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34 INQUIRY Volume 12 2011

THE OPAQUENESS OF FAIR VALUE ASSETS AND SYSTEMATIC RISK IN THE BANKING INDUSTRY

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Abstract

Opacity has economy-wide implications. A lack of information, whether from non-disclosure or complexity of business, creates uncertainty that even the most sophisticated of investors must face. In this paper, I analyze the relationship between opacity and the systematic risk of bank holding companies. Specifically, I find that investments in opaque assets required to be reported at fair value significantly affect the levels of financial institutions' systematic risk. Furthermore, I provide evidence that firm investments in opaque assets contribute to systematic risk to an even greater degree during times of financial crisis.

I. Introduction

Accurately assessing the true economic value of any firm can be an arduous task. When attempting to assess the underlying value of a portfolio of assets, information becomes critical. A lack of information, whether as a result of non-disclosure or complexity of business, creates uncertainty that even the most sophisticated of investors must face. Furthermore, the inherent nature of the banking industry lends itself to even greater informational asymmetries that manifest themselves in the form of opacity (Morgan, 2002). The existence of opacity in banks has economy-wide implications due to the vital role that financial institutions play in general economic activity (Bernanke, 1983). In this paper, I examine the relationship between financial opacity and the systematic risk of bank holding companies. Specifically, I investigate the impact of investments in assets required to be reported at fair value on the systematic risk of financial institutions.

The consequences of opacity have justified special regulatory oversight within the financial industry, as investors are forced to use non-firm specific valuation parameters to assess firm specific assets (Flannery, Kwan, and Nimalendran, 2004). In opaque industries such as banking, contagion that arises as a consequence of industry-wide revaluation around firm-specific events engenders an environment conducive to the development of speculative bubbles and crashes. Arising from the inability of investors to distinguish between bank-specific and systematic events, contagion is a product of information asymmetry (Diamond and Dybvig, 1983). Disclosure standards attempt to mitigate risks associated with opacity and information asymmetry by reducing the information gap between bank-insiders and investors. However, even full disclosure may not adequately resolve the problems associated with opacity (Jones, Lee, and Yeager, 2011a).

Opacity also influences the composition of a firm's risk. Morck, Yeung, and Yu (2000) show how opaque markets tend to have greater systematic risk and lower idiosyncratic risk. The positive relationship between opacity and systematic risk occurs because, in the absence of reliable, firm-specific information, a firm's equity price tends to just "follow along" with the overall movement of the market. Jones, Lee, and Yeager (2011a) demonstrate how the increasing opacity of banks during the period 2000-2006 increased the systematic risk of banks while decreasing idiosyncratic risk. Moreover, the more opaque banks suffered the greatest price decline during the 2007 financial crisis.

In this paper, I use a recent change in U.S. accounting rules to examine the impact of opacity on the systematic risk of banks. In 2007, US accounting regulatory bodies introduced SFAS 157, *Fair Value Measurement*, to address the increasing investment by financial institutions in illiquid and opaque assets. SFAS 157 requires firms to report certain assets at fair value, classified into categories of Level 1, 2, and 3. Across Level 1, 2, and 3 classifications, investors face greater degrees of information risk – uncertainty regarding the valuation parameters for underlying assets. To investigate the contributions of opacity to systematic risk, I utilize such fair value measurements to capture increasing levels of illiquidity and opacity. Consistent with previous finance literature, my results show that opacity is positively related to the systematic risk of banks.

II. Hypothesis Development and Research Design

My hypotheses and analysis build upon the assertions in previous work that information risk of bank assets is non-diversifiable in an economy (Easley and O'Hara 2004; Lambert, Leuz, and Verrachia 2007; Jones, Lee, and Yeager 2011b). When one bank's assets are particularly hard to value due to their opaque nature, outside investors must turn to idiosyncratic valuation parameters of other opaque yet seemingly similar firms. Consequentially, the correlation between the entire industry is intensified. As the industry-wide asset composition of financial firms contains relatively greater degrees of opaque assets than the non-financial industry, investors face difficulty in discriminating across good banks and bad banks (Morgan 2002). Such a scenario creates return synchronicity, reduces idiosyncratic risk, and increases systematic risk (Jones, Lee, and Yeager, 2011b).

