**Illinois Wesleyan University**

From the SelectedWorks of Elisabeta Pana

January 2010

# Commercial Real Estate Lending Concentrations: New Evidence

Contact Author

Start Your Own SelectedWorks

Notify Me of New Work

Available at: http://works.bepress.com/elisabeta_pana/3

# COMMERCIAL REAL ESTATE LENDING CONCENTRATIONS: NEW EVIDENCE

**Elisabeta Pana**[1]
***Illinois Wesleyan University, USA***
***E-Mail: epana@iwu.edu***

## ABSTRACT

This study documents the management of risk used by small banks with commercial real estate lending concentrations prior to the 2007-2009 financial crisis. We show that banks with commercial real estate concentrations traded interest rate risk for credit risk. The trade-off is accompanied by a higher leverage and liquidity risk. Our findings support the argument advanced by policymakers and academic researchers that the increased scrutiny over banks' lending standards and risk management practices is justified.

**Keywords:** Regulation, Commercial Banks, Lending, Bank Regulations
**JEL classification:** G18, G21, G28

[1] Dr. Elisabeta Pana is an Assistant Professor of Finance at Illinois Wesleyan University, Department of Business Administration, 205Beecher Dr, Bloomington, IL, USA. Tel: 309-556-3130, Fax: 309-556-3719.

The author thanks Kyriakos Tsiappoutas, David Willis, and the participants at the 2010 MBAA International annual meeting. This research was supported by an ASD Grant from Illinois Wesleyan University. Research assistance was provided by Teodora Petrova.

# I. INTRODUCTION

The importance of bank regulation and prudential supervision has been subject of a vivid debate among academic researchers and practitioners. While the debate is on the necessity of adding a macroprudential regulatory approach to an already accepted microprudential approach, it is acknowledged that effective regulatory and supervisory practices at individual bank level remain paramount[2]. Extant literature on the microprudential approach has focused on the cost-benefit analysis of bank-level regulation and supervision. Among others, Peek and Rosengren (1995), Berger, Kyle, and Scalise (2001), and Curry, Fissel, and Ramirez (2006) show that bank supervision has a significant impact on bank lending. Specifically, Peek and Rosengren (1995) find that the reduction in the rate of growth of bank lending during the 1990-91 recession was driven by an active enforcement of capital requirements. Berger, Kyle, and Scalise (2001) argue that changes in the intensity of bank supervision result in significant changes on bank lending, a finding later confirmed by Curry, Fissel, and Ramirez (2006).

One of the recent examples of regulatory interventions related to bank lending is the implementation at the end of 2006 of the Commercial Real Estate guidance, a set of risk management practices aimed at containing a worrisome trend in commercial real estate (CRE) lending. At the core of the CRE guidance is a set of rules designed to identify and place CRE-concentrated banks under enhanced supervisory scrutiny with respect to the adequacy of their loan and credit management[3]. Issued at a time of favorable market conditions, the CRE guidance was "intended to ensure that institutions pursuing a significant commercial real estate lending strategy remain healthy and profitable while continuing to serve the credit needs of the community" (Financial Institutions Letters, FIL 22-2008). However, the importance of imposing appropriate CRE concentration limits became more apparent during the recent market downturn. The period that followed the implementation of the CRE guidance witnessed a significant correction in the housing market, deterioration in the credit market liquidity, and a tightening

[2] "Regulatory restructuring" Chairman Ben S. Bernanke's testimony before the Committee on Financial Services, U.S. House of Representatives, Washington, July 2009

[3] "*Concentrations in Commercial Real Estate Lending, Sound Risk Management Practices*" (2006) issued by the Office of the Comptroller of the Currency, the Board of Governors of the Federal Reserve System, and the Federal Deposit Insurance Corporation.

of the lending terms. Operating in this challenging environment, many banks have been unable to adjust their lending portfolio, failed to implement the risk management practices outlined in the CRE guidance, and were unable to survive as separate entities (Pana, 2010).

