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Analysis of Bank Performance in California and the Rest of the Twelfth Federal Reserve District

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ANALYSIS OF BANK PERFORMANCE IN CALIFORNIA AND THE REST OF THE TWELFTH FEDERAL RESERVE DISTRICT

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ABSTRACT

In this study I examine the performance and sensitivity of performance to macro factors of banks headquartered in California and banks headquartered in the rest of the states in the Twelfth Federal Reserve District. I find that prior to the financial crisis which started in the fourth quarter of 2007 the non-California banks outperformed California banks; however, towards the end of the financial crisis California banks outperformed non-California banks. I also find higher macro factor sensitivities of non-California banks indicating more macro risk carried by these institutions. The higher risk explains the superior performance in expansions and underperformance in recessions of these banks. This fact suggests that non-California banks in the 12th Federal Reserve District are more nationwide oriented whereas California banks still tend to focus more on the local California economy.

INTRODUCTION

Bardhan and Walker (2010) document the effects of the "Great Recession" in the US and suggest that California has been in the foundation of this crisis. They argue that the mortgage problems intensity has been amplified by the activities of the banking sector. The study by Bardhan and Walker (2010) is related to a much more fundamental question addressed earlier by Allen (2001) – Do financial institutions matter and what is their role in society? Allen (2001) discusses the fact that in finance theory the perspective of individual investors is taken and the role of institutions is ignored. However, in reality investors usually do not directly invest in financial assets but rather invest indirectly through financial institutions. Considering the most recent crisis where institutions have clearly destroyed value their importance becomes apparent. Therefore, more research is needed in relation to the financial institutions importance, both theoretical and empirical.

In this study I examine the performance of banks headquartered in California in comparison to banks headquartered in the rest of the states in the Twelfth Federal Reserve District around the most recent crisis. I propose a new way of examining interstate banking integration and performance by using a macro factors framework developed by Chen, Roll, and Ross (1986). I examine what is the sensitivity of the sample of banks' performance to the Chen, Roll, and Ross (1986) macro factors. This is a new way of approaching the problem because most regional bank studies tend to focus on the relation of bank performance and local factors, not macro factors.

This study attempts to fill the void in the bank performance literature by examining the relation of bank performance and the overall market conditions. I find that California has more banks than the rest of the states in the 12th Federal Reserve District combined which is not surprising considering that California is the 8th largest economy in the world. I also find that prior to the financial crisis which started in the fourth quarter of 2007 the non-California banks outperformed California banks; however, towards the end of the financial crisis California banks outperformed non-California banks. Additionally, I find that this better performance is due to the fact that non-California banks bear more macro risk. The higher correlation with the macro factors suggests that non-California banks in the 12th Federal Reserve District are more interstate oriented relative to California banks which still tend to focus on the local California economy.

The paper is organized as follows. The next section, Section 2 discusses relevant literature. Section 3 gives a brief description of used methodology. Section 4 describes data used in the study and provides discussion of major findings and robustness tests. Section 5 offers robustness tests and Section 6 concludes the analysis.

LITERATURE REVIEW

This paper expands on the Clark-Neely and Wheelock (1997) study of the factors affecting the performance of banks across states. They find that bank earnings are predominantly related to the local state business climate and to a lesser extent to the national economy business climate. This paper is also related to a study by Levonian (1994) who examines the benefits of diversification in the Twelfth Federal Reserve District. He shows that the cross correlations of bank returns in the district suggest great potential for diversification. However, the Clark-Neely and Wheelock (1997) and the Levonian (1994) studies have been performed prior to the passage of the Riegel-Neal Interstate Banking and Branching Efficiency Act of 1994. This act allows for diversification of bank operations across states, which naturally has had an influence on bank performance. This fact calls for re-examination of the relation of bank performance and the national economy business climate and motivates this study. During the time of Riegel-Neal, Glass-Steagall has been active. Glass-Steagall created the Federal Deposit Insurance Corporation and clearly delineated the three banking sectors - commercial banking, investment banking and insurance business. The act was intended to break the “House of Morgan” in 1933. Gramm-Leach-Bliley act repealed Glass-Steagall in 1999 and allowed activities in all three sectors of banking regardless of the institution. Many blame the financial deregulation of Gramm-Leach-Bliley for the most recent financial crisis (Paletta and Scannell, 2009).