To evaluate the impact of opacity on systematic risk, I take advantage of recent accounting disclosure requirements that force financial institutions to report assets at Fair Value (SFAS, 157). Fair value is defined by SFAS 157 as "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." Furthermore, SFAS 157 requires firms to report assets at Fair Value Level 1, Level 2, or Level 3. Level 1 fair value inputs utilize quoted prices for identical items in active markets. Level 2 assets are valued using quoted prices in active markets for similar items or quoted prices in inactive markets for identical items. Market information helps to bring validity to such valuation models. Finally, Level 3 assets are valued with unobservable, firm-supplied estimates based on firm developed models. These models are left largely unaffected by market information. As one can certainly see, each fair value level indicates progressively more illiquid and opaque assets with Level 1 securities being relatively liquid and transparent and Level 3 being the most opaque. Therefore, by decomposing a firm's equity beta among various types of assets, I can begin to analyze the contribution of opacity to a firm's systematic risk.

As previously noted, finance theory implies that information risk – uncertainty regarding the valuation parameters for an underlying asset – increases the systematic risk of a firm. Consequently I expect that Level 2 and 3 assets will lead to greater systematic risk compared to other types of assets. Stated in hypothesis form:

> **H_1**: Level 2 and 3 assets should be positively related to a firm's equity beta.

I furthermore expect the magnitude of contribution to systematic risk to be monotonically increasing across Level 2 and 3 fair value assets, stated formally as:

> **H_2**: Level 3 assets should make a larger contribution to systematic risk compared to Level 2 assets.

Finally, I expect that the contribution of Level 2 and 3 assets to vary over time. During a financial crisis, opacity leads to increased synchronicity of returns. Consequently, my third hypothesis is stated as follows:

> **H_3**: Level 2 and 3 assets should make larger contributions to systematic risk during times of financial crisis.

III. Sample and Descriptive Statistics

My sample covers the period March 2007 through September 2010. Commencing the sample in March 2007 allowed me to take advantage of FAS 157, which provided financial institutions the option to report assets at fair value; however, only beginning in March 2008 did the standard become mandatory. I collected data to serve as proxies for opacity by identifying the entire sample of Bank or Financial Holding Companies (BHCs) that file the Federal Reserve's Consolidated Financial Statements for Bank Holding Companies (FR Y-9C) and that 1) reported at least one positive value at the Level 1, 2, or 3 designation, 2) have total assets in excess of $5 billion, and 3) are publicly traded. This led to a sample of 99 unique banks with 786 firm quarters of data collected. Market data for the sample was collected from the Center in Research and Security Prices (CRSP).

I computed the percent of assets reported as fair value Level 2 (*FV2*) and Level 3 (*FV3*) from the FR Y-9C. All other assets (*OA*) represent the percent of assets not classified as Level 2 or 3. I also computed the leverage (*Liab_to_Assets*) of the banks as total liabilities scaled by total assets. The market beta (*MktBeta*) was computed each quarter for each bank using weekly equity returns and the market model as follows:

$$r_{it} = \alpha_{it} + \beta_i (VW_t) \qquad (1)$$

where *VW* represents the CRSP value-weighted index.

On average, Level 2 (Level 3) assets represent 18.46% (1.19%) of total assets. The average equity beta is 1.58. Figure 1 plots the average asset composition of firms across the sampled time period. Of note, in January 2008, revisions to fair value accounting standards led firms to report more assets at Level 1 fair value designation rather than Level 2, thus a precipitous drop in Level 2 assets can be seen in the figure. Finally, the calculated leverage ratio (total liabilities to total assets) of sampled firms followed industry expectations with a mean of 89.12%.

IV. Empirical Results

In this section, I first analyze the impact of Level 2 and Level 3 assets on the systematic risk of the bank. I then examine the relative contribution each type of asset makes to overall systematic risk and the temporal differences of the impact on systematic risk during crisis and non-crisis periods.

IV.A. Opacity and Equity Risk

To ascertain the impact of Level 2 and 3 assets on the systematic risk of the bank, I estimate the following regression:

$$MktBeta_{ij} = \alpha_i + \beta_1 FV2_{ij} + \beta_2 FV3_{ij} + \beta_3 Liab\_to\_Assets_{ij} + \varepsilon_{ij} \qquad (2)$$

controlling for leverage. The intercept term represents the average market beta for other assets (*OA*), and the coefficients β_1 and β_2, the marginal contribution of Level 2 and Level 3 assets, respectively. Table 2 presents the results of estimations using both ordinary least squares (OLS) and weighted least squares[1] (WLS). Table 3 displays results with control variables for heterogeneity across time (fixed-effects model).