The primary objective of this paper is to provide additional evidence on the risk management practices used by small banks prior to the crisis. This study investigates whether the two-criterion screen process outlined in the CRE guidance helped regulators identify banks with inadequate risk management practices in areas other than credit risk. The sample of small banks provides the ideal empirical setting for this analysis because small banks manage risk via on-balance sheet (non-hedged) diversification strategies (DeYoung, Gron, and Winton, 2005). In addition, small banks represent the group of banks most affected by the commercial real estate market correction. This is primarily due to their lack the flexibility to diversify their revenue stream as well as their limited ability to quickly diversify into different geographic areas. The importance of research in this area is also reflected by the fact that the health of the small banks segment is vital not only to small businesses but also to deposit insurance funds (Gilbert and Sierra, 2003; Blasko and Sinkey, 2006).

The evidence contributes to a growing body of literature on the crisis of 2007-2009. We document that prior to the crisis, CRE-concentrated banks traded off their interest rate risk for credit risk. Using commonly accepted measures of risk, we show that the group of banks with CRE concentrations faced a higher liquidity and leveraged risk than those of a comparable group of banks with similar size. However, the delinquency rates for the residential and commercial loan portfolios were consistently lower for the sample of CRE-concentrated banks than for the group of peer banks.

The remainder of this study is organized as follows. The next section presents an overview of the extant theoretical and empirical literature and develops the testable hypotheses. Section 3 describes the sample and presents the methodology and the results. A summary of the main findings concludes the study.

## II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

It is widely acknowledged that the collapse of the housing market was one of the leading causes of the 2007-2009 U.S. financial crisis. The collapse concluded a real estate boom-bust cycle which was fuelled by low interest

rates, strong market demand, and a decrease in lending standards (Dell'Ariccia, Igan, and Laeven, 2008; O'Keefe, 2009). Disturbances in the residential area quickly propagated to the commercial real estate market. In an effort to gain some perspective on the magnitude of the commercial real estate problem, financial regulators have examined the similarities and differences between the recent period and that of the late 1980's to early 1990's (Garner, 2007; Lopez, 2007). One of the salient similarities between the two periods is the large exposure of banks to commercial real estate lending. Although commercial and multi-family constructions represented a smaller share of the economic activity prior to the 2007-2009 financial crisis, many researchers recognized that a weakening in this sector during a period of financial turmoil would pose a greater challenge (Garner, 2007).

The importance of identifying early signs of disturbances and understanding how crises unfold is stressed by the fact that commercial real estate market corrections are usually associated with a long-lasting effect on the banking sector. Cole and Fenn (2008) show that the increase in commercial lending that began in 1982 "was not a factor in the banking failures of 1985-1986" but "became a factor in banking failures beginning in 1987 and was strongly connected to bank failures occurring during 1988-1992." The increase in commercial real estate lending was part of a larger trend characterized by a shift in commercial banks' portfolio of real-estate loans. According to Blasko and Sinkey (2006), the change in commercial banks' portfolio strategy was also exacerbated by risk-based capital regulatory constraints imposed in early 1990s. In order to lower their capital requirements, banks traded credit rate risk for interest rate risk by shifting their portfolios to relatively safe assets such as residential loans.

Two decades later, commercial banks have a significantly different loan portfolio structure. Igan and Pinheiro (2009) argue that "the weight of real estate-related loans has steadily increased since the 1960s, but never has reached the levels observed at the end of 2006 even before or during the crisis of early 1990's." At the end of 2006, commercial real estate loans dominated the asset portfolio of the average small bank. While some researchers warned that the increase in commercial real estate loans was a worrisome trend, others downplayed it by arguing that the increase in commercial real estate lending had been accompanied by an increase in risk-based capital. The fact that the average risk-based capital at CRE-concentrated banks grew more rapidly than the industry median was considered a proof of a conservative bank risk management (Lopez, 2007).

## III. SAMPLE, RISK MEASURES, AND RESULTS

In this study, the empirical analysis is focused on small banks with concentration on CRE loans. A CRE loan is a loan secured by real estate for (1) construction, land development, and other land loans; (2) multi-family residential properties; and (3) non-farm, nonresidential properties. Loans where the cash flow from the real estate is the main source of repayment are classified as CRE loans. The sample of commercial banks is obtained from the Reports of Conditions and Income (Call Reports) database. We apply the two-step screening process outlined by the CRE guidance to identify the group of banks that violated the commercial real estate concentration requirements at the end of 2006. The first criterion is related to aggregate CRE loans for construction, land development, and other land representing 100% or more of bank total capital. The second criterion identifies banks where aggregate CRE loans represent 300% or more of total capital and the CRE portfolios have increased by 50% or more during the prior three-year period. We obtain a sample of 2,325 banks that violated at least one of the CRE lending concentrations criteria at the end of 2006. Each bank identified by the CRE guidance criteria is matched with a bank of similar size from the remaining population of banks.

