 will not be discussed here, the following analysis will examine the degree to which users of financial statements trusted fair value disclosures, both during and following the financial crisis.

Irrespective of the motivations supporting and critiques of SFAS 157 and fair value accounting, the significance of FASB's shift to a more unified definition and application of fair value for financial firms was, and remains, significant; at the end of 2011, the six largest U.S. financial institutions³ held a combined \$8.47 trillion of assets at fair value⁴.

Overview of Applicable Accounting Standards

Prior to discussing the specific details of this analysis, it is important to understand why fair value accounting standards are so relevant for financial firms. To do so requires an understanding of Accounting Standards Codification 320 (ASC 320), which outlines the treatment of held-to-maturity, trading, and available-for-sale securities. While ASC 320 applies to all reporting entities⁵, the standards are most relevant for financial firms because the majority of their operating assets are classified as HTM, trading, or AFS securities and the corresponding treatment of these assets can dramatically affect the financial performance and position depicted by the financial statements, as well as the degree to which SFAS 157 is applicable.

ASC 320: Held-to-Maturity Securities

³ Citigroup, J.P. Morgan, Bank of America, Wells Fargo, Goldman Sachs, and Morgan Stanley

⁴ Firms are permitted to report fully hedged derivatives and other assets held at fair value on a net basis. The aggregate amount of fair valued assets actually reported on balance sheet is thus significantly less than \$8.47 trillion, but significant nonetheless.

⁵ Non-profit and select broker dealers are exempt

As mandated by ASC 320, financial firms may only classify debt instruments as held-to-maturity securities. Only instruments that “management has both the positive intent⁶ and the ability to hold until maturity” may be classified as held-to-maturity securities. Because FASB crafted an intentionally restrictive definition of held-to-maturity, firms must often maintain evidence of positive intent to hold a given security until maturity (Ernst & Young, 11). For financial firms, loans traditionally constitute the bulk of the firm’s held-to-maturity securities. Crucially, securities classified as HTM are measured at amortized cost on the balance sheet and are not subject to periodic fair value adjustments⁷. Temporary fluctuations in the value of HTM securities are similarly not reflect in the income statement. While ASC 320 stands independent of SFAS 157 and fair value reporting standards, the two became interrelated during the financial crisis, as regulators allowed many institutions to reclassify massive portfolios of assets as HTM securities to avoid losses associated with mark-to-market adjustments. Such regulatory decisions would not be expected to cast doubt on the fair values reported in the financial statements, but such actions do bring into doubt the broader utility of fair value if regulators show a willingness to suspend requirements during times of crisis, when fair values are arguably of greatest value to investors, counterparties, and other users of financial statements.

ASC 320: Trading Securities

ASC 320 defines trading securities as either debt or equity securities “bought and held primarily to be sold in the near term” (Ernst & Young, 15). In the context of financial firms, such securities are traditionally held in conjunction with speculative bets on short-term price

⁶ Securities which the firm intends to hold for an indefinite period do not receive held-to-maturity classification.

⁷ All securities, however, are subject to periodic impairment tests. If auditors or management judge an asset to be “other-than-temporarily impaired”, the firm must adjust the asset’s value down to its fair value.

movements or are held to facilitate market-making activities. While FASB does not specify a time frame that qualifies as “near term”, accounting professionals generally considered securities with intended holding periods of days or weeks as worthy of the trading classification. Unlike HTM securities, trading securities are recorded at fair value on the balance sheet, with changes in the fair value reflected in earnings every reporting period.

ASC 320: Available-for-sale Securities

Available-for-sale securities effectively represent the residual after accounting for HTM and trading securities. FASB defines AFS securities as “debt securities not classified as either held-to-maturity or trading and equity securities that have readily determinable fair values not classified as trading...” (Ernst & Young, 18). The reporting entity’s intent with regard to the sale of the asset, rather than the nature of the security, is the dominant concern. Reflecting a blend of the treatment afforded to HTM and trading securities, AFS securities are measured at fair value on the balance sheet. However, changes in the fair value of AFS securities during the reporting period do not affect earnings, but are instead reflected as a change in Other Comprehensive Income. Upon the disposal of the asset, any unrealized gains or losses recognized in Accumulated Other Comprehensive Income will then be recognized in earnings during the corresponding reporting period.

SFAS 157:

As discussed above, SFAS 157 represented a dramatic shift in FASB’s approach to fair value as it applies to financial statements. FASB defined fair value as follows: “Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.” A definition that would prove crucial and highly contentious during the financial crisis, standard setters further defined an “orderly

transaction” as a “transaction that assumes exposure to the market for a period to the measurement date to allow for marketing activities that are usual and customary for transactions involving such assets or liabilities; it is not a forced transaction (for example, a forced liquidation or distress sale)” (Financial Accounting Standards Board, 8).