All models hold similar and significant degrees of validity. Coefficients for both Level 2 and Level 3 assets prove to be statistically significant at the 5% probability level within each model, with Level 3 assets carrying significance at the 1% probability level within each. The baseline regressions presented in Table 2 lack strong r-squared values. However, after controlling for time, the OLS Decomposition of Beta with fixed-effects provided the greatest goodness of fit measurement with an r-squared value of just over 16%. Each model's F-value proved statistically significant as well.

Interestingly, the results estimate a negative coefficient for FV2 assets. Such results suggest that, relative to the more opaque

[1] The weight in this regression is the inverse of the standard error from the model used to estimate the market beta, which controls for heteroskedasticity across the computed market betas.

Table 1: Summary statistics for each variable with number of quarterly observations collected and used.

Quarter	Observations
31-Mar-07	9
30-Jun-07	9
30-Sep-07	9
31-Dec-07	9
31-Mar-08	38
30-Jun-08	38
30-Sep-08	50
31-Dec-08	51
31-Mar-09	55
30-Jun-09	89
30-Sep-09	90
31-Dec-09	88
31-Mar-10	88
30-Jun-10	86
30-Sep-10	85
Total Observations Collected	794
Missing of Observations with Missing Values	8
Total Observations Used	786

Variable	Mean	Median	Std Dev
Dependent Variable			
MktBeta	1.5845809	1.4922536	0.7254663
Explanatory Variables			
OA/Intercept	80.24%	85.35%	24.49%
FV2	18.46%	13.64%	23.36%
FV3	1.19%	0.32%	1.83%
Liab_to_Assets	89.12%	89.85%	7.31%