As opposed to previous studies, we avoid the comparison of CRE-concentrated banks with the remaining population of banks. Such a comparison is problematic, as the two groups significantly differ in size, and hence extend different types of loans (Berger, Miller, Petersen, Rajan, and Stein, 2005; Berger and Bouwman, 2009). We test the two samples of banks for exposure to different specific types of risk by employing the Wilcoxon signed-rank test. Following Stojanovic, Vaughan, and Yeager (2008), we employ several measures of risk for the two samples of banks. First, we use two alternative measures for the leverage risk, the ratio of total equity to percentage of total assets (TE/TA) and the ratio of total qualifying capital allowable under regulatory guidelines to credit-risk-weighted measures of assets and off-balance sheet activity (TC/CRWA). Second, we assess liquidity risk by measuring noncore funding as a percentage of assets (NF/TA) and as loans as a percentage of core deposits (L/CD)[4]. Third, we

[4] Core funding includes deposits that are relatively insensitive to the difference between the interest rate paid by the bank and the market rate, such as checking accounts, savings

assess the interest rate risk by computing the 1-year GAP, defined as the value of the difference between assets and liabilities that reprice within one year, expressed as a percentage of total assets. Following Blasko and Sinkey (2006), we define 1-year GAP measure as the difference between rate-sensitive assets and rates sensitive liabilities, where rate sensitive assets are assets repricing within 12 months and rate sensitive liabilities are liabilities repricing within 12 months. In addition, we define 1-year GAP-best estimate as 1-year GAP plus small longer-term deposits as a percentage of total assets.

We document that, at the end of 2006, the credit risk was accompanied by a higher leverage risk for the sample of CRE-concentrated banks. According to Table 1, the ratio of equity to total assets is significantly lower for the group of banks with commercial real estate concentrations than for the peer group of banks. At the end of 2006, the group of CRE-concentrated banks had an average ratio of equity to total assets of 9.58%, as opposed to a 10.59% for the group of peer banks. We find a similar relationship for the ratio of total qualifying capital allowable under regulatory guidelines to credit-risk-weighted measures of assets and off-balance sheet activity. At the end of year 2006, the average ratio for the group of CRE-concentrated bank is 12.67%, compared with an average of 17.37% for the peer group.

Our results are consistent with the evidence advanced by Lopez (2007) that, prior to the crisis, CRE-concentrated banks faced a higher leverage risk than the peer banks. However, as opposed to his argument that "risk-based capital at CRE-concentrated banks grew more rapidly than at the median bank," we find that the risk-based capital decreased for both groups of banks over a three year period prior to 2006 and the rate of decrease was higher for CRE-concentrated banks. The difference in results might be explained by the fact that we analyze a sample of small CRE-concentrated banks, while Lopez (2007) analyzes the leverage risk management for all CRE concentrated banks.

---

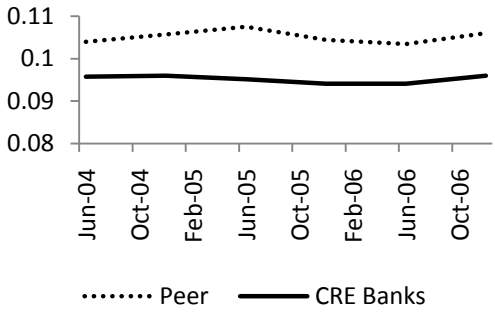
accounts, and small time deposits. Noncore funding includes brokered deposits, jumbo certificates of deposit (CDs over $100,000), and Home Loan Bank advances.

**Table 1: Leverage risk**

This table shows the average for two measures of leverage risk on a semiannual basis over the period 2003 – 2006. The sample of CRE-concentrated banks includes 2325 banks which violated at least one of the two conditions of the CRE Guidance at the end of 2006. The peer group represents a sample of banks matched by size.