SFAS 157: Fair Value Hierarchy

The most relevant aspect of SFAS 157 as it pertains to this paper is the so-called fair value hierarchy, which classifies assets and liabilities held at fair value according to the reliability and observability of the inputs used to determine their fair value. At the broadest level, SFAS 157 distinguishes between observable and unobservable inputs. Observable inputs are those inputs reflecting assumptions market participants would use when pricing the asset that are obtained from sources independent of the reporting entity. FASB mandates that firms use observable inputs whenever such inputs are available to determine fair value. Unobservable inputs, in contrast, are those inputs that reflect the firm’s *own* assumptions about assumptions that market participants would use to price the asset using “the best available information under the circumstances.” Although an oversimplification, unobservable inputs can be thought of as one step detached from actual market data. Emerging from the definitions of observable and unobservable inputs was FASB’s definition of Level 1, Level 2, and Level 3 fair values, which will constitute the focus of this analysis.

Level 1 Fair Values

Fair valued assets classified as Level 1 assets are presumably the most reliable of all fair values. Level 1 fair values are assets or liabilities whose fair values are determined using quoted and unadjusted prices “in active markets for identical assets or liabilities at the measurement date.” Just as the term “orderly transaction” became a point of contention and dispute during the

financial crisis, so too did the term “active market”, which FASB defines as a “market in which transactions for the asset or liability occur with sufficient frequency and volume to provide pricing information on an ongoing basis⁸” (Financial Accounting Standards Board, 12). As Level 1 fair values are determined exclusively using observable inputs, SFAS 157 requires that firms use Level 1 fair values whenever possible.

Level 2 Fair Values

Fair values determined using Level 2 inputs are less reliable than those determined using Level 1 inputs, but still rely upon observable inputs and represent largely objective measurements of fair value. SFAS 157 defines Level 2 inputs as “Other than quoted prices included with Level 1 that are observable for the asset or liability, either directly or indirectly” (Financial Accounting Standards Board, 12). Common examples of Level 2 inputs are quoted prices for similar assets in active markets, quoted prices for identical or similar assets in inactive markets, or assets whose price is determined from some other observable input such as the yield curve or matrix pricing.

During the financial crisis, the application of SFAS 157 for Level 2 assets was most relevant, as the majority of MBS securities and other complex securitized products held by the largest financial institutions were initially fair valued using Level 2 inputs⁹. However, as liquidity in the mortgage and asset-backed security markets evaporated and as asset sales became increasingly distressed in nature during the financial crisis, Congress and regulators pressured the SEC and FASB to ease fair value requirements. In response, FASB issued FASB Staff

⁸ Common markers of an inactive market include wide bid-ask spreads, a significant increase in implied liquidity premiums, and wide variations in quoted prices across market-makers or time.

⁹ Many securitizations were valued using Level 2 inputs because markets for specific securities were often thin and because assets were often comparable, but not identical as required of Level 1 inputs.

Position (FSP) 157-4, which clarified the definitions of “orderly transaction” and “active market”. Although FSP 157-4 did not represent a material change to existing fair value requirements and officially only reaffirmed existing guidance, many viewed FSP 157-4 as a loosening of fair value requirements. Specifically, the release emphasized that if a market transaction was not deemed to be orderly, the reporting entity need not consider the resulting and prevailing market price as indicative of fair value. Further, FASB reiterated that market prices in inactive and illiquid markets would require inherently subjective adjustments to accurately depict fair value. In inactive markets, firms were encouraged to use multiple valuation approaches and to then select a point within the resulting range of valuations which the firm and its auditors felt was most representative of the asset’s fair value “under current market conditions.” While many markets were indeed increasingly inactive and many transactions disorderly during the latter half of 2008, FSP 157-4 and the regulatory pressure that prompted it undoubtedly injected additional subjectivity and uncertainty into the determination and reporting of fair values and implicitly encouraged greater use of unobservable (Level 3) inputs.

Level 3 Fair Values

All assets marked to fair value using unobservable inputs are classified as Level 3 and firms are only permitted to value an asset using Level 3 inputs when observable inputs (Level 1 or 2) are unavailable. While the general objective of determining fair value remains the same when using Level 3 inputs, the approach differs significantly, as the firm must make assumptions about the assumptions market participants are likely to use when valuing the asset. Unsurprisingly, this process can yield dubious and highly subjective fair values and the resulting values are often referred to as “mark-to-model”. More cynical observers note that “mark-to-make-believe” is a more appropriate descriptor of Level 3 valuations. These sentiments were only reinforced during

the crisis, as many financial firms, most notably Lehman Brothers prior to declaring bankruptcy, aggressively shifted mortgage backed securities and other assets from Level 2 to Level 3 during 2008 in an effort to prop up the on-balance sheet values for these assets. Because of the inherent subjectivity associated with the determination of Level 3 fair values, firms are required to disclose the assumptions and methods used to determine fair values along with a detailed reconciliation of changes in the amount and composition of Level 3 assets during the reporting period.