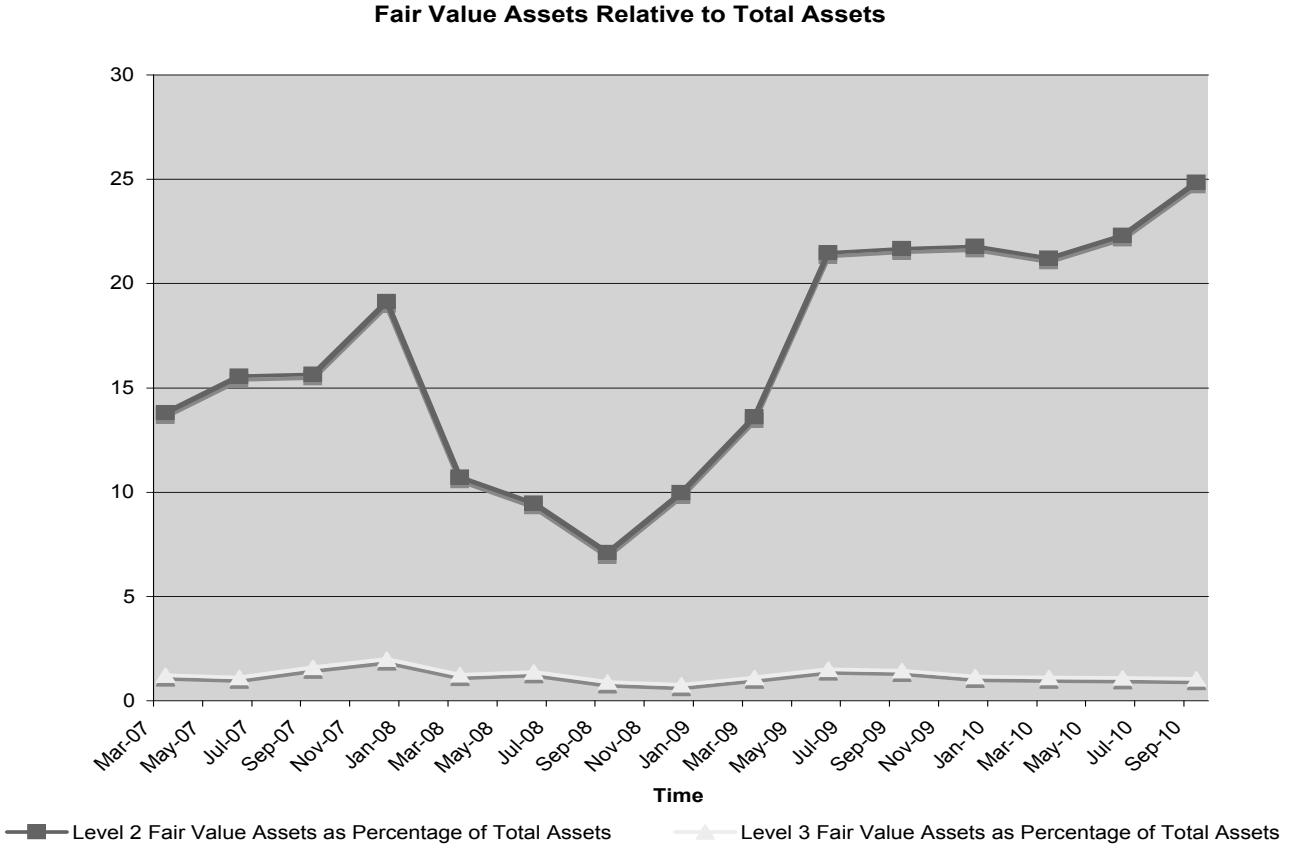

Figure 1: Fair Value Assets Relative to Total Assets

Table 2: Decomposition of equity beta: ordinary least squares and weighted least squares results of regression.

	Ordinary Least Squares Decomposition of Beta		Weighted Least Squares Decomposition of Beta	
Variable	Coefficient	t-statistic	Coefficient	t-statistic
Asset Portfolios				
Other Assets/Intercept	1.44931***	4.67	1.49342***	6.67
FV2	-0.5086***	-3.38	-0.26891**	-2.32
FV3	8.89846***	5.23	9.97159***	6.19
Liab_to_assets	0.13405	0.38	-0.20336	-0.8
Model Analysis				
R^2	0.0358		0.0503	
Adj R^2	0.0321		0.0467	
F-Value	9.68		13.81	
N	786		786	

*p< .10, ** p< .05, ***p< .01

This table reports the ordinary least squares and weighted least squares results of regressing market beta (scaled equity beta for firm I in quarter j) on the FV2 and FV3 components of the decomposed financial asset compositions of sampled firms. The basic model development follows that of Riedl and Serafeim (2009). For both the OLS and WLS models, market beta was used as the dependent variable with observations from March 2007 to September 2010. Coefficients and t-statistics for the explanatory variables of OA (all assets not measured at Level 2 or 3 Fair Value), FV2 (Level 2 Fair Value Assets), FV3 (Level 3 Fair Value Assets), and Liab_to_assets (a leverage component) can be found.

FV3 assets, FV2 assets carry with them much less information risk. In fact, it appears that investments in FV2 assets may actually reduce a firm's systematic risk. As noted earlier, FV2 assets are required to be valued "using quoted prices in active markets for similar items or quoted prices in inactive markets for identical items." The transparency of such valuation parameters appears to reduce investor uncertainty regarding FV2 assets compared to investment in FV3 assets. Without further asset decomposition within each level, however, I am unable to identify specific securities or asset types that contribute to increased transparency.

Most salient to the analysis, FV3 assets carry with them a strikingly positive coefficient. For example, in the OLS with fixed effects model, the coefficient of 7.613 provides strong evidence that investments in assets reported as Level 3 significantly contribute to systematic risk. The finding provides support for the first hypothesis that investments in opaque assets increase a firm's systematic risk. Additionally, the results provide support for the second hypothesis that FV3 assets should have a greater impact on systematic risk than FV2 assets.

IV.B. Robustness

While both the baseline regression and time-controlled models provide evidence that FV3 assets contribute to systematic risk, it is possible that illiquidity of the assets, and not opacity, may be driving the results. To remedy this problem and ensure the models predict the contributions of opacity rather than liquidity, I expanded the model to control for liquidity by inserting another measure into the regression analysis. A proxy for liquidity risk is computed according to the methodology of Pastor and Stambaugh (2003). Specifically, an OLS time-series regression for each bank *i* is estimated.

$$r^{e}_{i,d+1,q} = \theta_{i,q} + \phi_{i,q} * r_{i,d,q} + \gamma_{i,q} * sign(r^{e}_{i,d,q}) * v_{i,d,q} + \varepsilon_{i,d+1,q} \quad (3)$$

In (3), $r_{i,d,q}$ is the equity return for firm *i* on day *d* in quarter *q*; $r^{e}_{i,d,q}$, the excess equity return over the CRSP value-weighted for day *d* in quarter *q*; and $v_{i,d,q}$, the dollar trading volume on day *d* in quarter *q*. The equation is intended to capture return reversals related to lack of liquidity. The coefficient of reflects the liquidity risk of the stock and will be negative and larger in magnitude for a less liquid stock.