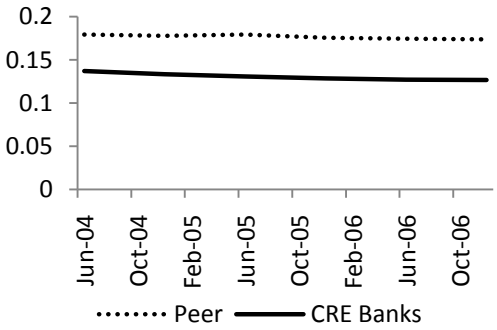
Panel A: Equity as a percentage of total assets (TE/TA)

| Variable TE/TA | CRE-banks | Peer group | Wilcoxon test (z score) |
|---|---|---|---|
| June 2004 | 0.0956 | 0.1039 | 12.0060*** |
| Dec 2004 | 0.0959 | 0.1056 | 12.5987*** |
| Jun 2005 | 0.0951 | 0.1074 | 15.7012*** |
| Dec 2005 | 0.0940 | 0.1043 | -12.8137*** |
| Jun 2006 | 0.0940 | 0.1041 | 11.7207*** |
| Dec 2006 | 0.0958 | 0.1059 | 12.9125*** |




Panel B: Capital as a percentage of credit risk weighted assets (TC/CRWA)

| Variable TC/CRWA | CRE-banks | Peer group | Wilcoxon test (z score) |
|---|---|---|---|
| June 2004 | 0.1370 | 0.1790 | 27.4095*** |
| Dec 2004 | 0.1332 | 0.1779 | 28.9702*** |
| Jun 2005 | 0.1307 | 0.1792 | 31.7059*** |
| Dec 2005 | 0.1286 | 0.1755 | -31.6183*** |
| Jun 2006 | 0.1272 | 0.1743 | 32.3159*** |
| Dec 2006 | 0.1267 | 0.1737 | 32.3174*** |




Next, we extend the analysis of risk management practices for the CRE-concentrated banks and the group of peer banks by investigating the differences in interest rate risk.

At the end of 2006, the average for the 1-year GAP measure of CRE-concentrated banks was -0.2590, significantly different than the -0.3922 average for the group of peer banks. The difference between the two averages remains the same at different points in time over the three year period (2004-2006).

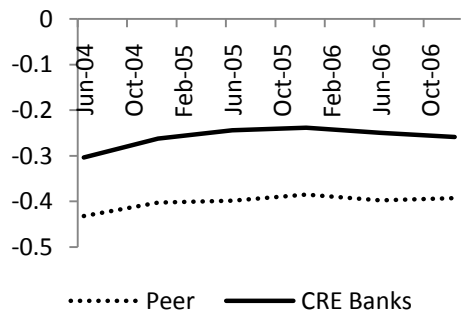
The positive trend observed for the first half of the period is followed by a reversed trend over the second half of the sample period, thus leaving the two measures of interest rate risk basically unchanged at the end of 2006 from their levels by mid-2004 year. However, caution needs to be exercised in interpreting these results, as the 1-year GAP is only a crude measure of interest rate risk.

**Table 2: Interest rate risk**

This table shows the averages for two measures of interest rate risk on a semiannual basis over the period 2003 – 2006. The sample of CRE banks includes 2325 banks which violated the CRE Guidance at the end of 2006. The peer group represents a sample of banks matched by size.

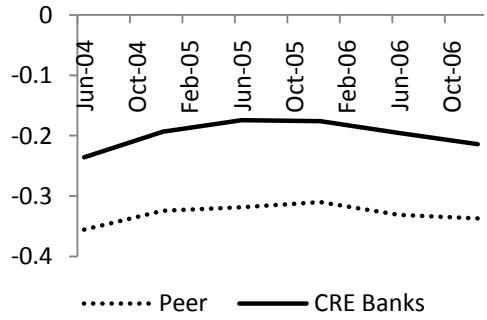
Panel A: 1-year GAP

| Variable 1-Year GAP | CRE-banks | Peer group | Wilcoxon tes (z score) |
|---|---|---|---|
| June 2004 | -0.3029 | -0.4316 | -24.6907*** |
| Dec 2004 | -0.2623 | -0.4021 | -26.0335*** |
| Jun 2005 | -0.2439 | -0.3980 | 28.2003*** |
| Dec 2005 | -0.2385 | -0.3847 | 26.6898*** |
| Jun 2006 | -0.2497 | -0.3971 | -27.1546*** |
| Dec 2006 | -0.2590 | -0.3922 | -24.9469*** |




