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Empirical Examination of Quantitative Easing in Monetary Policy and Earning Management of Financial Markets and Institutions

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Empirical Examination of Quantitative Easing In Monetary Policy and Earning Management of Financial Markets and Institutions

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Dedication

I am grateful to God Almighty for being gracious and benevolent in every aspect of my life, especially during the PhD academic life. I would also like to thank my parents and my family for their continuous financial and emotional support.

My sincere gratitude goes to my wife, Silvia Eusuf, for all the sacrifice that she had to incur while I pursued my PhD. Silvia; I have earned this degree for you.

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Abstract

In the first chapter, I analyze the impact of changes in aggregate holding in special asset purchase programs by Federal Reserve Systems (FED) as an alternate monetary policy at aggregate level. Later, to complement the analysis of monetary impact at aggregate level, I also analyze the impact of monetary actions at bank stock level with a set of 186 banks. First, for the overall sample period, expected monetary shock has positive effect on bank stock return; however, unexpected shock component has otherwise negative impact. Second, during both conventional and QE regime, monetary shocks are not significant in explaining weekly stock returns; however change in FED's total asset holding in special programs is significant during the QE regime and such findings are more robust for the "large" banks when compared to "medium" and "small" banks.

The second chapter presents the second essay that is one of the early studies to analyze whether either the changes in accounting standard or the changes in prudential regulatory regimes may affect the bank earning management in terms of Loan Loss Provisioning (LLP) systematically. Results suggest that, in general, bank managers use LLP as a tool for earning management for income smoothing and also for capital management once LLP is allowed to be a part of Tier-I capital requirement. Both changes in prudential regulation from pro-cyclic to a dynamic regime and convergence of accounting standard from rule-based to principle-based standards have significant negative fixed effects separately and jointly once included.

JEL Classification : G01, E42, E44, E52, E58

Key Words : Financial Crises, Monetary Systems; Government and the Monetary System; Monetary Policy, Central Banks and Their Policies

1. Chapter 01: Monetary Policy Tools, Monetary Shocks and Bank Stock Returns: Evidence From 2008 Quantitative Easing In United States

1.1 Introduction

Whether monetary policy has significant impact on financial markets is a long-debated open question in financial economics literature. While monetarists argue that monetary policy may actively affect aggregate demand, its ineffectiveness during the "liquidity trap" is also well documented. Besides, the nature of effective monetary involvement during a zero-bound regime is not vividly explained (see: Thorbecke (1997) among others).

The recent global financial crisis of 2007 preceded by the Lehman Brothers failure once again rejuvenates this debate on effectiveness of monetary policy. Following the 2007 financial debacle, the Federal Reserve (hereafter FED) introduces a set of conventional and non-conventional monetary policy tools to keep the economy vibrant. As conventional monetary tools become virtually ineffectual with Federal Fund Rates reaching the zero-bound threshold, the FED pursues Quantitative Easing (hereafter QE) monetary regime; QE policy entails purchasing different classes of assets from the financial market with the intent to impart additional liquidity and to affect the interest rate term structure by influencing markets expectations on future interest rates. FEDs decision to open asset purchase windows mark as the transition of Fed policies from conventional regime to the unconventional QE regime (Al-Mamun et. al (2010)[1]).

Although the recent research interest in QE is overly motivated by the extra-ordinary monetary policy responses by the developed economies, like: United State, United Kingdom, and European Union member countries during the global financial crisis, the QE as a monetary policy phenomenon has a relatively old history going back to the monetary regime of the United States of America during the great depressions of the 1930s. A more recent experience is the Japanese QE regime policy that is more frequently cited in the monetary easing literature; accordingly, extant literature on QE overly focuses on the interaction between monetary fundamentals and macroeconomic stability during QE in Japan. Only a select few studies, however, analyze the reaction of financial markets. Recently a few studies analyze the recent monetary easing in United Kingdom focusing on the impacts on conventional and unconventional monetary policy on interest rate, financial markets, and expected inflation (see: Joyce, Lasaosa, Stevens and Tong (2010)).

Bernanke (2004) draws the critical comparisons from Japanese QE and provides a theoretical framework about how a monetary authority may still influence money supply even under a zero-bound interest regime; Bernanke (2004) suggests two specific ways: a) by managing its balance sheet components, specifically, through re-organizing the type of assets, and b) re-stating its commitment to keep interest rates low over longer time horizons. However, few empiric studies analyze the validity of Bernanke (2004) argument in the context of recent 2007 financial crisis and the following 2008 QE regime. More recently, Shiratsuka (2010) finds out that the Bank of Japan's monetary easing policy and the FED's QE policy are fundamentally different as the FED's policy entails managing asset side components compared to Bank of Japan's approach of managing central bank liability components. So, a logical conclusion from Japanese QE studies is that any inference of Japanese evidence may approached

[1] Discussion of FEDs policy action during 2008 financial crisis and a detailed time line is available at; FED Systems webpage: http://www.newyorkfed.org/research/global_economy/Crisis_Timeline.pdf .

with some caution as the FED's monetary easing is qualitatively different from that of the Bank of Japan.

Given the present statute of monetary economics and finance literature, this paper is motivated to analyze FEDs QE policy responses in the context of the United States of America with three specific motivations. First, although Bernanke (2004) discusses a set of alternative monetary policy tools under QE, a few studies provide empiric evidence on the issue in US context. This study is one of the early studies to analyze the impact of FEDs total asset holdings under special programs over the other monetary policy tools, market indexes and other target variables; like: bond spreads, and SWAP and commercial paper interest rates.

Second, we use the definition of expected shocks and unexpected shocks as provided by Bernanke and Kuttner (2005). This paper is one of the early studies to analyze whether these monetary policy shocks are different during QE regime and pre-QE regime, and whether the relationship between expected and unexpected shocks with other monetary policy tools, market indexes and other target variables are similar. Accordingly, we also contribute to the monetary transmission channel literature.

Third, to complement our analysis of FEDs monetary actions at aggregate level, we also analyze impact of FED's Asset holding on bank stock prices in addition to our analysis of aggregate level. We extend from Bernanke and Kuttner (2005) framework of analyzing stock price reaction to expected and unexpected monetary shocks and include change FED's total asset holding as proxy for FED's asset side management and interact with a set of dummies for asset purchase program initiation and closing events.

We use a combination of daily and weekly data from December 18, 2002 to November 30, 2011 period and divide the total sample into three possible samples: a) the Overall period (December 18, 2002 to November 30, 2011), b) the Pre Quantitative Easing (QE) Period (December 18, 2002 to December 24, 2008), and c) the QE Period (December 31, 2008 to November 30, 2011). Summary statistics of conventional and unconventional monetary policy tools and monetary shocks support the argument of regime change in these variables during pre-QE and QE regime. In the first stage of empiric analysis, we use VAR setup to analyze the inter-relationship between the monetary policy tools and the aggregate target variables.

Results suggest that, during the QE regime, only asset-side monetary policy tool, i.e. changes in Federal Reserve's total asset holding under special programs, has impact on market indexes and other target variables. Evidence are also consistent with the hypothesis that, as federal fund rates approaches the zero-bound threshold, federal fund rate loses its effectiveness as monetary policy tool. As federal fund rates approaches zero-bound, monetary shocks, both expected and unexpected components, become rather less efficient tool in transmitting monetary policy information to the target variables during the QE regime.

Later, in the second stage, we use a panel regression set up to analyze impact of FED's total asset holding on the bank stocks by using an extension of Bernanke and Kuttner (2005) empiric specification. We use a sample of 186 banks that disclose financial information on the COMPUSTAT Bank Annual and have stock return on the CRSP database. We control for bank size effect by ranking the bank sample into three classes: small, medium and large for lowest 33% rank, middle 34% and highest 33% ranks respectively.

As such, this study may contribute to extant literatures on financial markets and monetary transmission in third distinct ways. First, empirical evidence from this study may enhance better understanding about how FED's asset side management can complement conventional monetary policy actions during monetary easing regime; that is directly related to the set of QE literatures. Second, the analysis of monetary policy shocks and their sensitivity contributes to the other trend of monetary policy literature that focuses on transmission

channels of monetary impact and their impact on financial markets. Third, we provide analysis at both aggregate level and firm level as we investigate the QE impact over the bank stocks.

Remainder of the paper is organized as follows. The section two provides a brief discussion on relevant literature. The next section discusses the data and methodology, followed by a brief description on descriptive statistics in section four. Later, the section five and section six summarize the pair-wise Granger causality and VAR estimations respectively. Section seven presents the bank stock level analysis, and section seven concludes with a brief discussion on the key findings.

1.2. Literature Review

1.2.1 Quantitative Easing Literature

The first evidence of Quantitative Easing cited in literature is the monetary response of the United States as the Federal Reserve System begins with $ 1 billion purchase of the Government treasuries in 1932 and maintains till 1936. However, monetary impact during Quantitative Easing (QE) regime is a rather less-frequently researched issue and still debated, and unlike the conventional monetary literature, literature on QE is rather scanty.

Existing literature overly focuses on the empiric evidences on mostly Japanese experience during 1990's following the later 1980's market crash. As Japanese official bank rate effectively reached the zero-bound in February 1999, the Bank of Japan initiates Quantitative Easing as a supplement to zero-rate policy in March 2001 to provide further stimulus to the economy and to avoid deflationary trend. Shirakawa (2002) provides a lucid discussion on the Japanese experience of QE. Shirakawa (2002) delineates possible transmission channels of monetary policy during a zero-bound interest regime and argues that Japanese approach to QE during 2000 is essentially similar to the early 1930's experience in Sweden and US of Quantitative Easing.