Empirical Analysis

Research Objectives & Hypotheses

The approach used in this analysis replicates the approach used by Goh, Ng, and Yong in “Market Pricing of Banks’ Fair Value Assets Reported under SSFAS 157 during the 2008 Economic Crisis” (2009) and loosely mirrors the approach of Song, Thomas, and Yi in “Value Relevance of FAS 157 Fair Value Hierarchy Information and the Impact of Corporate Governance Mechanisms” (2010). These analyses, which examined the efficacy SFAS 157 during the peak of the financial crisis in 2008, found that the market ascribed valuations to Level 1, 2 and 3 assets in accordance with the perceived transparency and reliability of the inputs used to determine the respective fair values. Specifically, Goh, et. al found that the market priced Level 1 net assets at \$.85 on the dollar, Level 2 net assets at \$.63 on the dollar, and Level 3 net assets at \$.49 on the dollar (18). They noted that pricing of more transparent Level 1 assets was statistically different from both Level 2 and Level 3 assets. Further, they noted that, as the financial crisis deepened into the third and fourth quarters of 2008, the market ascribed progressively lower valuations to Level 2 and Level 3 assets, while the valuations ascribed to reported Level 1 assets held constant (19-20).

In light of these studies, the objectives of this research are two-fold. First, given that this analysis relies upon the method and general findings of Goh, Ng, and Yong (2009), I will examine whether their findings, which analyzed 1,993 domestic banking institutions, apply to a smaller subset of only the largest, most systemically important financial firms. Given that the firms in my sample engaged to a greater degree in capital markets activity and securitization of the opaque and illiquid assets whose fair values were most questionable during the financial crisis¹⁰, it is expected that market discount on Level 2 and 3 assets observed in Goh et al. will be observed here. While the first objective of this analysis does not greatly extend the existing literature, it is important in establishing a baseline for the subsequent portion of this analysis.

Second, this paper seeks to extend the analysis using the approximately three years of financial data produced since the nadir of the financial crisis. Using this data, I will determine whether the discount applied to lower levels of fair value assets persists from 2009 onward. In conjunction with this analysis, I have defined a crisis dummy variable and will examine the statistical significance of the crisis in relation to the market's pricing of Level 1, 2, and 3 assets. The results of these regressions should yield one of two conclusions. First, the market could ascribe statistically equivalent discounts to Level 1, 2, and 3 assets, respectively, during and following the crisis. Alternatively, the results could indicate that the market ascribes statistically different discounts to Level 1, 2, and 3 assets in the crisis and post-crisis periods. If the market ascribes statistically different discounts in the post-crisis period, it would indicate that some exogenous market or regulatory factor exacerbated the frictions and perceived inaccuracies of

¹⁰ For firms in the 1,993-firm sample, net Level 3 assets as a percent of total net fair value assets was 4.1%. For firms in the 46-firm sample, net Level 3 assets as a percent of total net fair value assets 13.4%, a significant difference of 9.3%.

fair value accounting during the crisis. The potential sources of such frictions and perceived inaccuracies will be explored.

Data Set

The data set for this analysis includes 46 large-cap financial firms based in the United States.

The sample was restricted to include only those firms with assets in excess of \$25B as of the end of the second quarter of 2007, just prior to the date at which SFAS 157 took effect. The sample was limited to financial firms with more than \$25B of assets for two primary reasons. First, the regulatory and operating environments for the largest domestic financial firms are distinct from those in which smaller financial institutions operate. Larger firms are subject to additional oversight and must traditionally abide by different capital standards. At the same time, the largest firms experience the added benefit of a wider government-sponsored safety net.

Accounting for these differences in a meaningful fashion through control variables would have been exceptionally challenging given the limitations inherent in the available datasets. Finally, limiting the sample to the only the largest financial institutions is consistent with the broader objective of this analysis. Much of the controversy regarding SFAS 157 concerned the treatment of assets for the United States' largest financial firms. Including smaller firms thus distracts from the potential policy implications and qualitative conclusions that might emerge from the analysis. The sample was further limited to include only U.S.-based financial institutions for similar reasons and because GAAP and IFRS have not yet been sufficiently harmonized so as to allow for appropriate comparison among international and domestic banking institutions.