Panel B: 1-year GAP Best Estimate

| Variable 1-Year GAP | CRE-banks | Peer group | Wilcoxon test (z score) |
|---|---|---|---|
| June 2004 | -0.2356 | -0.3551 | -23.4120*** |
| Dec 2004 | -0.1934 | -0.3240 | -24.9121*** |
| Jun 2005 | -0.1742 | -0.3180 | 27.1073*** |
| Dec 2005 | -0.1760 | -0.3097 | 25.0622*** |
| Jun 2006 | -0.1955 | -0.3310 | -25.3232*** |
| Dec 2006 | -0.2141 | -0.3366 | -23.1607*** |




One might argue that in order a correct assessment of the exposure to interest rate risk should include off-balance sheet items. Nonetheless, the concern about using 1-year GAP as a measure of interest rate risk is partially alleviated by the fact that small commercial banks do not use derivatives, and thus there is no need to include off-balance sheet items (Blasko and

Sinkey, 2006). For purposes of robustness, we analyze the 1-year GAP best estimate, which also reflects the changes in small longer-term deposits. Table 2 documents a similar inverted U-shaped curve for the 1-year GAP best estimate over the three year period, thus reinforcing our findings for the interest rate risk management based on the analysis of 1-year GAP measure.

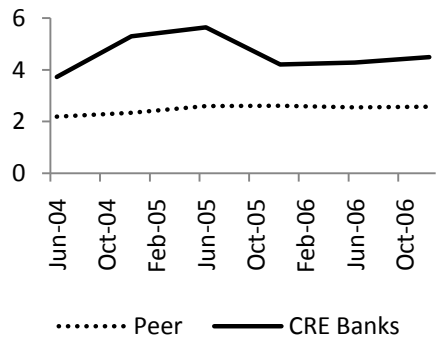
The third group of ratios related to risk management practices includes the ratio of noncore funding as a percentage of assets and the ratio of loans as a percentage of core deposits.

**Table 3: Liquidity risk**

This table shows the averages for two measures of liquidity risk on a semiannual basis over the period 2003 – 2006. The sample of CRE banks includes 2325 banks which violated the CRE guidance at the end of 2006. The peer group represents a sample of banks matched by size.

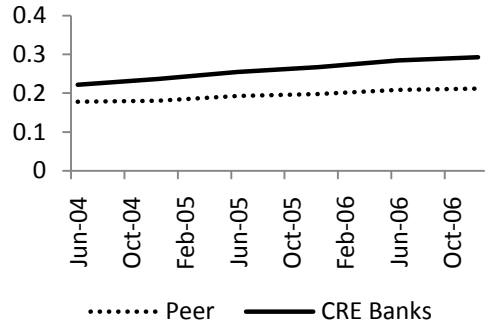
Panel A: Loans to Core Deposits (L/CD)

| Variable L/CD | CRE-banks | Peer group | Wilcoxon test (z score) |
|---|---|---|---|
| June 2004 | 3.7158 | 2.1933 | -25.6164*** |
| Dec 2004 | 5.2833 | 2.3402 | -25.4789*** |
| Jun 2005 | 5.6349 | 2.5985 | 25.0933*** |
| Dec 2005 | 4.1939 | 2.6138 | 24.7673*** |
| Jun 2006 | 4.2669 | 2.5533 | 25.1593*** |
| Dec 2006 | 4.4774 | 2.5814 | -24.8224*** |




Panel B: Noncore funding as a percentage of total assets (NF/NA)

| Variable NF/TA | CRE-banks | Peer group | Wilcoxon test (z score) |
|---|---|---|---|
| June 2004 | 0.2215 | 0.1776 | -11.6170*** |
| Dec 2004 | 0.2361 | 0.1798 | -14.1492*** |
| Jun 2005 | 0.2545 | 0.1923 | -15.3791*** |
| Dec 2005 | 0.2668 | 0.1975 | 17.1165*** |
| Jun 2006 | 0.2843 | 0.2087 | -18.4112*** |
| Dec 2006 | 0.2929 | 0.2119 | -19.8280*** |