Other studies have examined the benefits interstate bank diversification; however, to the best of my knowledge this is the first study to examine bank performance and correlation with national economy and the first study to use Chen, Roll, and Ross (1986) macro factors as proxies of the state of the national economy. Rose (1996) examines the accelerated interstate diversification of banks due to state changes enabling interstate diversification and also the passage of the Riegel-Neal

Interstate Banking and Branching Efficiency Act of 1994 which became effective in 1997. The author finds increased risk levels of firms engaged in interstate diversification. Rose identifies threshold diversification levels by different geographic classifications. He finds that if a bank is present in three or more Federal Reserve Bank districts it would experience lower insolvency probability and volatility of return on equity. Rose also finds lowest correlation ratios among small and medium sized banks, which suggests that they would benefit the most from interstate diversification. He finds that the largest banks have high correlations indicating lower diversification benefits if combined. In contrast to Rose's (1996) findings, Shiers (2002) finds that economic and geographic diversification reduce bank risk.

Zou, Miller and Malamud (2011) concur with Rose's (1996) findings that small banks experience decrease in risk levels due to interstate diversification. Zou, Miller and Malamud find that medium-sized banks experience increase in risk due to the interstate diversification. They find mixed results for large banks. They also find that small and medium sized banks' performance is related to state level macro variables but that large bank performance is not related to state level macro variables.

The Federal Reserve District Banks provide several studies of bank performance conducted naturally by region. For example, Zimmerman (1996) examines the performance of California community banks. These banks have small scale operations heavily influenced by local real estate and building conditions. The author finds underperformance of these banks relative to larger scale state banks which he endows to the local market focus.

METHODOLOGY

In this study I attempt to answer the question: "Do banks in California indeed perform worse than banks headquartered in the rest of the states in the Twelfth Federal Reserve District during the most recent crisis?" as suggested by Bardhan and Walker (2010). Thus, the working null hypothesis of this study is that California banks have worse performance than non-California banks in the 12th Federal Reserve District. I perform univariate and multivariate analysis to test the hypothesis.

First, I examine the state and performance of California banks and banks in the remaining states in the Twelfth Federal Reserve District. The Twelfth Federal Reserve District includes the following nine states - Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, Utah, and Washington. The Twelfth District also includes the following US territories which are excluded from the analysis - Guam, American Samoa, and the Northern Mariana Islands. I use return on equity (ROE) and return on total assets (ROA) as measures of bank performance.

I also examine how the performance of California and non-California banks correlates with Chen, Roll, and Ross's (1986) macro factors. The regression analysis using these factors as independent variables produces factor loadings which can be interpreted as macro risk sensitivities of the examined banks. Chen, Roll, and Ross (1986) consider as factors the spread between long and short term interest rates (UTS),

expected (DEI) and unexpected (UI) inflation, change in industrial production (MP), high and low grade bonds spread (UPR), and change in oil prices (OP). In this study, I examine how well returns of banks in California and the rest of the Twelfth Federal Reserve Bank District correlate with Chen, Roll, and Ross (1986) macro factors.

I retrieve Industrial Production: Major Industry Group (manufacturing by SIC) seasonally adjusted data, 3-month T-Bill rate of returns, 10 year maturity government bond nominal returns and Moody's Seasoned Baa rated corporate bond returns from the Federal Reserve website with a base of 100 set in 2002. The Federal Reserve website is: http://www.federalreserve.gov. The inflation data, Consumer Price Index: US All Item with the base of 100 set in 1982-1984, are from the Bureau of Labor Statistics. The Bureau of Labor Statistics website is: http://data.bls.gov. The price of oil is obtained from the United States Department of Energy. The United States Department of Energy website is: http://tonto.eia.doe.gov/dnav/pet/pet_pri_spt_s1_m.htm. The expected inflation data for the period February, 1997 to end of 2007 using Treasury Inflation Protected Securities (TIPS) are obtained from the Federal Reserve Bank of Cleveland. The Federal Reserve Bank of Cleveland website is: http://www.clevelandfed.org/research/data/tips/index.cfm. The way the Cleveland Fed calculates expected inflation is by subtracting the return on the TIPS bond from an appropriate treasury note, and by compensating for two specific types of biases: inflation premium bias and liquidity bias. The unexpected inflation is then calculated by subtracting expected inflation from the actual inflation rate.