Earlier QE studies provide analytical and theoretical reasoning on whether the FEDs policy may still be affective under zero-bound interest regime (see: Gauti and Woodford (2004), Auerbach and Obstfeld (2003), and Bernanke (2004), among others). Gauti and Woodford (2004) analyze the plausible impact of Quantitative easing as a supplement to zero interest rate in a Neo- Keynesian framework and argue that QE may fail to inject desired level of stimulus to an economy if central bank policy cannot change expectations about future policy conduct. However, Gauti and Woodford (2004) interpretation is different from Auerbach and Obstfeld (2003) based on similar framework as the latter assume that open-market operation may permanently increase the monetary base.

Bernanke (2004) draws reference form Japanese experience and discusses three monetary policy alternatives during a zero-interest regime that can provide additional stimulus to an economy. First, central bank can provide assurance that short rates will be kept lower in future as they expect. Second, monetary authority may change relative supply through open market operations. Thirdly, by increasing its balance sheet, central bank may keep the short rates at the zero-bound. Bernanke also argues that credibility of monetary policy will be pivotal in such policy regimes.

More recently, Klyuev et al (2009) discuss on four possible monetary alternative actions by central banks during a Quantitative Easing regime by: a) making explicit commitment to maintain low policy rates, b) providing additional liquidity to the financial institutions, c) affecting the long-term interest rates by purchasing government securities and d) actively intervening specific credit markets. However, the impact of central bank actions may not be obvious because monetary transmission to the economy is complex.

In a recent study, Shiratsuka (2010) compares the QE policy of the Bank of Japan during 2001 to 2006 and QE policy initiated by United States Federal Reserve. Shiratsuka (2010) concludes that, unlike Bank of Japan's approach of managing liability-side of the balance-sheet, US Fed engages in an asset-side management approach. So, the eventual monetary impact may not be necessarily similar.

1.2.2 Expected and Unexpected Monetary Shocks

Kuttner (2001) and Faust, Swanson, and Wright (2004) use the difference between the change in current month or one month ahead futures contract rate on the day of the announcement of monetary policy stance as a definition of policy surprise. One underlying assumption is that over a small interval, in their case one day over which they calculate the surprise, the risk premiums do not change. Later, Bernanke and Kuttner (2005) argue that using daily data in calculating policy surprise may lead to sample selection problem. Bernanke and Kuttner (2005) provide an alternate solution by calculating policy surprise at monthly horizons, as given in equation (1) and (2). Here, expected component of shock is the anticipated shock measures in terms of difference between previous period Federal Fund futures and Federal Reserve's target fund rate. Unexpected component is the difference between weighted average of target fund rates and the anticipated previous period federal fund futures (see: Bernanke and Kuttner (2005) for more).

Unexpected Monetary Shock $$\Delta r_t^u = 1/M \sum_{m=1}^{M} r_{t,m} - f_{t-1,M}^1 \quad (1)$$

Expected Monetary Shock $$\Delta r_t^e = f_{t-1,M}^1 - r_{t-1,M} \quad (2)$$

Here, expected component of shock is the anticipated shock measures in terms of difference between previous period Federal Fund futures and Federal Reserve's target fund rate. Unexpected component is the difference between weighted average of target fund rates and the anticipated previous period federal fund futures. Bernanke and Kuttner (2005) document that stocks are only unexpected shocks have explanatory powers, not the expected shocks.

1.3 Methodology

1.3.1 Data

Federal Reserve St. Louis Database provides Federal Reserve Systems balance sheet weekly data from 18-Dec-02 to 13-Jul-11 measured at weekly averages and Wednesday levels. Accordingly, we choose a common sample period of December 18, 2002 to July 13, 2011 and divide the overall sample period into two sub-samples: a) Pre Quantitative Easing (QE) Period (December 18, 2002 to December 24, 2008), and b) QE Period (December 31, 2008 to November 30, 2011). We consider four conventional monetary policy tools: DFF as Federal Fund Rate (in %) , TOT as total holding (in billion dollars) in special asset purchase programs by Federal Reserve System, M1 as Narrow Money (in billion dollars) and, nonM1 as components of M2 not included in M1 (in billion dollars). All monetary policy data are weekly frequency.

To analyze the impact of QE policies at aggregate level, we use three bond-spreads and four market indices. Three bond-spread returns are AAA as AAA option-adjusted spread (in %), BBB as BBB option-adjusted spread (in %), and CCC as CCC option-adjusted spread (in %). Four Market Indices are DJIA as return on Dow Jones Industrial Average Index, TWEXM as change in major trade-weighted exchange index, SNP500 as return on S&P500 Index, and VIX as Implied Volatility Index on S&P500. Besides, to analyze the impact of monetary shocks on

interest rates, we collect interest rate data on swaps and commercial papers (both financial and non-financials) of different maturities. All market index, bond spreads, swap and commercial paper interest rates are daily. Table 01 reports the descriptive statistics of the aggregate level variables. To analyze the impact of QE at bank stock level, we use a sample of 186 banks that report balance sheet information in the COMPUSTAT Bank Annual database and collect their stock return data from CRSP; later Table 08 reports bank summary statistics.

1.3.2 Variable Descriptions

Existing literature, generally, cites Federal fund rate and money supply measures; like: Narrow money or M1, Broad Money or M2, and others; like: M3, M4 and their components as conventional monetary policy tools. From Federal Reserve System balance sheet perspective, money supply components are essentially liability side components. Among the conventional monetary policy tools, federal fund rate is often cited as more effective measure compared to money supply measures. However, effectiveness of federal fund rate is limited by the zero-bound thresholds. Once fund rate approaches zero bound thresholds, deviations in fund rate become relatively insignificant in explaining its target variables, generally, interest rates and financial markets.

Cúrdia and Woodford (2010) is one the recent studies to use unconventional monetary policy tools terminology explicitly for Federal Reserves' asset purchase programs. As federal fund rate approaches zero bound, Bernanke (2004) argues that asset-side components of Federal Reserve System may evolve to be more efficient in influencing the target variables. Although repurchase and reverse-repurchase agreements are two most import elements, Fed's asset side comprises with a wide variety of components. However, as this study focuses on the analysis of monetary policy impact on market indexes, bond spreads and other indexes, we use total asset holding under special asset purchase programs by the Federal Reserves' as the proxy for unconventional monetary policy tool.

1.3.3 Calculation of Monetary Shocks

Following Bernanke and Kuttner (2005), we calculate the expected and unexpected monetary shocks as given in equation (1) and (2). Table 02 reports the descriptive statistics of the calculated expected and unexpected monetary shocks for the three sample periods: a) overall period, b) pre-QE period, and c) QE period.

Unexpected Monetary Shock $$\Delta r_t^u = 1/M \sum_{m=1}^{M} r_{t,m} - f_{t-1,M}^1 \qquad (1)$$

Expected Monetary Shock $$\Delta r_t^e = f_{t-1,M}^1 - r_{t-1,M} \qquad (2)$$

1.3.4 Monetary transmission under Quantitative Regimes: Testable Hypothesis

Bernanke (2004) argues that, under a zero-bound interest rate regime, monetary authority may still impart desired monetary impacts through managing the asset-side components. Kuttner (2001) and Faust, Swanson, and Wright (2004), and later, Bernanke and Kuttner (2005), provide alternate ways to measure monetary policy surprise that may work as transmission channel through which monetary policy impacts can be transmitted to the target variables. In line with these two sets of literature, this study is motivated at analyzing a few questions related with Quantitative Easing. Are expected and unexpected monetary shocks different during the Quantitative Easing regime? Is there any evidence of regime change during QE regime? What are the relationships between monetary shocks and monetary policy

tools, both conventional and unconventional, and whether these relationship change during the three samples? What are the relationships between monetary shocks and market indexes? As federal fund rate approaches zero bound, is it still effective in imparting desired impacts on the target variables? Does change in total asset holding by Federal Reserve have any impact as monetary policy tool during the QE regime? What is the impact of FEDs change in asset holding in special programs on bank stock returns?

Consistent with these questions and our core arguments, we summarize the testable hypotheses as follows:

	Testable Hypotheses
Hypothesis I	*Monetary shocks, conventional and unconventional monetary policy tools, market indexes, bond-spreads, and target other variables do not exhibit any evidence of regime change in a sense that both their means and their variances are not significantly different during pre-QE and QE samples.*
Hypothesis II	*Federal Reserves' total asset holding in special programs is an efficient monetary tool during QE-regime as compared to pre-QE regime.*

Our last hypothesis represents the question about how monetary shocks and FEDs total asset holding may impact bank stocks during pre-QE and QE regimes; accordingly, we hypothesize that:

Hypothesis III	*Monetary shocks and FED's total asset holding may have different impacts over the banking stocks during pre-QE and QE regimes*

1.3.5 Empiric Specifications

1.3.5.1 Impact on financial markets at aggregate level: VAR approach

Pedroni (2004) provides a lucid description on some frequently cited econometric concerns over the use of cointegration tests and other time series estimation methods. Structural breaks in time series data and shorter sample period are the two prominent impediments for estimating consistent and robust cointegrating equations. Pedroni (2004) argues that using a higher frequency data may not necessarily eliminate such estimation problems; Pedroni (2004) provides two alternate frameworks as solutions, first, by increasing the number of cross-sections to allow more variations in the data where possible and, second by continuing with a more conventional VAR (Vector Auto-Regressive) analysis framework. Since this paper focuses on only the United States monetary regime, we cannot use the Panel Cointegration technique; rather we use VAR approach in analyzing the impact of QE regime at aggregate level following the Pedroni(2004) arguments.

