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Credit Market Information Feedback

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We examine how a combination of credit market and asset quality information can jointly be used in assessing bank franchise value. We find that expectations of future credit demand and future asset quality explain contemporaneous bank franchise value, indicative of the feedback in credit market information and its consequent impact on bank franchise value.

JEL codes: E52, G01, G28.

Keywords: bank franchise value, asset quality, credit demand, information, expectations.

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Introduction

The 2007-2009 financial crisis and subsequent recession is a stark reminder of the importance of the role of credit in the macro economy and banks as major credit intermediaries in the economy. In this study, we examine whether private information on bank-level credit standards, credit demand and asset quality explain changes in a banking firm's franchise value? There are two channels through which changing asset quality could affect the market value of a bank. First, changing asset quality affects the value of on-balance sheet equity. Second, it may affect the value of bank equity through its impact of franchise or charter value (Myers (1977)). Our research is closely aligned with that of Keeley (1990), Demsetz et al. (1996) and Brewer and Saidenberg (1996). We extend their findings on the relationship between franchise value and risk by examining the relationship between franchise value and credit market and quality information.

The credit cycle is laden with information on credit demand and supply reflected in the underlying credit distribution. Under the traditional bank-credit channel, the distribution of loans and lending growth reflect information by banks on the credit quality of their existing loans and potential new loans. Banks use information from the evolving quality of their loan portfolio in their assessment of loan applications. This, however, is not a one-way street as bank assessments of the quality of new loan applications provides information on the risk characteristics and expected performance of previously made loans. As credit markets shift, credit market conditions are likely correlated with unobserved changes in the performance of the loan portfolio. In essence, banks are constantly anticipating deteriorations to their portfolio and juggling the quality of the current as well as future loan portfolio. As shown by Stiglitz and Weiss (1981) the opacity of credit presents lenders with an adverse selection problem, the

riskiness of loan applicants is not independent of the posted loan rate. To resolve this problem banks use credit standards as a second price and hence, an important determinant of the supply of credit. Credit standards may be adjusted by a bank to manage the riskiness of the loan portfolio by adjusting the asset quality of new loans added to the portfolio or in response to changing opacity of credit market information – and by implication, changing severity of agency problems. When a bank balance sheet improves during good times, banks are likely to ease standards. This may be because there is less credit risk on their balance sheet then is optimal and/or because during a strong growth cycle information problems in credit markets are less severe. Hence, during prolonged growth periods banks are more likely to pursue volume as their balance sheets strengthen and as they suffer from disaster myopia.[2] Information on credit demand also has implications on the underlying loan distribution. If loan demand is falling, the bank is likely to pull from the riskier part of the loan distribution, thereby affecting the asset quality of loans in the bank portfolio.

Lown and Morgan (2006) through the use of Senior Loan Officer Opinion Survey (SLOOS) data show that credit standards are more informative about future lending than loan rates. There is a feedback between loan standards and loan volume. Lown et al. (2000) find that there is a strong relationship between loan officers' reports of tighter credit standards and a decline in commercial lending. They find that changes in credit standards are able to predict a decline in business activity. Bassett et al. (2014), find that the effective supply of bank credit is a function is riskiness of the type of loan, bank strategy and response to bank supervision and regulation. As such, a negative shock to credit standards can result in a constriction of the bank credit channel. These are consistent with theoretical findings of Rajan (1994) that banks loosen

[2] See Guttentag and Herring (1981).

their lending standards during good times and grow their loan books during expansionary periods. Bassett et al (2012) conclude that supervisory ratings tend to be stricter with changes in lending standards and changes in bank lending providing evidence of an active bank lending credit channel.

Data and Methodology

We examine publicly-listed bank holding companies (BHCs) with over $10 billion in total assets.[3] The BHC data is obtained from both COMPUSTAT and the quarterly consolidated financial statements of holding companies (FR-Y9C) from 1997:Q1 to 2011:Q3. We keep a holding company-quarter in the sample if any of the BHC bank subsidiaries participate in the confidential Senior Loan Officer Opinion Survey (SLOOS).[4] We utilize the asset quality component ("A") of the confidential supervisory rating (C.A.M.E.L.S) at the bank level the unemployment rate from Haver Analytics[5]. Table 1 reports the summary statistics.

The empirical model is motivated by Keeley (1990) and Beatty and Liao (2011). We model credit market information with both lead, contemporaneous and lag in order to capture either forward-looking or delays in information of credit market and asset quality in explaining the bank's contemporaneous franchise value.