I use multivariate analysis to examine what is the relation of bank performance and the national economy. The regression analysis factor loadings can be interpreted as macro risk sensitivities of the examined banks. The multivariate analysis model that I use in this study to test this relation is as follows:

$$P_{i,q} = \beta_0 + \beta_1 UTS_q + \beta_2 DEI_q + \beta_3 UI_q + \beta_4 MP_q + \beta_5 UPR_q + \beta_6 OP_q + \sum_{j=7}^{n} \beta_j V_{j,i,q} + \varepsilon_q, \quad (1)$$

where $P_{i,q}$ is the performance measure, ROE or ROA for bank i in quarter q, UTS_q is the spread between long and short term interest rates in quarter q, DEI_q is expected inflation in quarter q, UI_q is unexpected inflation in quarter q, MP_q is industrial production in quarter q, UPR_q is high and low grade bonds spread in quarter q, OP_q is oil price in quarter q, $V_{j,i,q}$ are control variables for firm i in quarter q and ε_q is the error term. Similar to Shiers (2002) I use several control variables in the regression analysis. The control variables that I use in this study are a dummy variable accounting for the crisis period of 2007, total bank deposits, number of domestic bank offices, small, medium and large banks dummy variables, credit card banks, savings and commercial banks. The 2007 crisis period dummy variable can be used to test directly the null hypothesis of the study.

DATA AND ANALYSIS

The data used in this study are quarterly and are obtained from the Federal Deposit Insurance Corporation's website for the period fourth quarter 2002 until first

quarter 2011. The Federal Deposit Insurance Corporation's website is: http://www2.fdic.gov/idasp/main.asp.

First, I examine the relative performance of California banks and banks in the remaining states in the Twelfth Federal Reserve District. The bank samples in the two regions are relatively similar in size: there are 442 unique bank institutions in California and 435 unique banks in the rest of the 12th Fed District in the examined period. The fact that California has more banks than the rest of the states in the 12th Federal Reserve District combined is not surprising considering that California is the 8th largest economy in the world. Table 1 provides descriptive statistics on total assets, equity, net income, return on assets, return on equity and debt ratio over 34 quarters. The table indicates that the banks in California are on average smaller than the non-California banks in the examined period. The average total assets of California banks are $2,108,640,000 whereas the average total assets of non-California banks are $3,854,355,000. The table also shows that banks in California have equity capital of $221,839,000 than non-California banks which have $430,501,000, which naturally translates to higher debt ratios of California banks versus non-California banks. California banks' net income is on average $11,335,000 whereas the non-California bank average net income is higher at $18,219,000. This however might be due to the fact that the non-California banks are larger. Thus, to eliminate the influence of size in the analysis I employ relative performance measures return on assets and return on equity.

TABLE 1
DESCRIPTIVE STATISTICS

California Banks

	Assets	Equity	Net Income	Return On Equity	Return On Assets	Debt Ratio
N	10032	9999	9999	9997	9999	9999
Mean	2108640	221839	11335	3.25%	0.11%	86%
Standard Deviation	12786784	1262976	123500	21.51%	3.04%	13%
Minimum	1782	-4565197	-4585493	477.32%	-54.95%	1%
Maximum	310278210	25244641	3729000	207.89%	27.05%	119%

Non-California Banks

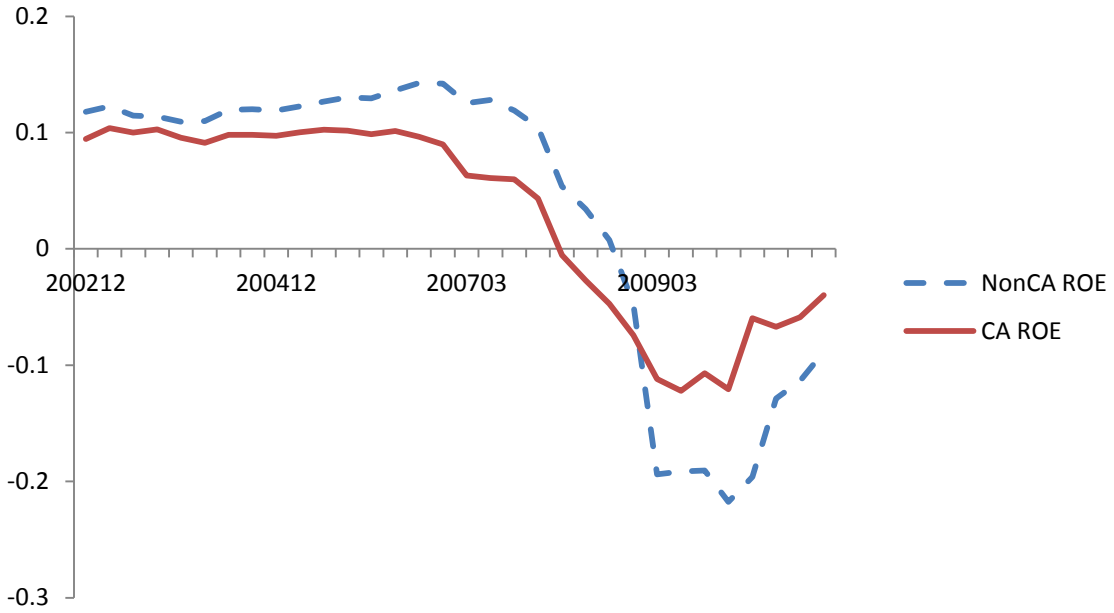
	Assets	Equity	Net Income	Return On Equity	Return On Assets	Debt Ratio
N	10839	10839	10839	10836	10839	10839
Mean	3854355	430501	18219	4.30%	0.82%	85%
Standard Deviation	48241967	4396494	227208	42.06%	9.24%	14%
Minimum	1391	-40551	-6215000	2273.91%	-119.63%	0%
Maximum	1292503000	127090000	9338000	459.24%	274.21%	116%