In this paper, we report that the time series properties and descriptive statistics of the target variables for the three possible sample periods: overall period, pre-Quantitative Easing period, and Quantitative Easing period. As we focus our analysis on only United States dataset and its monetary policy regime; we do not use a panel cointegration framework; rather, we focus on VAR analysis for the three sample periods and related pair-wise Granger causality relationships among the variables. We follow a three step process to decompose and analyze the causality between monetary policy tools and target variables. First, we analyze the causality between monetary policy tools and monetary shocks that are the possible transmission channel. Next, we analyze the causality between monetary shocks and target variables (i.e. market index, bond spreads, and others). And, finally we discuss the combined effect of the earlier two by analyzing causality between monetary policy tools and target variables.

1.3.5.2 Monetary Impact on Bank Stocks: Panel Regression Approach

Flannery and James (1984) is one of the early papers to provide a framework about how interest rates may affect common stock returns of financial institutions. In their empiric specification, Flannery and James (1984) extend the market model by including holding period return on default-free bond index:

$$\tilde{R}_{jt} = \beta_{0j} + \beta_{mj}\tilde{R}_{mt} + \beta_{Ij}\tilde{R}_{It} + \tilde{\varepsilon}_{jt} \quad \dots \dots \dots \quad (3)$$

More recently, Bernanke and Kuttner (2005) decompose monetary shocks into expected and unexpected components and use equation (4) specification to analyze stock reaction to FED's monetary shock components; Bernanke and Kuttner (2005) document that only unexpected shocks matter and they extend equation (4) by interacting unexpected shock component with FOMC meeting dummies and others variables of interest.

$$\tilde{R}_{jt} = \beta_{0j} + \beta_{Ij}\widetilde{ExShock}_{It} + \beta_{2j}\widetilde{UnExShock}_{It} + \tilde{\varepsilon}_{jt} \quad \dots \dots \dots \quad (4)$$

We use the Bernanke and Kuttner (2005) framework to analyze the impact of monetary shocks on stock returns as given in equation (4). Besides, we also analyze if there is any difference among bank with different asset sizes. Accordingly, we sort the banks and rank them into three size categories "small", "middle" and "large" for lower 33% banks, middle 34% banks and large 33% banks of the sample. To analyze the impact of bank size, small banks are held as base case and size dummies for "middle" and "big" are included as an extension of equation (4) specification, as shown in equation (5). Table 10 reports the panel estimates for equation (4) and equation (5).

$$\tilde{R}_{jt} = \beta_{0j} + \beta_{Ij}\widetilde{ExShock}_{It} + \beta_{2j}\widetilde{UnExShock}_{It} + D_i + D_i * \beta_{Ij}\widetilde{ExShock}_{It} + D_i * \beta_{2j}\widetilde{UnExShock}_{It} + \tilde{\varepsilon}_{jt} \quad \dots \quad (5)$$

To analyze whether monetary shocks have any differential impact of stock returns during QE and non-QE regime, we consider non-QE regime as the base case and then include "QE" as a dummy for QE regime. Bernanke (2004) argues that change in FED's total asset holding in special purchase programs may have impact on financial markets during QE period. To justify Bernanke (2004) argument, we include change in FED's total asset holding in special purchase programs and interact that with QE dummy in equation (6). We provide four alternate versions of panel estimations for equation (6). First, we estimate equation (6) for overall sample without differentiating bank size. Later we estimate equation (6) for small, medium and large banks separately; Table 11 summarizes the empiric findings.

$$\tilde{R}_{jt} = \beta_{0j} + \beta_{Ij}\widetilde{ExShock}_{It} + \beta_{2j}\widetilde{UnExShock}_{It} + \beta_{3j}\Delta\, in\, FEDtotalAsset_{It} + QE + QE * \beta_{Ij}\widetilde{ExShock}_{It} + QE * \beta_{2j}\widetilde{UnExShock}_{It} + QE * \beta_{3j}\Delta\, in\, FEDtotalAsset_{It} + \tilde{\varepsilon}_{jt} \quad (6)$$

We also analyze if there is any abnormal return in bank stocks for the opening and closure events of asset purchase programs initiated by the FED following the global financial crisis. We use separate dummies for individual events and interact the dummies with unexpected shocks using a similar approach as in Bernanke and Kuttner (2005). Equation (7) represents the empiric specification; Table 12 reports empiric evidence for the overall bank sample, and also for small, medium and large banks separately.

$$\tilde{R}_{jt} = \beta_{0j} + \beta_{Ij}\widetilde{ExShock}_{It} + \beta_{2j}\widetilde{UnExShock}_{It} + \gamma_{j,i}\, EventDummy_{i,t} * \widetilde{UnExShock}_{It} + \tilde{\varepsilon}_{jt} \quad (7)$$

1.4 Descriptive Statistics

1.4.1 Monetary policy tools, Market Indexes and Bond Spread

Table 01 reports the descriptive statistics and time series properties for weekly observations of four market indexes, three bond spreads and conventional and unconventional (asset side) monetary policy tools during three sample periods: a) Overall period (December 18, 2002 to November 30, 2011), b) Pre Quantitative Easing Period (December 18, 2002 to December 24, 2008), and c) QE Period (December 31, 2008 to November 30, 2011) in Panel A, B and C respectively. Four monetary policy variables are: DFF as Federal Fund Rate (in %), TOT as total holding (in billion dollars) in special asset purchase programs by Federal Reserve System, M1 in Narrow Money (in billion dollars), nonM1 as components of M2 not included in M1 billion dollars). For the overall period, maximum and minimum of DFF (Federal Fund rate) are 5.41% and 0.06% that reveals the decreasing fund rate set by the Federal Reserve leading to the financial crisis and maintaining at an almost zero threshold. TOT represents the aggregate holding of different assets held by the FED and shows significant variation during the two sub-samples: pre-QE and QE samples; as FED's involvement in asset purchase programs increase substantially during the QE regime. Mean value of TOT is around 162 billion dollar during pre-QE period where as it increases substantially up-to 1.28 trillion dollar. During the QE-period, because of FED's active monetary stance, both M1 and non-M1 components of M2 also rise significantly.

Three bond spreads are: AAA as AAA option-adjusted spread (in %), BBB as BBB option-adjusted spread (in %), and CCC as CCC option-adjusted spread (in %). Four Market Indices are: DJIA as return on Dow Jones Industrial Average Index, TWEX as change in major trade-weighted exchange index, SNP500 as return on S&P500 Index and VIX as change in Implied Volatility Index on S&P500. Mean option-adjusted bond spread for all three types of bonds: AAA, BBB and CCC grades are high during QE period that reveals higher credit risk related with the downward business cycle. Panel D presents Welch t-statistics of difference in means and F-statistics of variance comparisons that are generally statistically significant at 1%. Such results are consistent with the argument that during QE period, both Federal Reserve Systems liability-based tools (like: M1 and M2) and asset based tools (TOT) and Federal Fund Rate (DFF) exhibits properties of regime changes. For the bond spreads and Market index return, we note that only means are significantly different but the variances are rather not different during the pre-QE and QE sample periods. For VIX and Trade-weighted foreign exchange index, none of the test statics is significant. To summarize, results support regime changes in monetary policy tools and market indexes during the QE and pre-QE periods, consistent with the Hypothesis I.

1.4.2 Expected and Unexpected Monetary Shocks

We calculate expected and unexpected monetary policy shocks by using equation (1) and (2) respectively as given by Bernanke and Kuttner (2005). Table 02 presents the summary statistics of expected and unexpected shocks components for overall sample, pre-QE sample and QE sample period in Panel A, B and C respectively. Results suggest that mean unexpected shock of positive 2.03 basis points during overall sample period is largely contributed by generally positive and large shocks during pre-QE sample as the mean for QE sample is merely 0.46 basis points and on the negative side. Summary statistics of expected shock is quiet similar to unexpected shocks but otherwise different in sign. Panel D captures most important findings of the Table 02 that for both expected and unexpected shocks, both mean and variance are significantly different during pre-QE and QE samples. Such findings are essentially consistent with the hypothesis that monetary shocks are likely to be different during QE regime.

Table 01
Descriptive statistics of Major Market Indexes and Monetary Policy Tools

Table 01 reports descriptive statistics and time series properties for Major market indexes and monetary policy tools during three sample periods: (a) Overall period, (b) Pre-QE Period, and (c) QE Period in Panel A, B and C respectively. Four monetary policy variables are: (i) DFF as Federal Fund Rate (in %) , (ii) TOT as total holding (in million dollars) in special asset purchase programs by Federal Reserve System, (iii) M1 in Narrow Money (in billion dollars), (iv) nonM1 as components of M2 not included in M1 (in billion dollars). Three bond spreads are: (i) AAA as AAA option-adjusted spread (in %), (ii) BBB as BBB option-adjusted spread (in %), and (iii) CCC as CCC option-adjusted spread (in %). Four Market Indices are: (i) DJIA as return on Dow Jones Industrial Average Index, (ii) TWEX as change in major trade-weighted exchange index, (iii) SNP500 as return on S&P500 Index and (iv) VIX as change in Implied Volatility Index on S&P500. Panel D repots Welch t-statistics of mean difference and F-statistics of difference in variance for different variables during QE and Pre-QE sub-sample period. AR(p) is selected based on AIC (Akaike Information Criteria). As M1, nonM1 and TOT data are available at weekly frequency, all variables are in weekly frequency.