Table 4 presents the results that include the Pastor-Stambaugh liquidity factor as a control variable. Results are quantitatively similar to those presented in Table 3. The liquidity variable fails to achieve statistical significance; therefore my presumption regarding the opacity is of FV3 assets becomes stronger. Such results with an included liquidity factor add an important degree of qualitative robustness to the study in that I am able to differentiate between the contributions of liquidity and opacity toward equity risk of financial institutions. Furthering the work of Riedl and Serafeim (2009), I conclude that information risk for Level 3 assets appears to be primarily attributed to opacity.

IV.C. Temporal Analysis

Flannery, Kwan, and Nimalendran (2010) suggest that bank opacity varies across time. Though my study does not attempt to validate this claim, I am able to provide evidence about the impact of opacity on a systematic risk during times of crisis and non-crisis. My third hypothesis predicts that during times of financial crisis, FV2 and FV3 assets should make greater contributions to systematic risk.

In order to test the third hypothesis, I performed a Fama-Macbeth (1973) regression procedure and plotted the quarterly coefficients in Figure 2, which also highlights key events throughout the financial crisis.. Notice the spike in the coefficient for FV3 assets during the period January 2008 to January 2009. In fact, the coefficients for Level 3 assets during the third and fourth quarters of 2008 are nearly twice as great in magnitude as from the same quarters in the previous year. As markets suddenly revise expectations and valuations for such assets, the crisis is further exacerbated.

Table 3: Decomposition of equity beta with fixed effects, regressing on Level 2 and Level 3 Fair Value Assets.

	OLS Decomposition of Beta with Fixed Effects for Time		WLS Decomposition of Beta with Fixed Effects for Time		Decomposition of Beta with Fixed Effects for Time (Clustered at Firm Level)	
Variable	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Asset Portfolios						
Other Assets/Intercept	1.01857***	3.23	1.08249***	4.62	1.0824908***	7.34
FV2	-0.40829***	-3.18	-0.35571***	-3.12	-0.3557121**	-2.31
FV3	7.61304***	4.73	9.86821***	6.4	9.868206***	4.36
Liab_to_assets	0.14341	0.44	-0.03119	0.8974	-0.0311871	-0.25
Time Dummy Variables						
Year 08	0.45543***	3.73	0.11575	1.19	0.1157532	0.51
Year 09	0.68782***	5.86	0.56902***	6.01	0.5690224***	6.27
Year 10	0.1224	1.03	0.17774	1.89	0.1777365**	2.07
Model Analysis						
N	786		786		786	
R^2	0.1622		0.1494		0.1494	
Adj R^2	0.1558		0.1428			
F-Value	25.14		22.8			

*** p<.01, ** p< .05, and * p< .10

This table presents the results of regressing market beta on the Level 2 and Level 3 Fair Value Assets of firm i in quarter j while controlling for heterogeneity across time using fixed effects. The addition of dummy variables for time (Year08, Year09, Year10) in the OLS and WLS models adds robustness to the study. By adding time dummy variables the goodness of fit for the regression (Adj R^2) shows a relatively large jump from between 3% and 5% in the non-time controlled models to between 14% and 16% in the time controlled models. ***, **, and * represent statistical significance of all relevant variables at the 1%, 5%, and 10% levels respectively.

To further validate my claim, I performed a seemingly unrelated regression (SUR) to compare fair value asset coefficients during crisis and non-crisis periods. Though economic significance appears obvious in Figure 2, a SUR is required to substantiate the statistical significance. Results of the SUR models with variables for both crisis and non-crisis periods are presented in Table 5. As expected, F-values that test the difference in coefficients reveal that coefficients for both FV2 and FV3 assets are statistically higher during the crisis period compared to the coefficients during the non-crisis period, thereby confirming the presumption that investments in opaque assets carry varying degrees of systematic risk across time.

V. Conclusion

To summarize, I find that opacity contributes to financial instability by exposing firms with heavy investments in Level 3 fair value assets to a marked degree of systematic risk during times of crisis. The lack of transparency associated with these assets noticeably alters investors' risk perceptions, as they face uncertainty regarding the valuation parameters used to report Level 3 fair value assets. Hence, firms holding large portfolios of opaque assets may be among the first to feel the effects of an oncoming financial firestorm.