Assets is total assets, and equity is total shareholders' equity. Assets, equity, and net income are measured in dollars. Data is from the fourth quarter of 2002 until first quarter of 2011.

California banks exhibit smaller return on assets and return on equity levels than non-California banks. The California banks' return on equity and return on assets performance measures are 3.25% and 0.11%, whereas the non-California bank performance measures are 4.30% and 0.82%, respectively.

Thus, at a first glance the average performance of California banks is worse than the performance of banks in the rest of the 12th Federal Reserve District in the examined period, which is in support of the working null hypothesis. However, when the performance measures are examined across time this fact becomes less certain. The temporal behavior of return on equity of California and non-California banks is presented in Figure 1. Indeed prior to the financial crisis which started in the fourth quarter of 2007 and finished in the second quarter of 2009, as defined by the National Bureau of Economic Research, http://www.nber.org/cycles.html, the non-California banks outperformed California banks. However, towards the end of the financial crisis California banks have better average return on equity ratio, which rejects the working null hypothesis of the study. This means that it might be difficult to give an unambiguous answer to the research question of the study.

FIGURE 1
TEMPORAL BEHAVIOR OF RETURN ON EQUITY



The temporal behavior of return on assets of California and non-California banks is depicted on Figure 2. Again, prior to the financial crisis non-California banks outperformed California banks; however, towards the end of the crisis California banks have better average return on assets but this better performance almost disappears in the end of the period. In contrast, the California banks superior return on equity ratios towards the end of the period is much more pronounced and does not disappear.

FIGURE 2
TEMPORAL BEHAVIOR OF RETURN ON ASSETS

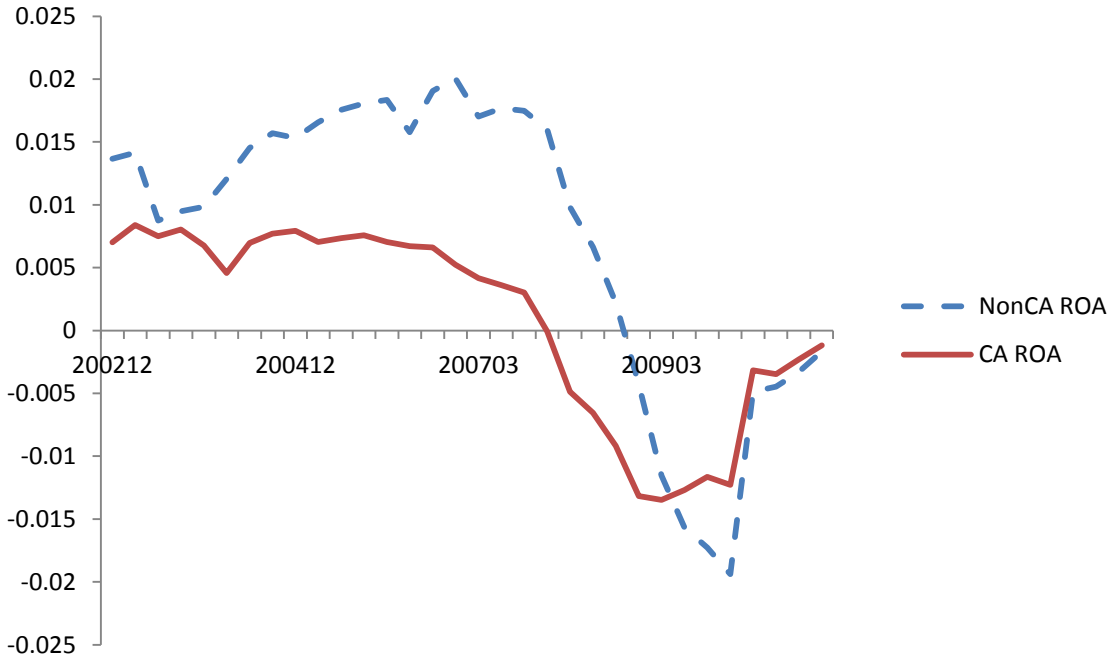


Table 2 provides descriptive statistics of macro variables used in this study. The descriptive statistics table shows average negative expected inflation rate in the period indicating deflationary sentiment in the economy. However, the average unexpected inflation in the period also appears to be negative indicating that the expectations of deflationary environment on average did not materialize. These facts only indicate the highly volatile state of the economy in the examined period which can be explained with the recent financial and economic crisis.