The graphs of the two measures of liquidity risk (Table 3) reveal that the two groups of banks experienced a deterioration of liquidity over the sample period. The liquidity risk seems to be a more challenging problem for the sample of CRE-concentrated banks. The liquidity risk of the group of peer

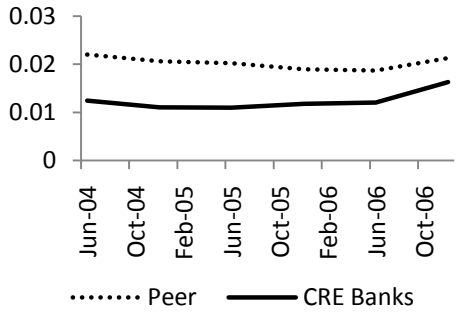
banks at the end of 2006 was the same with the liquidity risk of CRE-concentrated banks at the beginning of the sample period. At the end of 2006, the average ratio of noncore funding to total assets for the group of peer banks was 0.2119, almost equal to the average ratio of 0.2215 for the CRE-concentrated at the end of June, 2004.

Finally, we investigate the loan portfolio quality by analyzing the trend of delinquency rates for the commercial and residential loan portfolio.

**Table 4: Commercial and Residential Delinquency Rates**
This table shows the average commercial and residential delinquencies rates on a semiannual basis over the period 2003 – 2006. The sample of CRE banks includes 2325 banks which violated the CRE guidance at the end of 2006. The peer group represents a sample of banks matched by size.

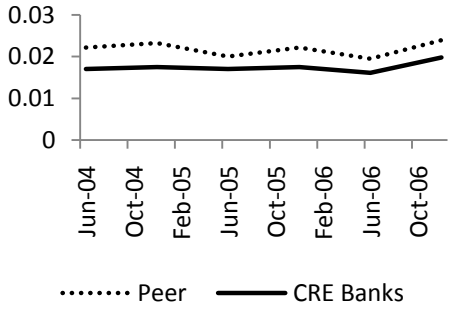
Panel A: Commercial Delinquency Rates (CDR)

| Variable CDR | CRE-banks | Peer group | Wilcoxon test (z score) |
|---|---|---|---|
| June 2004 | 0.0124 | 0.0220 | 10.0254*** |
| Dec 2004 | 0.0110 | 0.0206 | 9.5150*** |
| Jun 2005 | 0.0109 | 0.0202 | 7.7981*** |
| Dec 2005 | 0.0117 | 0.0189 | -6.4280*** |
| Jun 2006 | 0.0120 | 0.0186 | 5.3621*** |
| Dec 2006 | 0.0162 | 0.0212 | 3.5980*** |




Panel B: Residential Delinquency Rates

| Variable CDR | CRE-banks | Peer group | Wilcoxon test (z score) |
|---|---|---|---|
| June 2004 | 0.0170 | 0.0221 | 11.6260*** |
| Dec 2004 | 0.0174 | 0.0232 | 13.0839*** |
| Jun 2005 | 0.0170 | 0.0200 | 10.6602*** |
| Dec 2005 | 0.0174 | 0.0221 | 11.7153*** |
| Jun 2006 | 0.0161 | 0.0194 | 9.9889*** |
| Dec 2006 | 0.0197 | 0.0239 | 9.6752*** |




Interestingly, the delinquency rate for the commercial loans and residential loans portfolio of the CRE-concentrated banks had been significantly lower

than those of the peer group. However, it should be noted that the growth rate of the delinquency rate for the second half of 2006 was higher for the CRE-concentrated banks, an early sign of the huge challenge faced by the CRE-concentrated banks in the years that followed (Table 4).

The reassuring lower delinquency rates of CRE-concentrated banks over the 2004-2006 period may not seem astute in retrospect. However, the delinquency rate of CRE-concentrated banks started deteriorating rapidly during the last two quarters of 2006[5]. The shift in macroeconomic conditions, combined with relaxed risk management practices, was followed by a rapid and in some cases an irreversible deterioration of the asset portfolio. It is also possible that this effect was more pronounced for small banks. Nonetheless, our findings support the argument advanced by Igan and Pinheiro (2009) that the increased scrutiny over banks' lending standards, portfolio performance and risk management practices is justified.

## IV. CONCLUDING REMARKS

The empirical evidence on the dynamics of commercial real estate lending contribute to the literature on banking regulation and provide support to the continuous effort of scholars and policymakers to contain yet another problem arising from the banking sector.