[3] Refer to http://www.ffiec.gov/nicpubweb/nicweb/HCSGreaterThan10B.aspx
[4] Access to confidential SLOOS is restricted to only Federal Reserve Research staff.
[5] Special permission was granted to the Research Department coauthor to merge confidential supervisory CAMELS data (specifically Asset Quality component) with SLOOS data.

$$
\begin{aligned}
TobinsQ_{it} &= \alpha_0 + \beta_1 NonPerformLoans_{it+1} + \beta_2 NonPerformLoans_{it} + \beta_3 NonPerformLoans_{it-1} \\
&+ \beta_4 \Delta AssetQuality_{it+1} + \beta_5 \Delta AssetQuality_{it} + \beta_6 \Delta AssetQuality_{it-1} \\
&+ \beta_7 \Delta CreditStandard_{it+1} + \beta_8 \Delta CreditStandard_{it} + \beta_9 \Delta CreditStandard_{it-1} \\
&+ \beta_{10} \Delta CreditDemand_{it+1} + \beta_{11} \Delta CreditDemand_{it} + \beta_{12} \Delta CreditDemand_{it-1} \\
&+ \beta_{13} Capital_{it+1} + \beta_{14} Capital_{it} + \beta_{15} Capital_{it-1} \\
&+ Bank\ Controls_{it-1} + \Delta UnempRate_{t-1} + u_i + e_{it}
\end{aligned} \tag{1}
$$

In Model (1), the banking firm's franchise value is captured by Tobin's Q. It is regressed on credit standards, perceived credit demand, change in weighted asset quality ratings of the "A" component of C.A.M.E.L supervisory ratings, bank holding company controls as well as the unemployment rate. In order to capture the feedback effects of credit market and credit quality information, we incorporate lead, contemporaneous and lag effects in our model. Bank fixed effects is incorporated into our model.

Hypothesis 1: Future credit quality impacts contemporaneous franchise value

The coefficients of interest to test this hypothesis are β_1 through β_6 . In specification (1), we employ holding company level non-performing loans data. We also utilize asset size weighted asset quality information based on a bank's C.A.M.E.L ratings. In particular we use the change in the asset quality component of C.A.M.E.L.S ratings.

Hypothesis 2: Future credit standards and credit demand impacts current franchise value

The coefficients of interest to test hypothesis 2 are β_7 through β_{12} . Here we postulate that firm level credit standards and credit demand explain contemporaneous Tobin's Q. A credit standards and credit demand diffusion index is computed for each firm using bank level response from the SLOOS.

Results

Table 2 contains results of Equation (1) over 1997 to 2011. To isolate the impact of credit market conditions – the credit standards and credit demand variables – from those of changing asset quality we estimate successive regressions adding blocks of variables. The first specification includes publicly available information on non-performing loans with lead, contemporaneous and lagged specification. We find a negative sign associated with future non-performing loans and lagged non-performing loans. This implies that past non-performing loans and the expectation of future poor quality of loans erodes the banks' franchise value. In specification (2), we include SLOOS bank level credit standards and perceived demand information. We find that an increase future credit standards and credit demand is positively correlated with contemporaneous bank franchise value. Thinking about Tobin's Q as a measure of charter value, the data show that markets assess the impact of information on changing credit conditions and bank responses to them on the value of the real options embedded in the market value of equity. Specification (3) includes confidential supervisory measures of asset quality. Note an increase in the numeric C.A.M.E.L.S asset quality rating corresponds to a decrease in the perceived quality of the bank's assets by bank examiners. Significantly negative coefficients on the asset quality proxies are consistent with a reduction of charter value due to increased costs of financial distress (including increased supervisory intervention) – that is, a reduction in the value of the real options capitalized in market values.[6] The asset quality proxies retain their significance in the fuller model with bank controls in specification (5) and macroeconomic controls in specification (6).

[6] Buser, Chen and Kane (1981)

Conclusion

We find evidence of a feedback loop between bank risk and franchise value where expectation in asset quality deterioration negatively impacts charter values – through increased costs of financial distress and regulatory interference. To the extent that declines in market capitalization of banks due to eroding charter value increases the cost of capital for banking companies, this negative risk-charter value feedback loop has implications for the procyclicality of bank lending, particularly during credit cycle contractions.