TABLE 2
MACRO VARIABLES DESCRIPTIVE STATISTICS

Variable	N	Mean	Standard Deviation	Minimum	Maximum
UTS	34	0.0205	0.0127	-0.0038	0.0358
DEI	34	-0.1521	0.8631	-3.5351	0.8622
UI	34	-0.0151	0.0115	-0.0423	0.0027
MP	34	0.0008	0.0201	-0.0610	0.0221
UPR	34	0.0263	0.0103	0.0156	0.0601
OP	34	0.0562	0.1771	-0.6050	0.4527

UTS is the spread between long and short term interest rates, DEI is expected inflation, UI is unexpected inflation, MP is change in industrial production, UPR is high and low grade bonds spread, and OP is change in oil price.

Similar to Chen, Roll, and Ross (1986) I compute cross correlations among the macro variables. Table 3 provides these correlation coefficients. The table provides

Pearson Correlation Coefficients. The largest correlation coefficients are among the change in industrial production and the spread between high and low grade bonds.

TABLE 3
MACRO VARIABLES CORRELATION TABLE

	UTS	DEI	UI	MP	UPR	OP
UTS	1.0000					
DEI	-0.1717	1.0000				
UI	0.2165	-0.1783	1.0000			
MP	-0.0876	0.6253	0.1519	1.0000		
UPR	0.4941	-0.5735	-0.0763	-0.7938	1.0000	
OP	0.0987	-0.1775	0.6509	0.2273	-0.2995	1.0000

UTS is the spread between long and short term interest rates, DEI is expected inflation, UI is unexpected inflation, MP is change in industrial production, UPR is high and low grade bonds spread, and OP is change in oil price. Pearson Correlation Coefficients, N = 34.

The highest correlation here is different from the Chen, Roll, and Ross (1986) study. Chen, Roll, and Ross find that the largest correlation is between the spread of long and short term rates and the spread of high and low grade bonds. This difference might be due to a structural change in the economy due to the proliferation of junk bonds in recent times in contrast to the conditions at the time of the Chen, Roll, and Ross (1986) conducted over two decades ago. This difference might also be intensified by the financial crisis.

Next, I study how sensitive are the returns of banks in California and the rest of the Twelfth Federal Reserve Bank District to the Chen, Roll, and Ross (1986) macro factors. Table 4 provides multivariate cross section - time series analysis results for California and non-California banks when the dependent variable is returns on equity. The multivariate analysis is performed based on a model as defined in equation (1). The non-California banks' factor loadings are higher than the factor loadings of California banks either when return on equity or return on assets is used as the dependent variable.

When I examine return on equity not all macro factors are statistically significant. The expected and unexpected inflation and industrial production factors have statistically significant loadings for both the California and non-California samples and in addition the non-California sample has the difference between long and short term yields also as being statistically significant. Chen, Roll, and Ross (1986) also find that the change in oil prices is not statistically significant; however, they find that the difference between long and short term yields and high and low grade bonds are statistically significant. This is in contrast to my findings but it might be due to the fact that I do not use market data for the banks that I study.