We show that at the beginning of the recent financial crisis CRE-concentrated banks not only faced an increase in credit risk but also a high leverage and liquidity risk. Using two widely established measures of interest risk, we show that CRE-concentrated banks traded interest rate risk for credit risk. Our results that the group of CRE-concentrated banks was not well positioned in terms of risk management practices prior to the recent crisis supports the argument that the issuance of the "*Concentrations in Commercial Real Estate Lending, Sound Risk Management Practices*" guidance at the end of 2006 was necessary.

**REFERENCES**

A.N. Berger, and Bouwman, C.H.S. (2009), Bank liquidity creation, Review of Financial Studies 22, 3779-3837.

[5] Recent reports issued by the Deutsche Bank indicate that the delinquency rate of commercial real estate loans has grown from approximately 0.6% in 2008, to 1.8% at the end of the first trimester of 2009, and reached a high of 4.8% at the end of the second trimester of 2009.

A.N. Berger, Kyle, M.K., and Scalise, J.M. (2001), Did U.S. Bank Supervision Get Tougher during the Credit Crunch? Did They Get Easier during the Banking Boom? Did It Matter to Bank Lending? In Frederic Mishkin, Ed. Prudential Supervision: What works and What Doesn't? Chicago, IL: University of Chicago Press.
A.N. Berger, Miller, N.H., Petersen, M.A., Rajan, R.G., and Stein, J.C. (2005), Does functional follow organizational form? Evidence from the lending practices of large and small banks. Journal of Financial Economics 76 (1), 237-269.
M. Blasko, and Sinkey, J.F. (2006), Bank Asset Structure, Real-Estate Lending, and Risk-Taking. Quarterly Review of Economics and Finance 46, 53-81.
Board of Governors of the Federal Reserve System, Joint Press Release (2006), Concentrations in Commercial Real Estate Lending, Sound Management Practices www.federalreserve.gov/boarddocs/press/bcreg/2006/20061206/default.htm
J. Barth, Caprio G., and Levine R. (2006), Rethinking Bank Regulation: Till Angels Govern, Cambridge University Press, Cambridge MA
T.J. Curry, G. Fissel, and Ramirez, C.D. (2006), The Effect of Bank Supervision on Loan Growth. Federal Deposit Insurance Corporation Center for Financial Research Working Paper 2006-12. http://www.fdic.gov/bank/analytical/cfr/2006/wp2006/
R. DeYoung, Gron, A., and Winton, A. (2005), Risk overhang and loan portfolio decisions, Working Paper, Federal Reserve Bank of Chicago.
J. Freund, Curry, T., Hirsch, P., and Kelley, T, (1997), History of the Eighties: Lessons for the Future, Federal Deposit Insurance Corporation, Volume 1 http://www.fdic.gov/bank/historical/history/vol1.html
Garner, A. (2008), Is Commercial Real Estate Reliving the 1980s and early 1990s? Federal Reserve Bank of Oklahoma, Economic Review, 89-115
R.A. Gilbert, and Sierra, G.E. (2003), The financial condition of U.S. banks: How different are community banks? Working paper, Federal Reserve Bank of St. Louis
D. Igan, and Pinheiro, M. (2009), Exposure to Real Estate Losses: Evidence from the U.S. Banks, IMF Working Paper 09/79, International Monetary Fund
Lopez, J. (2007), Concentrations in Commercial Real Estate Lending, Federal Reserve Bank of San Francisco, Economic Letter, 2007-1
Pana, E. (2010), Have Commercial Real Estate Concentration Limits Encouraged Small Bank Consolidation? Evidence from the Financial Crisis of 2007-2009, Working Paper
J. Peek, and E.S. Rosengren (1997), Have Borrower Concentration Limits Encouraged Bank Consolidation? New England Economic Review, January/February, 37–47.
A.W.Santomero, and Chung, E. (1992), Evidence in Support of Broader Banking Powers, Financial Markets, Institutions, and Instruments, 1, 1-69.
D. Stojanovic, Vaughan, M., and Yeager T. (2008), Is the Federal Home Loan Bank System Good for Banks? A Look at Evidence on Membership, Advances and Risk, Journal of Banking and Finance 32, 680-698.