An examination of investments in informationally opaque fair value assets by bank holding companies yields significant evidence that opacity contributes to the systematic risk of a bank. Results signify that the market valuation of financial institutions is a product of those institutions' investments in Level 2 and 3 fair value assets. Additionally, the results imply that contributions of opacity to systematic risk are not consistent over time. During periods of turmoil, investments in opaque assets create a greater degree of systematic risk than in non-crisis periods.

The results suggest that the recent conversation about disclosure standards and mark-to-market accounting during times of crisis are legitimate. Recent implementation of fair value standards has allowed us to better understand how investors value different types of assets during varying market conditions. Fluctuations in the contributions of assets to systematic risk over time, particularly during crisis periods, indicated that current disclosure requirements still may not be sufficient to completely assuage investor uncertainty concerning such assets. Further regulation in the banking industry to bring greater degrees of transparency to highly opaque assets may increase market efficiency and alleviate the intensity of financial downturns. In short, enhanced disclosure standards for illiquid and opaque assets appear warranted.

References

Bernanke, Ben (1983). "Nonmonetary effects of the financial crisis in the propagation of the great depression." *American Economic Review* 73, 257-276.

Diamond, D. and P Dybvig (1983). "Bank runs, deposit insurance, and liquidity." *Journal of Political Economy* 91, 401-419.

Easley, D. and M O'Hara (2004). "Information and the cost of capital." *Journal of Finance* 59, 1553-1583.

Fama, E., and J. Macbeth, 1973. Risk, return, and equilibrium: Empirical tests. *Journal of Political Economy* 81, 607-636.

Table 4: Decomposition of equity beta adding Pastor-Stambaugh liquidity factor.

	OLS Decomposition of Beta with Pastor-Stambaugh Liquidity Factor		WLS Decomposition of Beta with Pastor-Stambaugh Liquidity Factor		OLS Decomposition of Beta with Pastor-Stambaugh Liquidity Factor (Clusterd at Firm-Level)	
Variable	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Asset Portfolios						
Other Assets/Intercept	1.01711**	3.23	1.07625***	4.6	1.0762493***	7.18
FV2	-.40660**	-3.16	-.35467***	-3.11	-.3546663**	-2.31
FV3	7.58947***	4.72	9.81575***	6.37	9.8157497***	4.42
Liquidity	-0.72987	-0.67	-1.38156	-1.31	-1.3815591	-0.76
Liab_to_assets	0.14316	0.44	-0.02785	-0.12	-0.0278478	-0.22
Time Dummy Variables						
Year 08	0.45904***	3.75	0.12366	1.27	0.1236617	0.56
Year 09	0.68945***	5.87	.57367***	6.05	.5736719***	6.11
Year 10	0.12471	1.04	.18319*	1.94	.1831876**	2.04
Model Analysis						
N	786		786		786	
R^2	0.1627		0.1513		0.1513	
Adj R^2	0.1552		0.1436			

*** p<.01, ** p< .05, and * p< .10

This table presents the results of regressing market beta on the Level 2 and Level 3 Fair Value Assets of firm i in quarter j with a proxy for liquidity risk. The proxy for liquidity risk is computed according to the methodology of Pastor and Stambaugh (2003). Qualitative analysis of the results remains similar to results of fixed-effects OLS models in Table 3. . ***, **, and * represent statistical significance of all relevant variables at the 1%, 5%, and 10% levels respectively.