	DFF	TOT	M1	nonM1	AAA	BBB	CCC	DJIA	TWEX	SNP500	VIX
Panel A: Overall Period (12/18/2002 to 11/30/2011)											
Mean	2.0233	514811.80	1499.82	5922.96	0.9810	2.2802	10.7686	0.0089	-0.0257	0.0102	0.0208
Maximum	5.4100	1764705.00	2198.10	7509.40	5.8800	7.9800	40.1700	4.2408	1.6078	4.3491	33.6343
Minimum	0.0600	36681.00	1220.10	4547.20	0.4900	1.1000	4.1900	-7.8733	-2.6556	-9.0350	-18.1112
Std. Dev.	1.9000	593860.00	226.93	880.85	0.7940	1.4843	6.1853	1.1942	0.5008	1.3005	6.5241
Obs.	461	461	461	461	461	461	461	461	461	461	461
Panel B: Pre QE Period (12/18/2002 to 12/24/2008)											
Mean	0.1467	1277540.00	1791.93	6969.76	1.0820	3.0541	13.1048	0.1359	-0.0553	0.1592	-0.1577
Maximum	0.2400	1584817.00	2198.10	7509.40	5.8800	7.3200	36.1000	4.2408	1.2829	4.3491	33.1579
Minimum	0.0600	1038151.00	1560.50	6723.70	0.5800	1.8500	7.4900	-4.6249	-1.5273	-4.4152	-18.1112
Std. Dev.	0.0466	131294.50	167.81	219.95	0.9171	1.4892	6.4963	1.2252	0.5207	1.3504	7.0825
Obs.	147	147	147	147	147	147	147	147	147	147	147
Panel C: QE Period (12/24/2008 to 11/30/2011)											
Mean	0.1467	1277540.00	1791.93	6969.76	1.0820	3.0541	13.1048	0.1359	-0.0553	0.1592	-0.1577
Maximum	0.2400	1584817.00	2198.10	7509.40	5.8800	7.3200	36.1000	4.2408	1.2829	4.3491	33.1579
Minimum	0.0600	1038151.00	1560.50	6723.70	0.5800	1.8500	7.4900	-4.6249	-1.5273	-4.4152	-18.1112
Std. Dev.	0.0466	131294.50	167.81	219.95	0.9171	1.4892	6.4963	1.2252	0.5207	1.3504	7.0825
Obs.	147	147	147	147	147	147	147	147	147	147	147
Panel D: QE and Pre-QE Comparison of Mean and Standard Deviation											
Welch t	(28.67)[c]	3.07[b]	2.20[b]	4.22[c]	2.95[b]	12.16[c]	5.47[c]	2.26[b]	(1.51)	2.40[b]	(0.29)
F-stat	1333[c]	3.08[c]	13.46[c]	2.12[b]	1.15	1.18	1.13	1.00	1.04	1.01	1.06

Superscripts of a, b and c correspond to statistical significance of 10%, 5% and 1% respectively.

Table 02
Descriptive Statistics of Expected and Unexpected Shocks

Panel A, B and C of Table 02 present Descriptive Statistics of Unexpected Monetary Shock (UNEXPSHOCK) and Expected Monetary Shock (EXSHOCK) for: a) the full sample period, b) Pre-Quantitative Easing Period, and c) Quantitative Easing Period. Unexpected and Expected monetary policy shocks are calculated based on the formula (as described by Bernanke and Kuttner (2005)).

UNEXP (Unexpected Shock): $\Delta r_t^u = 1/M \sum_{m=1}^{M} r_{t,m} - f_{t-1,M}^1$ .. (1)

EXP (Expected Shock): $\Delta r_t^e = f_{t-1,M}^1 - r_{t-1,M}$ .. (2)

Panel D reports Welch t-statistics for comparison of means and F-statistics for sample variance comparison. All data are daily frequency. Superscripts of a, b and c correspond to statistical significance of 10%, 5% and 1% respectively.

	Panel A		Panel B		Panel C			Panel D	
	Full Sample		Pre-QE Sample		QE Sample			QE and Pre-QE	
	UNEXP	EXP	UNEXP	EXP	UNEXP	EXP	Test Stat	Unexpected	Expected
Mean	0.0203	-0.0247	0.0297	-0.0352	-0.0046	0.0047	Welch t-stat	6.3456[c]	-7.2928[c]
Median	0.0000	0.0000	0.0100	-0.0100	-0.0050	0.0050			
Maximum	1.5925	1.7650	1.5925	1.7650	0.1000	0.0900	F-stat	111.5799[c]	131.6742[c]
Minimum	-1.9450	-1.3650	-1.9450	-1.3650	-0.0800	-0.0990			
Std. Dev.	0.1690	0.1717	0.1968	0.1994	0.0186	0.0174			
Skewness	-1.1669	0.5410	-1.1543	0.6404	0.8310	-0.2474			
Kurtosis	29.9901	21.2841	22.5648	16.1564	8.5856	9.0282			
Sample	7/5/2000 to 12/15/2011		7/5/2000 to 12/15/2009		12/16/2009 to 12/15/2011				
No. of Obs.	1858		1355		503				

Superscripts of a, b and c correspond to statistical significance of 10%, 5% and 1% respectively.

Table 03
Unit Root Tests of Monetary Shocks, Monetary Policy Tools, Market Indexes and Bond Spreads

Panel A through Panel C in Table 03 report Unit Root Test results for Monetary Shocks, Conventional and Unconventional Monetary Policy tools, Market Indexes, Traded weighted foreign exchange index and Bond Spreads for: (a) Overall sample, (b) Pre-QE sample, and (c) QE sample period; using Augmented Dickey Fuller Test (ADF) with intercept and trend in the mean equation. Lag length corresponds to lags selected and used in ADF statistics chosen on the basis of AIC (Akaike Information Criteria).

	Panel A: Overall Period (12/18/2002 to 11/30/2011)												
	UNEXP	EXP	DFF	TOT	M1	nonM1	AAA	BBB	CCC	DJIA	TWEX	SP500	VIX
ADF at Level t-stat	-10.65[c]	-14.96 [c]	-1.01	-2.70	1.49	-1.96	-1.95	-2.20	-2.56	-17.35[c]	-21.97[c]	-17.52[c]	-21.86[c]
lag length	2	1	2	4	3	0	4	2	3	0	0	0	0
ADF at First Diff t-stat	-13.30[c]	-12.13[c]	-20.18[c]	-6.66[c]	-18.96[c]	-18.00[c]	-13.99[c]	-7.94[c]	-9.14[c]	-14.31[c]	-14.51[c]	-14.85[c]	-14.76[c]
lag length	11	12	1	5	2	1	3	1	2	6	6	6	0
I(p) process	0	0	1	1	1	1	1	1	1	0	0	0	0
No. of Obs.	462	462	462	462	462	462	462	462	462	462	462	462	462

	Panel B: Pre QE Period (12/18/2002 to 12/24/2008)												
	UNEXP	EXP	DFF	TOT	M1	nonM1	AAA	BBB	CCC	DJIA	TWEX	SP500	VIX
ADF at Level t-stat	-14.65[c]	-12.45[c]	2.06	7.56	-0.977	0.335	-0.66	-0.74	1.00	-16.81[c]	-17.69[c]	-13.49[c]	-17.95[c]
lag length	0	1	2	15	14	2	2	2	13	2	0	0	0
ADF at First Diff t-stat	-10.88[c]	-9.97[c]	-17.16[c]	-4.82[c]	-1.04[c]	-16.51[c]	-8.00[c]	-8.58[c]	-5.45[c]	-13.26[c]	-11.92[c]	-11.61[c]	-15.14[c]
lag length	11	12	1	3	13	1	1	0	12	0	6	6	3
I(p) process	0	0	1	1	2	1	1	1	1	0	0	0	0
No. of Obs.	315	315	315	315	315	315	315	315	315	315	315	315	315

	Panel C: QE Period (12/24/2008 to 11/30/2011)												
	UNEXP	EXP	DFF	TOTSPEC	M1	NONM1	AAA	BBB	CCC	DJIA	TWEX	SP500	VIX
ADF at Level t-stat	-9.80[c]	-9.72[c]	-3.07	-1.20	-0.71	-0.84	-1.98	-1.29	-1.42	-12.42[c]	-13.08[c]	-11.01[c]	-13.00[c]
lag length	0	0	1	12	3	0	4	1	1	1	0	1	0
ADF at First Diff t-stat	-8.53[c]	-10.09[c]	-17.26[c]	-5.89[c]	-11.94[c]	-13.09[c]	-9.29[c]	-6.66[c]	-7.74[c]	-10.53[c]	-9.16[c]	-10.87[c]	-10.36[c]
lag length	6	7	0	11	2	0	3	1	1	6	5	6	6
I(p) process	0	0	1	1	1	1	1	1	1	0	0	0	0
No. of Obs.	147	147	147	147	147	147	147	147	147	147	147	147	147

Superscripts of a, b and c correspond to statistical significance of 10%, 5% and 1% respectively.