Firms included in the initial screen were limited to those with Standard Industrial Classification (SIC) codes associated with commercial banking, savings and loans, or security and brokerage functions. Of the firms that satisfied the screening criteria detailed above, they

carried the SIC codes as shown below. A complete list of firms included in the sample is shown below.

Financial data for firms included in the sample was collected from Compustat Quarterly. Share prices and shares outstanding data were obtained from CRSP. While Compustat does not provide a detailed breakdown of the accounts most relevant for an analysis of financial firms, commonly preferred databases such as Bankscope do not yet provide reliable historical data for quarterly periods.

Firms Included in Sample	
POPULAR INC	KEYCORP
BANK OF NEW YORK MELLON CORP	STATE STREET CORP
UNIONBANCAL CORP	SLM CORP
COMPASS BANCSHARES INC	SUNTRUST BANKS INC
JPMORGAN CHASE & CO	ZIONS BANCORPORATION
COMERICA INC	BEAR STEARNS COMPANIES INC
CITIGROUP INC	BB&T CORP
FANNIE MAE	MORGAN STANLEY
FIFTH THIRD BANCORP	SYNOVUS FINANCIAL CORP
REGIONS FINANCIAL CORP	SCHWAB (CHARLES) CORP
M & T BANK CORP	FEDERAL HOME LOAN MORTG CORP
U S BANCORP	WASHINGTON MUTUAL INC
FIRST HORIZON NATIONAL CORP	COMMERCE BANCORP INC/NJ
WACHOVIA CORP	NEW YORK CMNTY BANCORP INC
HUNTINGTON BANCSHARES	LEHMAN BROTHERS HOLDINGS INC
JEFFERIES GROUP INC	CAPITAL ONE FINANCIAL CORP
MARSHALL & ILSLEY CORP	E TRADE FINANCIAL CORP
MERRILL LYNCH & CO INC	GOLDMAN SACHS GROUP INC
BANK OF AMERICA CORP	HUDSON CITY BANCORP INC
NATIONAL CITY CORP	AMERIPRISE FINANCIAL INC
NORTHERN TRUST CORP	INTERACTIVE BROKERS GROUP
WELLS FARGO & CO	DISCOVER FINANCIAL SVCS INC
PNC FINANCIAL SVCS GROUP INC	MF GLOBAL HOLDINGS LTD

SIC Code	Classification	Number of Firms
6020	Commercial banks	26
6035	Federally chartered savings institutions	2
6036	Not Federally chartered savings institutions	1
6111	Federal & Federally-sponsored credit agencies	3
6141	Personal credit institutions	2
6199	Finance services	1
6200	Security & commodity brokers, dealers, & exchange services	1
6211	Security brokers, dealers, & flotation companies	10

Method

The model employed in this analysis is consistent with models employed in similar research.

The table below provides descriptions of the variables used throughout the following analysis.

All variables are normalized by the total amount of shares outstanding at the date quarterly earnings were announced rather than at the balance sheet date. The share price (*shprrdq*) is the average share price on the day earnings were announced and on the three trading days before and after the earnings announcement. This averaging adjustment was introduced to control for information leakage prior to the earnings announcement and to allow an adjustment period in case the market reaction to the announcement was not immediate. The variables *netvlone*, *netvltwo*, and *netvlthree* represent Level 1, 2, and 3 assets per share net of Level 1, 2, and 3 liabilities per share, respectively. *Nonfvassets* represents assets not held at fair value less liabilities not held at fair value on a per share basis. Earnings per share was provided in the Compustat data. Attempts to include other variables intended to capture accounting opacity or transparency, differences in performance across firms, and predictability of performance across firms were unsuccessful. Variables such as goodwill per share, return on assets, return on equity, or net interest income per share were either insignificant in every analysis or highly collinear with existing explanatory variables. Lastly, a binary “crisis” dummy variable was introduced to examine the effect of the financial crisis. The crisis period was defined as the Q4 of 2007 (the earliest period for which most of the firms in the sample reported under SFAS 157) through Q1

of 2009. Q2 of 2009 onward was defined as the post-crisis period¹¹. Although the actual end of the crisis period is debatable, this cutoff was chosen because the market bottomed prior to the release of Q2 2009 results and because revised accounting standards (FSP 157-4) were clarified prior the release of Q2 2009 financial reports.