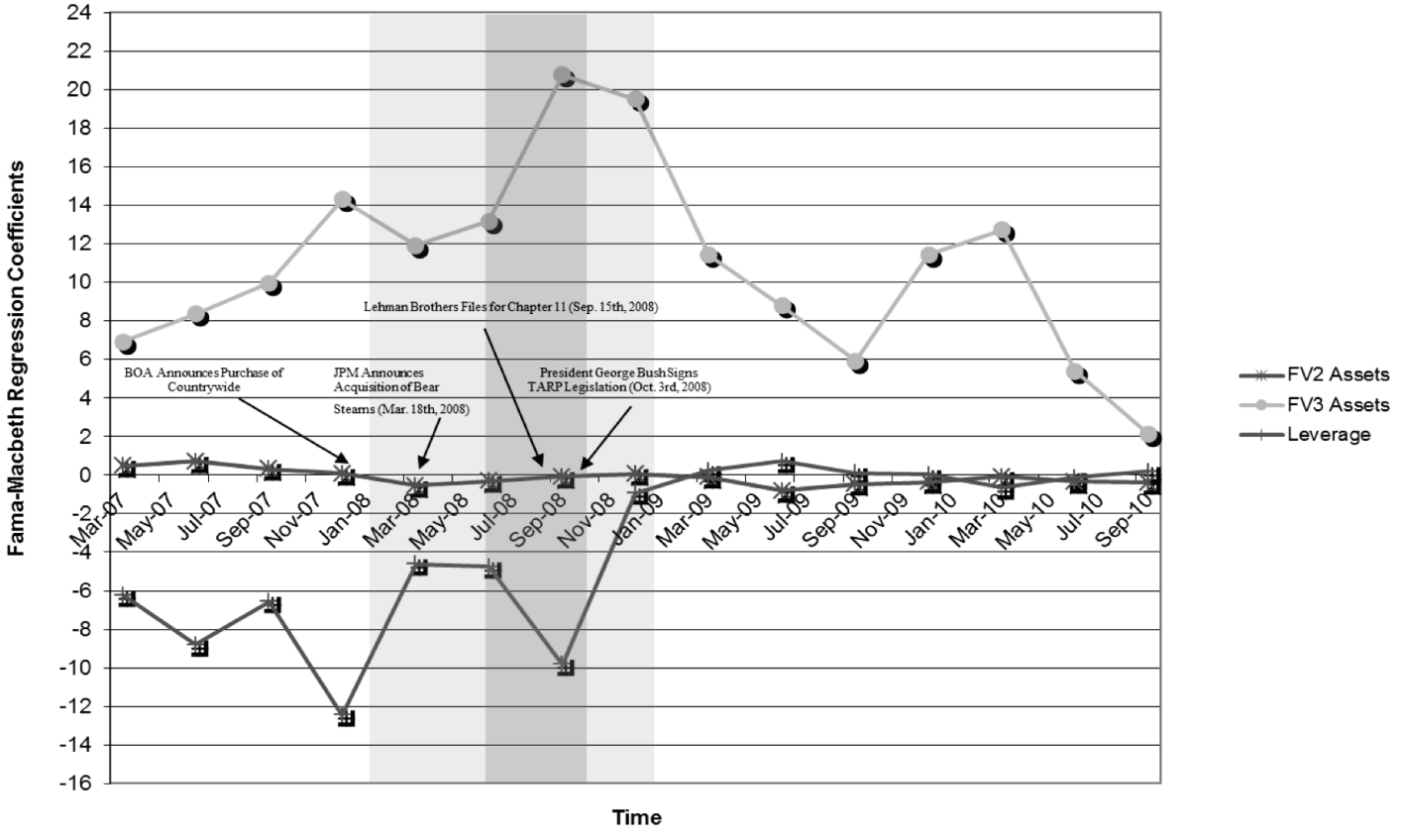

Figure 2: Fair Value Coefficients Across Time

Table 5: Fama-Macbeth procedure results/tests for differences between crisis and non-crisis periods.

	OLS Test for Differences Between Crisis and Non-Crisis Periods		WLS Test for Differences Between Crisis and Non-Crisis Periods	
Variable	Coefficient	t-statistic	Coefficient	t-statistic
Intercept	1.1153***	3.61	1.15516***	5.05
FV2_Crisis	0.02599	0.13	-0.04792	-0.26
FV2_NonCrisis	-.65430***	-4.13	-.47593***	-3.53
FV3_Crisis	10.66145***	4.63	15.12463***	6.38
FV3_NonCrisis	3.43554	1.61	5.26646***	2.72
Liab_to_assets	0.14929	0.47	-0.01392	-0.06
Year 08	0.28095**	2.29	-0.04111	-0.42
Year 09	0.5916***	5.11	.48130***	5.16
Year 10	0.12186	1.04	0.09226	1.86
Model Analysis	F-Value	Pr > F	F-Value	Pr > F
FV2	7.81	0.0053	3.63	0.0571
FV3	5.36	0.0209	10.47	0.0013

Fama-Macbeth Implied Betas		
Quarter	FV2 Coefficient	FV3 Coefficient
31-Mar-07	0.47889	6.9137
30-Jun-07	0.7145	8.3525
30-Sep-07	0.32244	9.9758
31-Dec-07	0.07578	14.291
31-Mar-08	-0.53859	11.9109
30-Jun-08	-0.31685	13.1637
30-Sep-08	-0.075	20.7681
31-Dec-08	0.06075	19.4953
31-Mar-09	-0.10543	11.4045
30-Jun-09	-0.81894	8.7906
30-Sep-09	-0.46253	5.9243
31-Dec-09	-0.36429	11.4266
31-Mar-10	-0.08238	12.7273
30-Jun-10	-0.33475	5.4026
30-Sep-10	-0.40045	2.1241

*** p<.01, ** p< .05, and * p< .10

This table presents the quarterly implied equity betas of FV2 and FV3 assets from March '07 through September '10. It also presents results of seemingly unrelated regressions to test for significance of coefficients in crisis and non-crisis periods. F-value's reveal that the coefficients are statistically higher in crisis periods (defined as March '08 to January '09). . ***, **, and * represent statistical significance of all relevant variables at the 1%, 5%, and 10% levels respectively.