TABLE 4
REGRESSION RESULTS FOR RETURN ON EQUITY AND RETURN ON ASSETS

Dependent Variable:	Return On Equity				Return On Assets			
Independent	California		Non-California		California		Non-California	
Variable	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value	Coefficient	p-value
Intercept	0.0504***	<0.001	0.0852***	<0.001	0.0057***	<0.001	0.0267***	<0.001
UTS	-0.0636	0.295	-0.4012***	0.001	-0.0146*	0.084	-0.0682***	0.005
DEI	0.0064***	<0.001	0.0136***	<0.001	0.0005***	<0.001	0.0009**	0.017
UI	0.2054***	0.001	0.3642***	0.002	0.0199**	0.019	0.0314	0.203
MP	-0.1772***	0.001	-0.5959***	<0.001	0.0075	0.332	-0.0053	0.812
UPR	-0.0651	0.667	-0.2782	0.354	0.0106	0.613	0.0244	0.691
OP	0.0007	0.870	-0.0003	0.972	0.0003	0.632	0.0011	0.545
Crisis	-0.0374***	<0.001	-0.0486***	<0.001	-0.0033***	<0.001	-0.0042***	<0.001
LDEP	-0.0012**	0.038	0.0018*	0.073	-0.0009***	<0.001	-0.0004*	0.065
OFFDOM	-0.000019*	0.056	-0.000026**	0.042	0.000003**	0.013	-0.000001	0.729
SMALL BANK	-0.0335***	<0.001	-0.0174***	<0.001	-0.0078***	<0.001	-0.0057***	<0.001
MEDIUM BANK	-0.0100***	<0.001	-0.0044	0.134	-0.0023***	<0.001	-0.0015**	0.011
LARGE BANK	0.0205***	<0.001	0.0175**	0.013	0.0016**	0.020	0.0014	0.325
INSTCRD			0.0280***	<0.001			0.0061***	<0.001
INSSAVE	0.0038**	0.033	-0.0012	0.712	0.0009***	<0.001	-0.0003	0.674
DR	0.0054	0.310	-0.0571***	<0.001	0.0116***	<0.001	-0.0179***	<0.001
N		9689		10477		9691		10480
Adjusted R-Squared		0.1752		0.0850		0.1906		0.0392

UTS is the spread between long and short term interest rates, DEI is expected inflation, UI is unexpected inflation, MP is change in industrial production, UPR is high and low grade bonds spread, and OP is change in oil price, crisis is a dummy variable of one after crisis starting in the fourth quarter of 2007 and zero otherwise, LDEP is natural logarithm of total bank deposits and OFFDOM is the number of domestic offices, DR is debt ratio. SMALL BANK take a value of 1 for assets up to $100 million, MEDIUM BANK take a value of 1 for assets between $300 million and $1 billion, and LARGE BANK takes a value of 1 if assets exceed $15 billion. INSTCRCD is a dummy variable for credit card institution and INSSAVE is insured savings institution. Significant difference from zero at the 10%, 5% and 1% level is denoted with *, ** and ***, respectively.

All statistically significant coefficients are larger for the non-California sample than they are for the California sample. For example, the expected and unexpected inflation and industrial production coefficients for the California sample are 0.0064, 0.2054 and -0.1772, respectively, whereas the coefficients for the same macro factors but for the non-California sample are almost twice as high, 0.0136, 0.3642 and -0.5959, respectively.

When I examine return on assets only the spread between long and short term interest rates and expected inflation factor loadings are statistically significant. The California sample spread between long and short term interest rates and expected inflation factor loadings are -0.0146 and 0.0005, respectively; whereas the non-California sample factor loadings are again almost double, -0.0682 and 0.0009, respectively.

The higher regression coefficients mean that the non-California banks exhibit higher sensitivity to the macroeconomic conditions and also that they bear more macro risk. The higher risk explains the higher returns in the expansion period of the economic cycle but also explains the underperformance of the non-California banks in the recession period of the business cycle. This fact that non-California banks are more sensitive to the macro conditions suggests that non-California banks in the 12th Federal Reserve District are more interstate oriented relative to California banks. This also suggests that California banks appear to be still more focused on the local California economy.

I use control variables as designated in equation (1) to account for company specific factors and factors identified in the prior literature as potentially having an impact on the bank performance in the period besides the macro factors. The control variables that I use in this study are a dummy variable accounting for the crisis period starting in 2007, total bank deposits, number of domestic bank offices, small, medium and large banks dummy variables, credit card institution dummy, insured commercial banks and insured savings institutions dummy variables and debt ratio.

Zou, Miller and Malamud (2011) use the following bank categories: small banks - banks with assets up to $100 million, next to small banks with assets between $100 million and $300 million, medium sized banks - banks with assets between $300 million and $1 billion, banks next to large banks with assets between $1 billion and $15 billion, and large banks - banks with assets exceeding $15 billion. In a similar fashion I separate the sample of California and non-California banks into groups; however I use only three groups, small, medium and large banks and use dummy variables to identify these banks. I also control for credit card institutions. Credit card institutions are those banks which have total loans greater than 50% of total assets and credit card loans greater than 50% of total loans. Note that there are no credit card institutions in California.

The control variables are mostly significant when either return on equity or return on assets is used as a dependent variable. The dummy variable for the crisis period is negative indicating that during the recession both return on equity and return

on assets decrease. The coefficient is larger for the non-California sample, -0.0486, compared to -0.0374 for the California sample when return on equity is the dependent variable (when return on assets is the dependent variable the coefficients are -0.0042 and -0.0033 for the non-California and California samples, respectively) suggesting much greater underperformance of non-California banks relative to California banks during the crisis.