Variable	Interpretation
shprdq	Share price at reporting date
netfvassets	Net assets at fair value
netlvlone	Level 1 assets net of Level 1 liabilities
netlvltwo	Level 2 assets net of Level 2 liabilities
netlvlthree	Level 3 assets net of Level 3 liabilities
nonfvassets	Net assets not at fair value
eps	Earnings per share

The analyses are conducted using pooled ordinary least squares regression, as shown below. Beyond allowing for comparison with prior analyses, the model employed in this analysis is beneficial because the interpretation of the model's results is highly intuitive. Because the Level 1, 2, and 3 and non-fair value assets are presented net of liabilities and are normalized by shares outstanding, the variables effectively represent the equity value per share attributable to the respective asset type. Thus the coefficients associated with each variable represent how much each additional dollar per share of net assets for each asset type (in book terms) contributes to the share price. The use of earnings per share as a control variable was introduced by Goh, et. al to account for differences in profitability across firms, which can influence price to book ratios independent of the level of net assets (16).

$$shprdq_{i,t} = \alpha_0 + \beta_1 netlvlone_{i,t} + \beta_2 netlvltwo_{i,t} + \beta_3 netlvlthree_{i,t} + \beta_4 nonfvassets_{i,t} + \beta_5 EPS_{i,t} + \varepsilon_{i,t}$$

¹¹ Fiscal year second quarters ended in May, June, or July for firms in the sample.

Results

Regression 1: Full Sample

The first analysis utilizes the entire dataset and replicates the method employed by Goh, et. al. with 594 quarterly observations across the 46 firms. The average share price during the approximately four-year period was \$26.25. Interestingly, net assets at fair value per share averaged \$95.77 and net assets not at fair value per share averaged (\$68.49), reflecting the fact that financial institutions typically carry a greater percentage of their assets at fair value than their liabilities. Among assets classified under the fair value hierarchy, net Level 2 assets per share was the largest and net Level 3 assets per share was the second largest, although significantly less than net Level 2 assets per share. Note that while ROA, ROE, goodwill per share, and total assets are included in the table below, these variables were not included in the regression model, as they failed to prove significant or were prohibitively collinear with other explanatory variables. The results of the full sample model reflect prior empirical studies and show that the market ascribes a lower than reported value to Level 2 and Level 3 assets (73.3 cents and 60.4 cents per dollar of net assets, respectively). Interestingly, Level 1 assets, whose book values should almost undisputedly reflect market values, have a coefficient that is significantly less than 1. The reasons for this will be discussed later.

Descriptive Statistics					
Variable	Observations	Mean	Std. Dev.	Min	Max
shprrdq	594	26.251	27.751	0.420	206.530
netfvassets	594	95.770	175.856	(58.266)	1,067.728
netlvlone	594	8.764	24.384	(159.159)	143.380
netlvltwo	594	74.462	137.055	(1.909)	832.492
netlvlthree	594	12.544	32.788	(2.030)	248.203
nonfvassets	594	(68.494)	164.947	(1,077.157)	70.941
roa	594	(0.001)	0.023	(0.188)	0.054
roe	594	(159.023)	4,762.815	(79,433.740)	50,260.790
eps	594	(0.217)	3.512	(39.095)	9.625
goodwill	577	6.545	7.717	-	34.360
atq	594	386,628.700	609,473.000	19,978.690	3,293,755.000

Model: Full sample, Predicting share price (shprrdq)						
Variable	Coefficient	Standard Error	t-stat	P>t	95% Confidence Interval	
netlvlone	0.816	0.036	22.950	0.000**	0.746	0.886
netlvltwo	0.733	0.032	23.240	0.000**	0.671	0.795
netlvlthree	0.604	0.049	12.260	0.000**	0.507	0.700
nonfvassets	0.680	0.034	19.950	0.000**	0.613	0.747
eps	1.065	0.206	5.170	0.000**	0.660	1.470
constant	3.746	0.926	4.050	0.000**	1.928	5.563

**Significant at the 1% level

Source	SS	df	MS
Model	340,326.57	5	68,065.31
Residual	116,369.45	588	197.91
Total	456,696.01	593	770.15

Summary	
Number of Observations	594
F(5, 612)	343.93
Prob > F	0.0000
R-squared	0.7452
Adj R-squared	0.743
Root MSE	14.068

Regression 2: In-Crisis Sample

The second analysis utilizes only the portion of the dataset defined as the financial crisis and

includes data from Q4 2007 through Q1 2009. The period includes 209 observations and is

unbalanced in that not all firms reported under SFAS 157 for the 4th quarter of 2007. The results

are consistent with the hypothesis that the market values assets according to their placement in the fair value hierarchy. Level 1 net assets during the crisis were valued at 71.5 cents on the dollar, Level 2 at 55.4 cents on the dollar, and Level 3 at 53.1 cents on the dollar (all significantly different from one). None of the coefficients are statistically different from one another, however.