Flannery, Kwan, and Nimalendran M (2004). "Market evidence on the opaqueness of banking firms' assets*." Journal of Financial Economics,* 71, 419-460

Flannery, Kwan, and Nimalendran M (2010). "The 2007-2009 financial crisis and bank Opaqueness." *Federal Reserve Bank of San Francisco Working Paper.*

Lambert, R., Leuz, C., and Verrachia, R (2007). "Accounting information, disclosure, and the cost of capital." *Journal of Accounting Research* 45, 385-420.

Morck, R., Yeung, B., Yu, W., 2000. The information content of stock markets: Why do emerging markets have synchronous stock price movements? *Journal of Financial Economics* 58, 215-160.

Morgan, Donald P. (2002). "Rating banks: risk and uncertainty in an opaque industry." *American Economic Review* 92, 874-888.

Jones, Jeffrey S., Lee, Wayne Y. and Timothy Yeager (2011a). Opaque banks, price discovery, and financial instability. *Working Paper*, University of Arkansas.

Jones, Jeffrey S., Lee, Wayne Y. and Timothy Yeager (2011b). Valuation and systemic risk consequences of bank opacity. *Working Paper*, University of Arkansas.

Pastor, L., and R. Stambaugh, 2003. Liquidity risk and expected stock returns. *Journal of Political Economy* 111, 642-685.

Riedl, Edward and George Serafeim (2009), "Information risk and fair value: An examination of equity betas and bid-ask spreads," Working Paper, Harvard Business School.

Mentor Comments: Professor Jeff Jones describes the manner in which Jody took advantage of a recent change in accounting disclosure requirements to explore the relationship between opacity of assets and bank risk, noting the independence and sophistication of his work.

As an important supplier of credit to the economy, a healthy banking industry is essential for economic prosperity. The opacity of the banking industry, however, can jeopardize the health of the industry (and the overall economy) since opacity fosters price contagion that exacerbates the cycle of speculative bubbles and crashes that create financial instability. Price contagion that arises in opaque markets can manifest itself in a number of ways, one of which is a change in the composition of risk. Since opacity makes it difficult for investors to "see inside" individual firms, it tends to decrease idiosyncratic (firm-specific) risk and increase systematic risk. When the systematic risk of all firms in an industry becomes elevated, it creates a high degree of return synchronicity. In such an environment, negative information about a single firm tends to drive down the stock prices of all firms in the industry, creating the potential for a systemic crisis. Consequently, understanding how the activities and assets of banks impact this process is of critical importance to abating the negative consequences of opacity.

I became acquainted with Jody in 2010 while he was a student in two of my courses. During this time, we had a number of out of class discussions regarding the causes and consequences of the recent financial crisis. I shared with him some of the research projects I had been working on related to the opacity of the banking industry as a contributing factor to the financial crisis. Soon after, he approached me with an idea that he wished to explore for his Senior Honors Thesis. His work on this project has consistently exceeded

my expectations of an undergraduate student, and in fact is of a quality that would rival that of many PhD students. I am extremely impressed by how well Jody was able to independently process the literature and recognize how to make a significant contribution.

In this project, Jody uses a novel approach, made possible by a recent accounting change, to investigate how investments in opaque assets impact the systematic risk of a bank. The recently adopted SFAS 157 requires banks to classify certain assets into 3 levels and report them at fair value. Level 1 assets are considered relatively transparent, and Level 2 and Level 3 assets are considered increasingly opaque, respectively. Jody finds that investing in greater quantities of Level 3 assets significantly increases the systematic risk of a bank. Moreover, the contribution to systematic risk for both Level 2 and Level 3 assets was much higher during the height of the 2007-2008 financial crisis compared to periods of relative tranquility. Thus, Jody effectively demonstrates how the opaqueness of banks can exacerbate a financial crisis, providing useful information for policymakers and regulators.