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Table 1: Descriptive Statistics

Variable Name	**Variable Description and Construction**	**Source**	**Mean**	**Std. Dev.**
TobinsQ	Ratio of market value to book value of assets	COMPUSTAT	1.074	0.074
NonPerformLoans	Ratio of non-performing loans to total assets	Call Reports	0.003	0.005
Δ*AssetQuality*	Change in the bank asset size weighted asset quality component of regulatory rating	Supervisory CAMEL Ratings	0.005	0.666
Δ*CreditStandard*	The net fraction of loans on a bank's balance sheet that were in categories for which bank reported changing lending standards over the survey period	Senior Loan Officer Opinion Survey (SLOOS)	-0.002	0.259
Δ*CreditDemand*	The net fraction of loans on a bank's balance sheet that were in categories for which bank reported a change in demand over the survey period	Senior Loan Officer Opinion Survey (SLOOS)	-0.013	0.387
Capital	Ratio of total equity to total assets	Call Reports	0.093	0.016
BankControls	Change in the ratio of total loans to total assets	Call Reports	-0.001	0.019
BankControls	Natural Log of total assets	Call Reports	17.537	1.441
BankControls	Ratio of total brokered deposits to total assets	Call Reports	0.005	0.012
Δ*UnempRate*	Change in unemployment rate	BLS-Haver	0.125	1.076

Table 2: Pooled panel regression for bank holding companies. TobinsQ is regressed on determinants credit quality, credit standards and credit demand

TobinsQ	(1)	(2)	(3)	(4)	(5)	(6)
NonPerformLoans(t+1)	-3.925*** (1.204)	-3.935*** (1.073)	-3.976*** (1.033)	-2.716*** (0.877)	-1.562* (0.833)	-1.272 (0.852)
NonPerformLoans(t)	0.424 (0.693)	0.576 (0.640)	0.825 (0.684)	0.080 (0.496)	0.048 (0.539)	0.030 (0.551)
NonPerformLoans(t-1)	-2.105** (0.938)	-2.024** (0.961)	-2.276** (1.060)	-0.624 (1.073)	-0.291 (0.841)	-0.648 (0.869)
Δ*AssetQuality(t+1)*			-0.002 (0.001)	-0.003*** (0.001)	-0.003*** (0.001)	-0.002** (0.001)
Δ*AssetQuality(t)*			-0.005*** (0.002)	-0.006*** (0.002)	-0.005*** (0.001)	-0.005*** (0.001)
Δ*AssetQuality(t-1)*			-0.004*** (0.001)	-0.005*** (0.001)	-0.004** (0.001)	-0.003** (0.001)
Capital(t+1)				-1.258*** (0.193)	-1.068*** (0.205)	-1.035*** (0.205)
Capital(t)				0.025 (0.132)	0.192 (0.135)	0.195 (0.138)
Capital(t-1)				-0.881*** (0.215)	-0.779*** (0.209)	-0.810*** (0.202)
Credit Market Controls						
Δ*CreditStandard (t+1)*		0.010** (0.004)	0.010** (0.005)	0.006 (0.005)	0.000 (0.004)	-0.000 (0.004)
Δ*CreditStandard(t)*		0.002 (0.006)	0.001 (0.005)	-0.006 (0.005)	-0.006 (0.005)	-0.006 (0.005)
Δ*CreditStandard(t-1)*		0.006 (0.008)	0.005 (0.009)	0.000 (0.009)	0.001 (0.008)	0.002 (0.008)
Δ*CreditDemand(t+1)*		0.009* (0.004)	0.009 (0.005)	0.006 (0.009)	0.004 (0.006)	0.004 (0.006)
Δ*CreditDemand(t)*		0.009* (0.005)	0.009* (0.005)	0.006 (0.005)	0.003(0.004)	0.003 (0.004)
Δ*CreditDemand(t-1)*		0.011* (0.006)	0.012* (0.007)	0.010 (0.006)	0.007(0.005)	0.008 (0.005)
Bank Controls						
Δ*TotalLoans(t-1)*					0.121** (0.049)	0.093** (0.046)
LogTotalAssets(t-1)					-0.066*** (0.014)	-0.065*** (0.014)
BrokeredDeposits(t-1)					-0.623** (0.233)	-0.527** (0.255)
Macroeconomic Control						
Δ*Unemprate(t-1)*						-0.003* (0.002)
Constant	1.088*** (0.004)	1.087*** (0.004)	1.086*** (0.004)	1.280*** (0.016)	2.402*** (0.249)	2.384*** (0.250)
No of Obs.	1467	1467	1405	1405	1405	1405
Adj R-square	0.412	0.421	0.420	0.532	0.602	0.604
R-square (within)	0.116	0.134	0.140	0.308	0.414	0.417
R-square (between)	0.138	0.156	0.145	0.187	0.000	0.001
F-statistic	5.090	3.050	4.300	33.870	20.71	37.67
P(value)	0.006	0.010	0.005	0.000	0.000	0.000
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

* denotes significance at the 10% level** 5% level*** 1% level