The regression results also show that the larger the bank institution (California or non-California), in terms of total assets, the higher the performance measure (both return on equity and return on assets); alternatively, the smaller the bank institution (in both regions) the lower the bank performance. Insured savings institutions tend to have higher performance and statistical importance in California whereas there is no statistical importance of this characteristic for non-California banks. The California banks sample is also characterized with lack of credit card institutions. It is natural to assume that credit card institutions are more nationwide oriented than savings and commercial bank institutions which might help explain the higher macro risk sensitivity of non-California banks and more local orientation of California banks.

ROBUSTNESS TESTS

Robustness tests are conducted to examine the stability of the macro variables regression coefficients. The additional robustness tests are performed by using different model specification based on excluding variables from the regression model defined in equation (1). The macro factor loading results are robust to the alternative model specifications. As an additional robustness check a commercial bank dummy is used instead of the savings bank dummy because both dummy variables cannot be used at the same time in order to have a specified model. Results are the same regardless which dummy variable is used, the insured commercial institution or the insured saving institution dummy variable.

As an additional robustness test I use market returns instead of ROE and ROA. The market returns are obtained from CRSP. However, the CERTs available in the original Federal Reserve database cannot be used in CRSP. The only way to obtain CRSP data is by matching CERT numbers, RSSID numbers and PERMCOs. I manually retrieve each bank's RSSID number by matching it with the banks CERT number through the Federal Reserve's website: http://www.ffiec.gov/nicpubweb/nicweb/SearchForm.aspx. Then I identify the banks PERMCO by matching the bank's RSSID to its corresponding PERMCO through the New York Fed's database of RSSID and PERMCO's. The New York Fed's website, which has been used to obtain RSSIDs and PERMCOs is: http://www.newyorkfed.org/research/banking_research/datasets.html. After I obtain the PERMCOs I retrieve market return data from the Center for Research in Security Prices (CRSP).

TABLE 5
DESCRIPTIVE STATISTICS, BANKS WITH MARKET DATA

California Banks

	QRET	Assets	Equity	Net Income	Return On Equity	Return On Assets	Debt Ratio
N	1002	1002	1002	1002	1002	1002	1002
Mean	0.0011	4247533	487057	22169	7.40%	0.88%	0.88%
Standard Deviation	0.2256	8260261	1177925	69431	21.83%	2.27%	0.12%
Minimum	-0.8779	132590	11264	-537335	-244.90%	-28.37%	0.06%
Maximum	1.2039	66890239	9028897	572032	91.97%	16.39%	0.98%

Non-California Banks

	QRET	Assets	Equity	Net Income	Return On Equity	Return On Assets	Debt Ratio
N	636	636	636	636	636	636	636
Mean	-0.0069	4080026	1147487	16855	2.12%	0.46%	0.87%
Standard Deviation	0.2320	6837059	4777915	108214	28.55%	2.01%	0.13%
Minimum	-0.7648	15861	-11085	-830332	-318.16%	-13.45%	0.03%
Maximum	2.5266	46048007	31921253	1059404	54.62%	5.72%	1.02%

QRET is quarterly bank stock returns. Assets is total assets, and Equity is total shareholders' equity. Assets, Equity, and Net Income are in dollars. Data is fourth quarter of 2002 until first quarter of 2011.

Naturally, the sample of California and non-California banks shrank, because only large organizations are publically traded. The sample of unique California banks decreased to 45 banks; whereas the sample of non-California banks decreased to 25 unique institutions. Thus, even though the banks in the non-California 12th district are larger, they tend not to be publicly traded.

Table 5 provides the descriptive statistics of the banks left in the sample over the examined period. Clearly, contrary to the working null hypothesis of the paper the California banks on average outperform non-California banks. The California banks average quarterly return is 0.11%, whereas the non-California banks average quarterly return is -0.69% over the examined period. The California banks average ROE is also higher than the non-California banks returns, 7.4% against 2.12%, respectively, but the California banks ROA is lower. In contrast to the full sample of banks, the California banks with publicly traded stocks are larger when assets are used than non-California banks, whereas in the full sample non-California banks are larger.