1.4.3 Unit Root Tests

In Table 01 and Table 02, we report the descriptive statistics of monetary policy tools, the market indexes, bond spreads and other target variables; and expected and unexpected shocks, respectively. Panel A, B and C of Table 03 report Augmented-Dickey-Fuller (ADF) tests for stationarity for unexpected and expected shocks, DFF (Federal Fund Rate), M1 and M2 at their levels and at their first differences. Test results suggest that both expected and unexpected monetary shocks are generally I(0) process i.e. stationary at their levels and at their first differences as well in all three sample periods. However other monetary policy tools are generally I(1) processes during all three samples. One important finding from Panel A, B and C is that Federal Fund Rate is rather an I(1) process which is in stark contrast with the data generation process of expected and unexpected monetary shocks. One plausible implication of monetary shocks being I (0) process is that by definition (see: equation (1) and (2)) the process is differenced and hence both shocks are rather I (0).

1.5. Granger Causality Analysis

We analyze a three step procedure to analyze the causality between the monetary tools, monetary shocks and market indexes, bond spreads and other target variables. We conduct extensive pair-wise causality analysis for all these variables; we report detailed results on causality in tabular format in the *Appendix B*.

1.5.1 Causality between Monetary Policy Tools and Monetary Shocks

On the causality between conventional monetary policy tools; and monetary shocks, results suggest that expected shock has causality over non-M1 components of M2 during QE regime but the relationship is altered otherwise reverse direction during the overall sample period. For DFF and expected shocks, there is no clear causality as both are Granger caused by each other. For other variables, however, there is no significant evidence of causality. For unexpected shocks, unexpected shocks have causality over DFF during QE regime. Besides, non-M1 components of M2 have causality effect on unexpected shocks during overall period that is largely driven by the dominant impact during pre-QE period. For QE regime, there is, however, no such causality relationship between non-M1 components of M2 and unexpected shocks.

About the causality relationships between conventional or liability-side components (M1 and non-M1 components of M2), and unconventional or asset-side components, (total holding of special program security holding), we find that during QE regime, all the conventional policy tools have significant causality relationship over TOTSPEC. However, during pre-QE and overall period, such causality does not persist generally. However, for causality between: monetary shocks and unconventional monetary tools, results suggest that there is no clear causality during QE regime as both expected and unexpected shocks has causality over TOT and again TOT has causality over the shocks. During the overall and pre-QE sample, there is no evidence of causality relationship.

1.5.2 Causality between Monetary Shocks and Market Indexes and Bond Spreads

Granger Causality between Monetary Shocks and Major market indexes (DJIA as return on Dow Jones Industrial Average Index and SNP500 as return on S&P500 Index); and change in major trade-weighted exchange index, and Implied Volatility Index on S&P500 reveal some interesting findings. Results show that there is no significant causality relationship between the market indexes and expected monetary shocks in any of the three sample periods. For unexpected shocks, however, unexpected shocks do have causality over DJIA returns and

SNP500 returns during all of the three sample periods. But unexpected shocks have causality over VIX index during overall period that is largely due to the causality persistent during pre-QE period and not QE regime otherwise. Causality relationship between expected and unexpected shocks is however only vivid during QE regime when unexpected shocks have causality over expected shocks. During other period, there is no clear causality as both expected and unexpected shocks are caused by each other.

Results on Granger causality between Monetary Shocks and the three bond spreads (AAA option-adjusted spread, BBB option-adjusted spread, and CCC option-adjusted spread) suggest that AAA has causality over expected shocks During QE regime. However, expected shock itself has causality effect over BBB and CCC during the QE period. For unexpected shock, it has clear causality over AAA and BBB during QE regime but its impact on CCC is not clear as both CCC and unexpected shocks are caused by each other.

We also analyze Granger Causality between Monetary Shocks and daily swap rates for 8 maturities, 1 yr, 2 yr, 3 yr, 4 yr, 5 yr, 7 yr, 10 yr and 30 yr (DSWP1 through DWSP30), and a commercial papers of different maturities for both financial and non-financial firms with AA-rating. Results suggest that only 4 year SWAP has clearly observable causality over expected shocks and SWAPs with 4 year and less maturity have rather ambiguous causality as these SWAPs and expected shocks have causality over each others during QE regime. During the pre-QE regime, however, SWAPs of 4 year and higher maturity generally have causality over expected shocks. But, for the overall sample, expected shocks rather have causality over 4 year, 7 year and 10 year SWAPs only. During QE regime, unexpected shocks have rather clearly defined causality over all but 10 year maturity SWAPs. But during overall and pre-QE sample, the relationships are ambiguous. Besides, results also suggest that both expected and unexpected shocks have generally significant causality over both financial and non-financial commercial papers during QE regime. However, causality relations are rather ambiguous during other sample periods.

1.5.3 Causality between Monetary Policy Tools and Market Indexes and Bond Spreads

In this section, we report the combined impact of monetary policy and market index and bond spreads. Results suggest that all the market indexes and three bond-spreads generally Granger cause DFF during the overall sample period which effect is largely dominated by the causality prevalent during pre-QE period. However, during QE period such causality does not hold. It reveals some important implications. First, during QE period DFF is not responsive to market forces. Second, DFF also generally does not have causality over the market indexes and three bond markets in any of the three periods. These two implications are consistent with the argument that as Federal Fund Rate approaches zero-bound, as a policy tools its effectiveness diminishes. Results also suggest that log(TOT) Granger causes AAA and CCC bond spreads during QE sample period only. For BBB bond spread, the causality is not clear as BBB spread also causes log(TOT). Besides, log(TOT) Granger causes SNP500 return only during pre-QE period and that is effect is dominant enough to be evident for the overall sample period but not during QE period. For other market indexes, there is no significant causality relationship in any of the three sample periods.

1.6. Effects of Monetary Shocks on Market Indexes

In the previous section, we discuss the nature of pair-wise causality relationships between monetary shocks, conventional and unconventional monetary policy tools and their impact on market indexes and bond spreads. In continuation with that discussion, this section discusses key findings on the magnitude of these causality relationships during the three

periods: overall period, pre-QE period and QE period; by using VAR (Vector Auto Regressive) estimations. We limit our analysis to the extent of VAR estimation following Pedroni (2004) arguments. Pedroni summarizes the shorter time span as a key impediment to robust and consistent estimation for co-integration tests. As solutions to the problem, Pedroni points out two plausible options: first, by extending the data set by allowing additional cross-sections and then using a Panel Co-integration approach, and second, by using more conventional VAR analysis technique. Between these two alternatives, we skip the first choice as our study focuses on Quantitative Easing impact on United States only. Accordingly, we use VAR technique and summarize the key results in this section.

1.6.1 Monetary Policy Tools and Monetary Shocks

Panel A, B and C of Table 04 report VAR estimates for a) conventional monetary policy tools: DFF as Federal Fund Rate (in %), percentage change in M1 (Narrow Money), percentage change in nonM1 (components of M2 not included in M1), and b) two types of Monetary Shocks and percentage change in unconventional asset-side component of TOT (total holding in special asset purchase programs by Federal Reserve System) for three sample periods.

Results suggest that 1% change in previous period and previous second period Federal Fund Rate (DFF) are likely to impart a negative 16.8 basis point and a positive 17.20 basis point change in elasticity for Total special programs holding (% Δ in TOT) respectively during the overall period. However, during the pre-QE period, the economic significance is much less prominent as DFF is only significant at second period over % Δ in TOT and in QE regime there is no evidence of any economic and statistical significance. Such result is consistent with the nature of DFF as Federal Funds approaching the zero-bound become less effective. Impact of Federal Fund Rate on change in elasticity for non-M1 components of M2 (% Δ in NONM1) also is almost similar in magnitude but otherwise different in signs in the previous period and previous second period estimates. DFF is generally ineffective over the change in elasticity of M1 (% Δ in M1) and two monetary shocks in all three samples.

Although previous period and previous second period change in elasticity in M1 are significant in explaining changes in elasticity for non-M1 components of M2 and total special programs holdings by the Federal Systems (TOT) during the overall period, during the pre-QE and QE such results are not robust consistent with the structural changes in the interaction between Monetary policy tools. Most important findings from Table 04 concerning our study are the impacts of change in elasticity of total assets held in special programs by the FED. Results suggest that, among the three sample periods, change in elasticity of total assets held in special programs has only significant impact on expected and unexpected monetary shocks during the QE regime. Generally, other variables have no significant impact on monetary shocks in the three sub-samples which suggest that Federal Reserves' special asset holding is quiet effective in terms of channeling the monetary shocks further.

1.6.2 Monetary Shocks and Market Indexes

Panel A, B and C of Table 05 report VAR estimates for; a) two types of Monetary Shocks; i) Expected and ii) Unexpected shocks (all in % interest); and b) returns on four market indexes: i) DJIA as return on Dow Jones Industrial Average Index, ii) TWEX as change in major trade-weighted exchange index, iii) SNP500 as return on S&P500 Index and iv) VIX as Implied Volatility Index on S&P500; for three sample periods.

Results suggest that both expected and unexpected shocks have statistically and economically significant effects on DJIA and SNP500 returns in all three sample periods.

Table 04
VAR Estimation for Monetary Shocks and Monetary Tools

Panel A, B and C of Table 07 report VAR estimates for; a) conventional monetary policy tools: i) DFF as Federal Fund Rate (in %) , and Federal Reserve System's liability side tools such as: ii) % change in M1 (Narrow Money), iii) % change in NONM1 (components of M2 not included in M1); b) two types of Monetary Shocks; and c) % change in unconventional asset-side component of TOTSPEC (total holding in special asset purchase programs by Federal Reserve System) for three sample periods: a) Overall period (December 18, 2002 to November 30, 2011), b) Pre Quantitative Easing (QE) Period (December 18, 2002 to December 24, 2008), and c) QE Period (December 31, 2008 to November 30, 2011).