Descriptive Statistics					
Variable	Observations	Mean	Std. Dev.	Min	Max
shprrdq	209	26.737	28.400	0.420	206.530
netfvassets	209	115.318	212.409	(58.266)	1,067.728
netlvlone	209	7.988	28.531	(159.159)	143.380
netlvltwo	209	88.691	163.730	(1.383)	832.492
netlvlthree	209	18.639	42.697	(2.030)	242.548
nonfvassets	209	(86.993)	204.444	(1,077.157)	70.941
roa	209	(0.007)	0.033	(0.188)	0.043
roe	209	(555.847)	8,002.575	(79,433.740)	50,260.790
eps	209	(1.038)	5.174	(39.095)	8.084
goodwill	203	7.539	8.093	-	34.360
atq	209	403,920.700	574,114.100	19,978.690	2,321,963.000

Model: In-crisis sample, Predicting share price (shprrdq)						
Variable	Coefficient	Standard Error	t-stat	P>t	95% Confidence Interval	
netlvlone	0.715	0.073	9.820	0**	0.571	0.859
netlvltwo	0.554	0.068	8.140	0**	0.420	0.688
netlvlthree	0.531	0.100	5.320	0**	0.335	0.728
nonfvassets	0.513	0.071	7.210	0**	0.373	0.654
eps	1.294	0.320	4.050	0**	0.664	1.924
constant	8.007	2.197	3.650	0**	3.676	12.339

**Significant at the 1% level

Source	SS	df	MS
Model	98,112.99	5	19,622.60
Residual	69,651.61	203	343.11
Total	167,764.61	208	806.56

Summary	
Number of Observations	209
F(5, 612)	57.19
Prob > F	0.0000
R-squared	0.5848
Adj R-squared	0.5746
Root MSE	18.523

Regression 3: Post-Crisis Sample

In contrast to the second analysis, the third analysis utilizes only the portion of the dataset defined as the post-financial crisis period and includes data from Q2 2009 through Q4 2011. The results are consistent with the hypothesis that the market values assets according to their placement in the fair value hierarchy. Level 1 net assets following the crisis were valued at 83.9 cents on the dollar, Level 2 at 83.4 cents on the dollar, and Level 3 at 66.0 cents on the dollar (all significantly different from one). Note that the difference between Level 2 and Level 3 is statistically significant, as well.

Descriptive Statistics					
Variable	Observations	Mean	Std. Dev.	Min	Max
shprrdq	385	25.987	27.427	0.770	187.590
netfvassets	385	85.158	151.650	(23.845)	1,033.362
netlvlone	385	9.185	21.836	(23.780)	126.492
netlvltwo	385	66.738	119.653	(1.909)	779.143
netlvlthree	385	9.235	25.328	-	248.203
nonfvassets	385	(58.451)	138.160	(1,020.809)	36.378
roa	385	0.003	0.015	(0.085)	0.054
roe	385	56.395	457.878	(1,627.223)	8,257.108
eps	385	0.229	1.996	(16.971)	9.625
goodwill	374	6.006	7.461	-	31.722
atq	385	377,241.600	628,365.000	24,438.340	3,293,755.000

Model: Post-crisis sample, Predicting share price (shprdq)						
Variable	Coefficient	Standard Error	t-stat	P>t	95% Confidence Interval	
netlvlone	0.839	0.037	22.400	0.000**	0.766	0.913
netlvltwo	0.834	0.033	25.150	0.000**	0.769	0.899
netlvlthree	0.660	0.051	13.040	0.000**	0.560	0.759
nonfvassets	0.780	0.035	22.030	0.000**	0.711	0.850
eps	1.072	0.364	2.950	0.003**	0.357	1.788
constant	1.897	0.851	2.230	0.026**	0.223	3.571

**Significant at the 1% level

Source	SS	df	MS
Model	247,023.01	5	49,404.60
Residual	41,832.11	379	110.37
Total	288,855.12	384	752.23

Summary	
Number of Observations	385
F(5, 612)	447.61
Prob > F	0.0000
R-squared	0.8552
Adj R-squared	0.8533
Root MSE	10.506

Regression 4: Full Sample with Crisis Interaction Effects

The final analysis combines the results of Regressions 2 and 3 using a dummy variable for the crisis and interaction effects. The crisis variable is defined as 1 if the quarterly reporting period is Q1 of 2009 or earlier and takes the value 0 if the reporting period is Q2 of 2009 or later. The results below show that Level 1 net assets are valued nearly identically in the in-crisis and post-crisis periods, at approximately 80 cents on the dollar. Level 2 net assets are valued at 81.6 cents on the dollar following the crisis, but only 65.9 cents on the dollar during the crisis, a statistically significant difference. Level 3 assets, meanwhile, are valued at only 67.7 cents on the dollar following the crisis, while these assets were discounted another 9.70% during the crisis. All assets at fair value, regardless of the period, are valued by the market at significantly less than 100 cents on the dollar.