TABLE 6
REGRESSION RESULTS FOR QUARTERLY STOCK RETURNS

Variable	Coefficient	p-value	Coefficient	p-value
Intercept	0.2642***	0.001	0.3779**	0.027
UTS	7.4433***	<.001	4.8821***	<.001
DEI	-0.0567***	<.001	-0.0351**	0.024
UI	0.0393	0.960	-1.0173	0.325
MP	-0.4827	0.507	-0.6108	0.536
UPR	-12.2982***	<.001	-9.9875***	<.001
OP	-0.2499***	<.001	-0.2456***	0.002
Crisis	-0.0971***	<.001	-0.0917***	0.001
LDEP	0.0046	0.472	-0.0209*	0.055
OFFDOM	-0.0004***	0.001	0.0006**	0.044
SMALL BANK				
MEDIUM BANK	0.0037	0.922	0.0029	0.945
LARGE BANK	0.1135***	0.005	0.0157	0.770
INSSAVE	-0.0183	0.384	0.0005	0.979
DR	-0.1149	0.201	0.0669	0.498
N		1002		636
Adjusted R-Squared		0.1955		0.137

UTS is the spread between long and short term interest rates, DEI is expected inflation, UI is unexpected inflation, MP is change in industrial production, UPR is high and low grade bonds spread, and OP is change in oil price, crisis is a dummy variable of one after crisis starting in the fourth quarter of 2007 and zero otherwise, LDEP is natural logarithm of total bank deposits and OFFDOM is the number of domestic offices, DR is debt ratio. Dummies are used for medium banks have assets between $300 million and $1 billion, and large banks have assets exceeding $15 billion. INSSAVE is insured savings institution. Significant difference from zero at the 10%, 5% and 1% level is denoted with *, ** and ***, respectively.

Due to the fact that there are no small publicly traded banks as per the above discussed criteria and no credit card institutions in California the regression analysis is performed on all of the equation (1) variables with the exception of the small bank dummy variable and the credit card dummy variable. The regression results based on market returns are presented in Table 6.

Similar to the accounting data results California large banks experience higher market returns. However, in contrast to the accounting data California banks have suffered slightly more during the recession than non-California banks. If you recall, when the accounting data and the much larger sample of banks were used, on average, non-California banks performed worse than California banks, even though both sets of banks underperformed. This is most likely due to the fact that when market returns are used the sample is smaller and consists only of large publicly traded banks. Also, in contrast to the accounting rates of return the macro variables factor loadings are larger for California banks. This implies higher macro risks for the larger publicly traded California banks, relative to the larger publicly traded non-California banks. Also, in contrast to the accounting data results some variables lose statistical significance whereas other variables gain statistical significance. The variables that lose statistical significance are the unexpected inflation, change in industrial production, natural logarithm of total bank deposits, medium banks and the debt ratio variable. The variables that become significant in the sample of publicly traded banks are the high and low grade bonds spread and change in oil price.

CONCLUSION

In this study I examine the performance and performance correlation with Chen, Roll, and Ross (1986) macro factors of banks headquartered in California in comparison to banks headquartered in the rest of the states in the Twelfth Federal Reserve District. I attempt to find an answer to the question: "Do banks in California indeed perform worse than banks headquartered in the rest of the states in the Twelfth Federal Reserve District during the most recent crisis?" as suggested by Bardhan and Walker (2010).

I find that prior to the financial crisis which started in the fourth quarter of 2007 and finished in the second quarter of 2009 the non-California banks outperformed California banks; however, towards the end of the financial crisis California banks have better average return on assets and return on equity ratios. I also find that the non-California banks' factor loadings in the multivariate analysis are higher than the factor loadings of California banks both when return on equity and return on assets is used as the dependent variable. The higher regression coefficients mean that the non-California banks exhibit higher sensitivity to the macro economic conditions and also that they bear more macro risk. The higher risk explains the higher returns in the expansion period of the economic cycle but also explains the underperformance of these banks in the recession period of the business cycle. This fact suggests that non-California banks in the 12th Federal Reserve District are more interstate oriented relative to California banks which still tend to be focused on the local California economy. This study can be used as a model for banking policy modifications. Policymakers can use the framework

developed in this paper to assess risk in the banking sector from macro perspective, which is not commonly done considering the regional focus of bank operations.

Naturally, the study has limitations. The Chen, Roll, and Ross (1986) is related to the Arbitrage Pricing Theory (APT) framework which has assumptions on the factors used in the model. The assumptions are that the factors should be related to undiversifiable risk, should be based on timely data, should be economically justified and should be unexpected. The argument can be made that banks specialize in a region and as such suffer from the undiversifiable risk specific for that region. I attempt to minimize this issue by examining only banks in the 12th Federal Reserve District. Also, one might argue that the limitation in this study is due to the quarterly Federal Reserve data used and that higher frequency analysis is required. Of course, these limitations are great opportunities for future research. It would be interesting to examine bank performance across Federal Reserve Districts and at a higher data frequency.

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