	Panel A: Overall Period						Panel B: Pre QE Period						Panel C: QE Period					
	DFF	%Δ M1	%Δ nonM1	%Δ TOT	EXP	UN EXP	DFF	%Δ M1	%Δ nonM1	%Δ TOT	EXP	UN EXP	DFF	%Δ M1	%Δ nonM1	%Δ TOT	EXP	UN EXP
DFF(-1)	0.95^{c}	-0.01	0.003^{c}	-0.16^{c}	0.12^{b}	-0.08	0.93^{c}	-0.01^{a}	0.01^{b}	-0.15^{b}	0.12	-0.10	0.69^{c}	0.01	-0.02	0.19	0.03	-0.08
DFF(-2)	0.04	0.01	-0.003^{c}	0.17^{c}	-0.12^{a}	0.07	0.06	0.01	-0.01^{a}	0.15^{b}	-0.11	0.09	0.23	-0.02	0.01	-0.18	-0.03	0.03
%ΔM1(-1)	-2.91^{c}	-0.08	0.06^{c}	1.57^{c}	0.73	-1.33^{c}	-4.61^{c}	0.04	0.02	2.61^{c}	1.33	-1.91^{b}	-0.05	-0.24^{c}	0.12^{c}	-0.06	-0.105	-0.15
%ΔM1(-2)	0.71	-0.26^{c}	0.05^{c}	1.34^{c}	-1.39^{b}	0.39	1.02	-0.31^{c}	0.05^{c}	1.75^{a}	-2.01^{a}	0.21	-0.38^{b}	-0.21^{c}	0.05^{a}	0.38^{b}	0.20^{a}	-0.28^{a}
%ΔnonM1(-1)	-13.66^{c}	0.72^{c}	-0.03	1.64	7.02^{c}	-10.21^{c}	-21.05^{c}	0.89^{c}	-0.11^{c}	2.98	10.93^{c}	-15.87^{c}	0.41	0.36	0.08	-0.18	-1.29^{c}	0.37
%ΔnonM1(-2)	-5.20^{c}	0.11	-0.11^{c}	3.40	-2.66	-3.08	-8.86^{c}	0.03	-0.15^{c}	5.06	-4.37	-5.77^{c}	-0.94	0.08	-0.03	0.24	0.94^{c}	-1.01^{b}
%ΔTOT(-1)	-0.10^{c}	-0.006^{b}	0.002^{c}	-0.41^{c}	-0.07	-0.01	-0.11^{b}	-0.01	0.01	-0.41^{c}	-0.07	-0.01	-0.36^{c}	-0.04	0.01	0.01	0.14^{c}	-0.19^{c}
%ΔTOT(-2)	-0.05	-0.01	0.01	0.15^{c}	-0.08^{a}	0.01	-0.06	-0.01	0.01	0.16^{c}	-0.09	0.01	-0.08	0.08^{c}	-0.03^{c}	-0.27^{c}	0.01	-0.03
EXP(-1)	-0.12^{c}	0.01	-0.01	-0.05	0.35^{c}	-0.12^{c}	-0.10	0.01	-0.01	-0.06	0.34^{c}	-0.11^{a}	-0.21	-0.07	0.01	0.10	0.23^{b}	-0.18
EXP(-2)	0.16^{c}	0.00	-0.00	0.08	-0.20^{c}	0.04	0.15^{c}	0.01	-0.01	0.07	-0.19^{c}	0.03	0.38^{c}	0.00	-0.01	-0.17	-0.32^{c}	0.45^{c}
UNEXP(-1)	-0.63^{c}	0.01	-0.004^{c}	0.14^{a}	0.01	0.20	-0.59^{c}	0.01	-0.03	0.12	-0.01	0.22^{c}	-0.49^{c}	-0.06	0.03	-0.48^{c}	-0.05^{c}	0.12
UNEXP(-2)	0.10	-0.01	0.002	-0.08	-0.04	-0.11	0.09	-0.01	0.02	-0.08	-0.02	-0.12	0.02	0.01	-0.02	-0.07	-0.21^{b}	0.19
C	0.01	0.002^{c}	0.001^{c}	-0.01	0.004	0.005	0.02	0.01	0.01^{c}	-0.00	0.01	0.01	0.01	0.01	0.01	-0.01	0.01	0.01
Adj. R-sq	0.99	0.12	0.08	0.27	0.12	0.10	0.99	0.150	0.07	0.27	0.12	0.12	0.79	0.08	0.13	0.13	0.21	0.14
No. of Obs.	462	462	462	462	462	462	315	315	315	315	315	315	147	147	147	147	147	147

Superscripts of a, b and c correspond to statistical significance of 10%, 5% and 1% respectively.

Table 05
VAR Estimation for Monetary Shocks and Market Indexes

Panel A, B and C of Table 08 report VAR estimates for; a) two types of Monetary Shocks; i) Expected and ii) Unexpected shocks (all in % interest); and b) returns on four market indexes: i) DJIA as return on Dow Jones Industrial Average Index, ii) TWEX as change in major trade-weighted exchange index [do not report], iii) SNP500 as return on S&P500 Index and iv) VIX as Implied Volatility Index on S&P500; for three sample periods: a) Overall period (December 18, 2002 to November 30, 2011), b) Pre Quantitative Easing (QE) Period (December 18, 2002 to December 24, 2008), and c) QE Period (December 31, 2008 to November 30, 2011). We only report VAR estimates for monetary shocks and market indexes because of space constraint.

	Panel A: Overall Period					Panel B: Pre QE Period					Panel C: QE Period				
	EXP	UNEXP	DJIA	SP500	VIX	EXP	UNEXP	DJIA	SP500	VIX	EXP	UNEXP	DJIA	SP500	VIX
EXP(-1)	0.395[c]	-0.143[c]	1.776[c]	1.848[c]	-6.366[b]	0.394[c]	-0.135[a]	1.766[c]	1.805[c]	-5.768[a]	0.007	0.012	27.417[c]	32.073[c]	-187.569[c]
EXP(-2)	-0.236[c]	0.059	1.152[b]	1.206[b]	-5.705[a]	-0.249[c]	0.069	1.206[c]	1.296[c]	-6.321[b]	-0.335[c]	0.458[c]	-11.078	-7.657	74.367
UNEXP(-1)	0.177[c]	0.102[a]	1.061[a]	1.078[a]	-4.243	0.187[c]	0.096	1.038[a]	1.009	-3.818	-0.170[c]	0.225[c]	15.528[c]	20.892[c]	-119.171[c]
UNEXP(-2)	-0.175[c]	-0.052	1.351[c]	1.471[c]	-2.762	-0.174[c]	-0.056	1.449[c]	1.587[c]	-3.579	-0.287[c]	0.256[c]	-13.674[a]	-12.918	67.204
DJIA(-1)	0.028	-0.033	0.354	0.418	-0.210	0.040	-0.051	0.545[a]	0.636[b]	-0.702	0.011[c]	-0.013[c]	-0.385	-0.401	2.664
DJIA(-2)	0.016	-0.011	0.024	0.019	0.083	0.027	-0.033	0.174	0.141	-0.881	-0.001	0.008	-0.344	-0.323	2.003
TWEX(-1)	0.003	0.008	0.009	0.010	-0.417	0.003	0.015	-0.115	-0.133	0.357	-0.001	-0.001	0.124	0.161	-1.365
TWEX(-2)	-0.001	-0.013	-0.079	-0.032	0.017	-0.001	-0.020	-0.152	-0.149	0.636	-0.001	-0.000	-0.015	0.108	-0.947
SP5(-1)	-0.024	0.030	-0.118	-0.145	-0.353	-0.032	0.046	-0.224	-0.281	-0.074	-0.009[c]	0.011[b]	0.144	0.170	-1.506
SP5(-2)	-0.011	0.008	0.060	0.037	-0.105	-0.022	0.030	-0.027	-0.015	0.482	0.004	-0.010[b]	0.052	-0.016	-0.314
VIX(-1)	-0.001	-0.001	0.010	0.012	-0.101	-0.001	-0.001	0.020	0.023	-0.148[c]	-0.001	0.001	-0.046[a]	-0.046	0.127
VIX(-2)	0.001	-0.001	0.015	0.010	-0.002	0.001	-0.002	0.018	0.011	-0.025	0.001[c]	-0.001	-0.031	-0.038	0.216
C	0.020[c]	-0.021[c]	-0.001	0.002	0.123	0.029[c]	-0.029[c]	-0.037	-0.044	0.169	0.001	-0.004[c]	0.137	0.183	-0.429
Adj. R-sq.	0.076	0.050	0.061	0.058	0.001	0.064	0.045	0.129	0.120	0.020	0.175	0.116	0.047	0.058	0.056
No. of Obs.	462	462	462	462	462	315	315	315	315	315	147	147	147	147	147

Superscripts of a, b and c correspond to statistical significance of 10%, 5% and 1% respectively.

Table 06
VAR Estimation for Monetary Shocks and Bond Spreads

Panel A, B and C of Table 09 report VAR estimates for; a) two types of Monetary Shocks; i) Expected and ii) Unexpected shocks (all in % interest); and b) three Bond Spreads : i) AAA as AAA option-adjusted spread (in %), ii) BBB as BBB option-adjusted spread (in %), and iii) CCC as CCC option-adjusted spread (in %); for three sample periods: a) Overall period (December 18, 2002 to November 30, 2011), b) Pre Quantitative Easing (QE) Period (December 18, 2002 to December 24, 2008), and c) QE Period (December 31, 2008 to November 30, 2011).