Model: Full sample with interaction effects, Predicting share price (shprdq)						
Variable	Coefficient	Standard Error	t-stat	P>t	95% CI	
netlvlone	0.807	0.047	17.050	0.000**	0.714	0.900
crisis_netlevelone	-0.001	0.059	-0.020	0.986	-0.116	0.114
netlvltwo	0.816	0.039	21.110	0.000**	0.740	0.892
crisis_netleveltwo	-0.157	0.042	-3.730	0.000**	-0.240	-0.074
netlvlthree	0.677	0.068	9.940	0.000**	0.543	0.811
crisis_netlevelthree	-0.097	0.086	-1.130	0.259	-0.266	0.072
nonfvassets	0.765	0.043	17.970	0.000**	0.681	0.849
crisis_nonfvassets	-0.152	0.046	-3.280	0.000**	-0.243	-0.061
eps	1.049	0.206	5.080	0.000**	0.643	1.455
constant	3.555	0.923	3.850	0.000**	1.743	5.368

**Significant at the 1% level

Source	SS	df	MS
Model	343,196.71	9	38,132.97
Residual	113,499.31	584	194.35
Total	456,696.01	593	770.15

Summary	
Number of Observations	594
F(5, 612)	196.21
Prob > F	0.0000
R-squared	0.7515
Adj R-squared	0.7476
Root MSF	13.941

Discussion

The results presented above yield several potential observations and conclusions. Namely, the surprising discount applied to Level 1 fair values generally, the significantly greater discount applied to Level 2 assets during the financial crisis, and the confirmation of heavy discounting of Level 3 fair values will be discussed.

First, in all four analyses, the market ascribed a discount to Level 1, Level 2, and Level 3 assets. Notably, in the fourth and most descriptive analysis, the market ascribed a discount of approximately 20% to the reported fair values for Level 1 assets, with the discount being effectively identical in the in-crisis and post-crisis periods. This finding is inconsistent with the findings of prior research, which found that the market's valuation of Level 1 assets was not statistically different from 100 cents on the dollar. Further, the inputs used to determine fair value for assets classified as Level 1 are highly transparent, objective, and observable, making it

surprising that the market does not fully agree with the values presented in the financial statements. Several possible explanations for this observation exist, though. First, the firms in the sample saw declining price-to-book ratios during the sample period, a trend reflective of the diminished profitability that has resulted from the financial crisis and the elimination of once-profitable business units. In conjunction with this trend (and a major contributor to it) is the increased regulatory uncertainty that has characterized the operating environment for the largest financial institutions the past several years. That new regulations such as Basel III, Dodd-Frank (namely the Volcker Rule), and any eventual rules governing Systemically Important Financial Institutions (SIFIs) predominantly, if not exclusively, affect the largest financial firms perhaps explains why the coefficients in these analyses reflect greater uncertainty for all assets reported at fair value than the coefficients in models examining samples with both large and small firms. Finally, it should be noted that while the model formulation used in this analysis is consistent with models used in prior research and is theoretically correct, it is also perhaps excessively literal. In practice, bank analysts do not literally value a financial institution's equity by determining a market value for each individual asset net of liabilities. Valuation is more nuanced and incorporates other considerations.

Beyond the fact the Level 1 assets are seen to carry a statistically significant discount from reported fair values, this analysis also suggests a potentially interesting conclusion about the efficacy of Level 2 fair values. In prior studies, researchers found that the market applied a significantly greater discount to Level 2 assets than Level 1 assets, although the discount was smaller than that ascribed to Level 3 fair values. In this analysis, none of the regressions show a statistically significant difference between the discount applied to Level 2 assets and Level 1

assets, but the point estimates are noticeably smaller for Level 2 assets¹². Interestingly, though, Regression 4 shows that the “crisis” interaction term is only statistically significant for Level 2 fair values. During the non-crisis period, the market valued Level 2 assets at 81.6% of their reported value. During the financial crisis, the market valued Level 2 assets at 65.9% of their reported value, a discount of 15.7%. These results are interesting for two reasons. First, the results reflect the nature of the financial crisis, as the majority of mortgage backed securities (MBS) and asset backed securities (ABS) were fair valued using Level 2 inputs¹³. As the markets for these assets became increasingly illiquid and opaque and as the value of these assets declined at a rapid pace during the financial crisis, it is reasonable to surmise that the pricing uncertainty and divergence in fair value opinions (both the market’s and auditors’ opinions) was greatest for MBS and ABS assets relative to other assets. Further, Level 2 fair values occupy a unique position in the fair value hierarchy. Level 1 fair values are generally indisputable regardless of the period (crisis or non-crisis), as they are developed using observable, objective inputs. Level 3 fair values, as will be discussed below, are highly subjective regardless and the market appears to have little trust in Level 3 fair values regardless of the period, as uncertainty is ever-present within Level 3 fair values. However, Level 2 fair values are unique because they effectively represent pricing by analogy¹⁴. If all of the analogous markets upon which one might