	Panel A: Overall Period					Panel B: Pre QE Period					Panel C: QE Period				
	EXP	UNEXP	AAA	BBB	CCC	EXP	UNEXP	AAA	BBB	CCC	EXP	UNEXP	AAA	BBB	CCC
EXP(-1)	0.384[c]	-0.159[c]	-0.007	-0.051	-0.391	0.383[c]	-0.189[c]	0.016	0.008	-0.101	0.033	-0.003	-4.178[b]	-1.405[b]	-14.091[c]
EXP(-2)	-0.228[c]	0.050	0.070	-0.071[b]	0.284	-0.215[c]	0.036	0.086[c]	-0.033	0.425	-0.337[c]	0.507[c]	-1.278	-0.635	-3.258
UNEXP(-1)	0.183[c]	0.086	-0.086	-0.054	-0.497	0.213[c]	0.057	-0.004	0.035	-0.186	-0.117	0.142	-1.164	-1.048[b]	-6.420
UNEXP(-2)	-0.162[c]	-0.071	0.152	-0.016	0.165	-0.164[c]	-0.098	0.179[c]	0.005	0.275	-0.280[c]	0.279[c]	-1.307	0.158	2.678
AAA(-1)	-0.011	-0.047	0.969[c]	0.029	0.085	-0.275[c]	-0.286[c]	1.023[c]	0.084	1.139[c]	0.004	-0.007	0.723[c]	0.007	-0.162
AAA(-2)	0.042	0.007	-0.073	0.050[c]	0.175	0.274[b]	0.057	0.139[b]	0.276[c]	0.395	-0.004	0.003	-0.111	0.038	0.229
BBB(-1)	0.020	-0.112	0.263[c]	1.366[c]	0.948[c]	0.169	0.041	0.031	1.119[c]	-0.065	0.053[c]	-0.048[b]	-0.552	1.020[c]	-1.415
BBB(-2)	-0.028	0.121	-0.210[c]	-0.396[c]	-0.816[c]	-0.151	0.100	-0.101	-0.320[c]	-0.613	-0.043[c]	0.042[c]	0.326	-0.187[b]	0.971
CCC(-1)	-0.010	0.011	0.015	0.031[c]	1.257[c]	-0.014	0.015	-0.021[c]	0.026[c]	1.227[c]	-0.006[c]	0.008[c]	0.160[c]	0.048[c]	1.367[c]
CCC(-2)	0.007	-0.007	-0.018	-0.035[c]	-0.327[c]	0.008	-0.020	0.018[c]	-0.021[c]	-0.248[c]	0.004[c]	-0.006[c]	-0.062	-0.019	-0.300[c]
C	0.044[c]	-0.039[c]	0.014[c]	0.030[c]	0.193[c]	0.057[c]	-0.040[c]	0.016[b]	0.010	0.078	-0.003	-0.002	-0.193[c]	0.067[c]	0.336[a]
Adj. R-sq.	0.089	0.070	0.954	0.997	0.987	0.087	0.085	0.989	0.997	0.988	0.177	0.118	0.924	0.997	0.987
No. of Obs.	462	462	462	462	462	315	315	315	315	315	147	147	147	147	147

Superscripts of a, b and c correspond to statistical significance of 10%, 5% and 1% respectively.

However, the magnitudes of their impacts during pre-QE and overall period are much lower than those during the QE period. Besides the signs of VAR estimations in QE sample are otherwise different and exhibits tendency of reversion over the previous first and second periods. For example, 1% change in previous period expected shock is likely to impart 1.77 basis changes in DJIA and 1.85 basis changes in SNP500 return during overall period; and the impact is similar during pre-QE sample. However, during QE period, only previous period shocks are significant; like: 1% change in expected shock is likely to impart 27 basis changes in DJIA and 32 basis changes in SNP500. During all three sample periods, monetary shocks have no significant impact on changes in trade-weighted exchange index. However, for VIX, expected monetary shocks are significant in all three samples but unexpected shocks are rather significant in only QE sample period at their previous periods.

Later, in Panel A, B and C of Table 06, we report VAR estimates for; a) two types of Monetary Shocks: Expected and Unexpected shocks; and b) three Bond Spreads: AAA as AAA option-adjusted spread (in %), BBB as BBB option-adjusted spread, and CCC as CCC option-adjusted spread (in %); for three sample periods. Results are rather straightforward to summarize. During overall and pre-QE sample periods, the monetary shocks are not significant in explaining any of the three bond-spreads. However, for QE regime, expected shocks at their previous first period are significant for all three bond-spreads and unexpected shocks at their previous first period are significant for only BBB bond-spreads. Results suggest that, among the three sample periods, monetary shocks partially explain corporate bond spreads only during the QE regime.

1.6.3 Impact of Monetary Policy Tools on Market Indexes and Bond Spreads

Panel A, B and C of Table 07 report VAR estimates for; a) conventional monetary tools: DFF as Federal Fund Rate (in %) , and Federal Reserve System's liability side tools such as: percentage change in M1 (Narrow Money), percentage change in nonM1 (components of M2 not included in M1), percentage change in unconventional asset-side component TOT; and c) returns on four market indexes: DJIA, TWEX as change in major trade-weighted exchange index, SNP500 and VIX as Implied Volatility Index on S&P500 for the three sample periods.

Results from Panel A show that, among all the monetary policy tools both conventional and unconventional, only percentage changes in Federal Reserve's Total Asset held under Special programs in their previous period and previous second period are statistically significant in explaining DJIA and SNP500 returns, during the overall period. Although similar patter also holds during the pre-QE period, percentage change in TOT is rather not significant during the QE period.

Later, Panel A, B and C of Table 08 report VAR estimates for; a) conventional monetary tools: DFF as Federal Fund Rate (in %) , percentage change in M1 (Narrow Money), percentage change in nonM1 (components of M2 not included in M1); b) percentage change in unconventional asset-side component TOT; c) three Bond Spreads: AAA as AAA option-adjusted spread (in %), BBB as BBB option-adjusted spread (in %), and CCC as CCC option-adjusted spread (in %); for the three sample periods.

Table 07
VAR Estimation for Monetary tools and Market Indexes

Panel A, B and C of Table 10 report VAR estimates for; a) conventional monetary tools: i) DFF as Federal Fund Rate (in %) , and Federal Reserve System's liability side tools such as: ii) % change in M1 (Narrow Money), iii) % change in NONM1 (components of M2 not included in M1); b) % change in unconventional asset-side component TOTSPEC; and c) returns on four market indexes: i) DJIA return, ii) DTWEXM as change in major trade-weighted exchange index, iii) SNP500 as return on S&P500 Index and iv) VIX as Implied Volatility Index on S&P500; for three sample periods. We only report VAR estimates for market indexes because of space constraint.

	Panel A: Overall Period				Panel B: Pre QE Period				Panel C: QE Period			
	DJIA	TWEXM	SP500	VIX	DJIA	TWEXM	SP500	VIX	DJIA	TWEXM	SP500	VIX
DFF(-1)	-0.477	0.068	-0.468	1.583	-0.284	0.059	-0.268	0.765	1.933	0.699	4.401	-18.084
DFF(-2)	0.510	-0.059	0.497	-1.745	0.352	-0.052	0.333	-0.958	0.845	-0.473	-0.936	-8.463
%ΔM1(-1)	2.036	-1.843	2.586	-17.480	3.557	-1.524	3.875	-33.553	-5.812	-1.853	-7.577	30.679
%ΔM1(-2)	-8.543	-1.296	-7.816	54.463	1.879	-3.430	3.182	16.540	-27.355[c]	2.829	-27.200[c]	128.968[c]
%ΔnonM1(-1)	17.656	-7.112	15.055	-41.378	37.123	-3.208	39.053	-141.004	18.636	-15.289	8.057	-44.181
%ΔnonM1(-2)	-44.426[c]	-8.594	-41.225	249.50[c]	0.027	-16.263	6.734	40.961	-107.765[c]	3.349	-104.493[c]	537.911[c]
%ΔTOT(-1)	-1.279[c]	0.091	-1.164[c]	2.243	-1.213[c]	0.118	-1.081[c]	1.696	-4.385	-1.284	-6.009	36.338
%ΔTOT(-2)	-1.221[c]	0.036	-1.225[c]	4.632	-1.099[c]	0.053	-1.094[c]	4.087	3.209	-1.627	3.524	-11.662
DJIA(-1)	0.339	0.011	0.404	-0.179	0.507	0.150	0.609[b]	-0.673	0.076	-0.116	0.097	-0.007
DJIA(-2)	0.030	-0.031	0.030	-0.031	0.270	0.093	0.249	-1.506	-0.258	-0.107	-0.144	1.162
TWEXM(-1)	-0.034	-0.054	-0.031	-0.220	-0.155	-0.037	-0.169	0.544	0.074	-0.106	0.108	-1.143
TWEXM(-2)	-0.082	-0.024	-0.038	0.082	-0.165	-0.017	-0.168	0.769	-0.136	0.002	-0.023	-0.232
SP500(-1)	-0.116	-0.072	-0.144	-0.388	-0.217	-0.219	-0.287	-0.096	-0.253	0.146	-0.246	0.652
SP500(-2)	0.027	-0.002	0.001	0.142	-0.154	-0.157	-0.153	1.249	-0.071	0.232	-0.229	0.653
VIX(-1)	0.010	-0.007	0.012	-0.102	0.019	-0.010[a]	0.021	-0.140	-0.035	0.009	-0.032	0.025
VIX(-2)	0.014	0.003	0.008	0.005	0.017	-0.002	0.010	-0.019	-0.034	0.030[c]	-0.040	0.209
C	-0.002	-0.024	0.007	0.026	-0.245	-0.012	-0.257	0.661	-0.100	-0.116	-0.159	2.828
Adj. R-sq.	0.042	-0.001	0.032	-0.010	0.090	0.027	0.077	-0.012	0.056	-0.032	0.054	0.060
No. of Obs.	462	462	462	462	315	315	315	315	147	147	147	147

Superscripts of a, b and c correspond to statistical significance of 10%, 5% and 1% respectively.