¹² That the samples for previous studies were nearly 20 times larger could explain why the results presented here did not exhibit statistically significant differences.

¹³ Many firms did not disclose a breakdown of MBS and ABS classifications according to the fair value hierarchy during the initial reporting periods following the implementation of SFAS 157. In their 2007 10-Ks, though, the following firms valued their MBS/ABS assets using Level 2 inputs as follows: Goldman Sachs (70.4% of \$54.1B MBS/ABS), J.P. Morgan (90.5% of \$30.1B MBS/ABS), Lehman Brothers (71.5% of \$89.1B MBS/ABS), Bear Stearns (62.6% of \$46.1B MBS/ABS). Only Lehman Brothers carried any MBS/ABS as a Level 1 assets, carrying just \$240mm (.3% of their holdings) as Level 3 assets.

¹⁴ Recall that Level 2 fair values are often developed by referencing prices for similar assets in different markets.

base a Level 2 valuation have become illiquid or distressed, certainty regarding the real price or fair value diminishes. Lastly, FASB's relatively broad definition of distressed sales and of illiquid markets, paired with the unwillingness of auditors to initially incorporate adjustments to fair value methodologies, during the financial crisis likely contributed to the increased discount applied to Level 2 fair values.

Finally, all four analyses indicate that the market values Level 3 assets at a value statistically different from 100 cents on the dollar, typically between 50 to 70 cents on the dollar. As shown in Regression 4, the market prices Level 3 assets at 67.7% of their reported value outside of the crisis and at 58.0% of their reported value during the crisis, although the difference is not statistically significant from Level 2 assets. The coefficients for Level 3 assets are significantly lower than those for Level 2 assets only in the post-crisis sample (Regression 3). These findings regarding the market's valuation of Level 3 assets mirror those of past studies and imply that market participants ascribe significant discounts to the Level 3 fair values reported by financial firms, thus supporting existing criticisms of SFAS 157. However, criticisms of SFAS 157 that focus on the apparent unreliability of Level 3 fair values ignore the possible alternatives. Compared to the alternative (reporting the assets at historical or acquisition cost), this analysis implies that Level 3 fair values at least do not increase uncertainty for users of financial statements. In all four regressions performed above, the difference in the market's valuation of non-fair value assets and Level 3 assets was insignificant. In the model including "crisis" interaction effects (Regression 4), the market actually ascribed a statistically greater discount to non-fair value assets during the crisis, while this trend was not observed for Level 3. In sum, the apparent worst-case scenario indicated by this analysis is that the existence of a Level 3

classification within the fair value hierarchy provides no additional useful information to users of financial statements.

Further Research

The results of this analysis provide a number of avenues for further research. A subsequent analysis could adopt a more granular approach, analyzing individual balance sheet accounts to examine how differences in the composition and level of assets within the fair value hierarchy affects the way in which the market values these assets. As discussed earlier, this approach was not adopted here due to the lack of a database that could provide such granular information on a quarterly basis. Additionally, future research could incorporate additional more descriptive forward-looking explanatory variables. Such variables, while perhaps more subjective, could include equity analyst opinions or other variables that might capture the market's expectations of future performance. Diminished expectations of future performance for financial firms, rather than inadequate accounting standards, could explain the discount to fair value witnessed here. Finally, as GAAP and IFRS are increasingly harmonized, an international comparison of fair value accounting standards would add to the literature.

Conclusion

While SFAS 157 represented a significant shift in the approach to fair value accounting. Consistent with prior research, this analysis confirms that the market ascribes a significant discount to Level 3 fair values as reported under SFAS 157. However, this analysis, which examined the market's valuation of assets held at different levels of the fair value hierarchy also showed how the market's assessments of fair value changed between the crisis and post crisis periods. The results indicate that Level 2 assets, not the most opaque Level 3 assets, saw the greatest increase in market skepticism due to the financial crisis, and it is speculated that this

trend is observed due to the nature of Level 2 inputs (pricing via analogy) and because of the nature of the financial crisis (emanating from assets initially valued as Level 2).

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