Table 08
VAR Estimation for Monetary Policy Tools and Bond Spreads

Panel A, B and C of Table 11 report VAR estimates for; a) conventional monetary tools: i) DFF as Federal Fund Rate (in %) , and Federal Reserve System's liability side tools such as: ii) % change in M1 (Narrow Money), iii) % change in NONM1 (components of M2 not included in M1); b) % change in unconventional asset-side component TOTSPEC; c) three Bond Spreads : i) AAA as AAA option-adjusted spread (in %), ii) BBB as BBB option-adjusted spread (in %), and iii) CCC as CCC option-adjusted spread (in %); for three sample periods: a) Overall period (December 18, 2002 to November 30, 2011), b) Pre Quantitative Easing (QE) Period (December 18, 2002 to December 24, 2008), and c) QE Period (December 31, 2008 to November 30, 2011). We only report VAR estimates for bond spreads because of space constraint.

	Panel A: Overall Period			Panel B: Pre QE Period			Panel C: QE Period		
	AAA	BBB	CCC	AAA	BBB	CCC	AAA	BBB	CCC
DFF(-1)	-0.068	0.016	0.075	-0.039	0.040[a]	0.085	0.040	-0.267	-0.020
DFF(-2)	0.079	-0.024	-0.133	0.033	-0.039[a]	-0.147	0.531	0.360	0.620
%ΔM1(-1)	0.474	-0.423	0.788	0.268	-0.640	-0.608	1.520	0.100	2.068
%ΔM1(-2)	0.353	1.032[c]	10.468[c]	1.580[c]	0.544	13.436[c]	-1.791	1.369	3.632
% ΔnonM1(-1)	1.443	-0.059	-12.556	1.314	0.370	-26.693[c]	8.012	-1.414	5.358
% ΔnonM1(-2)	3.446	4.209[c]	19.018	3.648[b]	3.208[b]	7.960	3.767	3.816	27.035
% ΔTOT(-1)	0.120[b]	0.058[b]	0.245	0.044	0.017	-0.046	2.223[c]	0.847[c]	5.799[c]
% ΔTOT(-2)	0.052	0.049	0.332	0.017	0.009	0.127	-2.718[c]	0.006	-4.470
AAA(-1)	0.946[c]	0.023	0.154	0.972[c]	0.055	0.945	0.711[c]	0.008	-0.182
AAA(-2)	-0.094[c]	0.071[c]	0.289	0.111	0.286[c]	0.293	-0.158[a]	0.020	0.085
BBB(-1)	0.246[c]	1.359[c]	0.711[a]	0.087	1.160[c]	0.381	-0.337	0.985[c]	-1.325
BBB(-2)	-0.182[b]	-0.393[c]	-0.632	-0.104	-0.350[c]	-0.786	0.123	-0.155	0.832
CCC(-1)	0.019	0.031[c]	1.254[c]	-0.022[c]	0.027[c]	1.228[c]	0.157[c]	0.055[c]	1.392[c]
CCC(-2)	-0.018	-0.037[c]	-0.345[c]	0.015[a]	-0.022[c]	-0.292[c]	-0.055	-0.023[a]	-0.297[c]
C	-0.038	0.056[c]	0.447[c]	0.046[c]	-0.001	0.443[c]	-0.298[c]	0.044	0.142
Adj. R-sq	0.955	0.997	0.988	0.989	0.998	0.989	0.930	0.997	0.987
No. of Obs.	462	462	462	315	315	315	147	147	147

Superscripts of a, b and c correspond to statistical significance of 10%, 5% and 1% respectively.

Among all the conventional and non-conventional monetary policy tools, only percentage changes in Federal Reserve's Total Asset holding in special programs are generally significant in explaining bond spreads during the Quantitative Easing regime. While during pre-QE and overall sample period, the impact of percentage changes of special asset holding is not robust and in some cases, other monetary tools are also significant.

1.7. Impact of monetary shocks and alternate monetary policy on Bank Stocks

Earlier in the paper, the section six discusses the impact of monetary shocks at aggregate level during QE and pre-QE monetary regimes. Section seven presents empiric evidence on whether monetary shocks have differential impacts on bank stock returns during changing monetary regimes; later this section also analyzes whether changes in FED's total asset holding as an alternate monetary policy have impacts at bank stock level or not. Finally, this section also documents some evidences about which of the FED's asset purchase window have impact at bank level.

1.7.1 Summary Statistics of the Bank Sample

A sample of 186 banks is selected based on availability of balance sheet information in the COMPUSTAT Bank Annual database and stock return data from CRSP. Banks are sorted by their total asset size and then ranked and categorized in three types: a) small banks that are ranked bottom 33%; b) medium banks that are ranked middle 33%, and c) large banks that are ranked top 33%. All balance sheet data used from the COMPUSTAT Bank Annuals dataset are annual frequency; Table 9 presents summary statistics of the key bank characteristics. Included variables are: AT (Bank Total Assets in million USD), CAPR (Risk-Adjusted Capital Ratio – Combined), EBIT (Earnings before Interest and Taxes in percentage of bank total asset) and LT (Total Liabilities normalized with respect to bank total asset size). As FEDs total asset holding in special asset programs data begins from 2002, we select a matching sample period from December 18, 2002 to November 30, 2011; banks are ranked based on their previous year total asset size disclosed in the balance sheet information in the COMPUSTAT Bank Annual dataset. Table 9 reports the summary statistics by years as well as by bank size classifications; it also presents the Welch t-statistics of difference in mean among the samples.

Results suggest that, in general, banks with larger asset size tend to have higher EBIT. The variations in EBIT between the large and the small, and the large and the medium banks are statistically significant and different; however, for the medium and the small banks difference in EBIT is rather insignificant. Such findings are generally robust for each year under the sample from 2001 to 2010. For example, in year 2001, a large bank earns an average 702 million USD in EBIT compared to their medium size and smaller size counterpart banks with average EBIT of 18.52 million USD and 5.49 million USD respectively. Positive relation between bank size and EBIT resembles the argument of benefits from economies of scale and scope that larger banks enjoy over their smaller size counterparts. For CAPR and LT variables, there is no much difference among the large, the medium and the small ranked banks. The latter findings about CAPR and LT are consistent with the facts that banks as financial institutions are obliged to maintain a specific Capital ratio as given the regulators.

Table 09
Descriptive Statistics of Bank Characteristics

Table 09 reports the summary statistics of the key bank characteristics of a total of 186 banks included in the sample. All information is collected from COMPUSTAT Bank Annual database; sample period is 2000 to 2010. Banks are ranked by their total asset size each year and categorized into three categories: a) small banks that are ranked bottom 33%; b) medium banks that are ranked middle 33%, and c) large banks that are ranked top 33%. Included variables are: AT (Bank Total Assets in million USD), CAPR3 (Risk-Adjusted Capital Ratio – Combined), EBIT (Earnings before Interest and Taxes in percentage of bank total asset) and LT (Total Liabilities normalized by bank total asset).

Panel A: Bank Characteristics of Overall Sample

	Year: 2001				Year: 2002			
Variable	Mean	Max.	Min.	Std. Dev.	Mean	Max.	Min.	Std. Dev.
AT	20280.330	695877.000	86.478	87945.410	27521.160	759246.000	110.519	115129.100
CAPR3	14.296	49.900	9.200	4.723	14.172	48.200	8.200	4.403
EBIT	2.062	4.849	-2.763	0.771	2.152	4.481	-3.018	0.781
LT	0.908	0.963	0.740	0.026	0.907	0.966	0.556	0.032
	Year: 2003				Year: 2004			
AT	31934.990	1034216.000	51.295	137386.660	39281.880	1276778.000	75.953	177447.700
CAPR3	14.047	28.410	7.200	3.169	14.147	57.710	8.850	5.357
EBIT	2.179	13.648	-1.064	1.087	2.067	14.120	-2.925	1.114
LT	0.908	0.975	0.602	0.031	0.907	0.974	0.655	0.036
	Year: 2005				Year: 2006			
AT	43333.720	1588784.810	82.176	206491.000	54970.860	1952307.020	116.714	260796.580
CAPR3	14.099	50.830	10.080	5.188	14.387	48.900	10.020	5.117
EBIT	2.141	14.906	-2.199	1.212	2.026	12.277	-1.275	1.024
LT	0.904	0.974	0.722	0.038	0.902	0.973	0.754	0.036
	Year: 2007				Year: 2008			
AT	62208.830	2474411.180	119.361	305232.120	68564.900	3001251.460	45.235	348885.560
CAPR3	14.187	58.970	9.280	5.703	14.276	49.240	8.730	5.003
EBIT	1.824	13.565	-1.499	1.273	1.174	12.273	-8.674	1.462
LT	0.899	0.974	0.668	0.041	0.902	0.978	0.660	0.039
	Year: 2009				Year: 2010			
AT	70906.700	2949092.770	47.517	341921.060	70575.420	2651355.850	49.346	334540.590
CAPR3	14.823	45.500	3.000	4.674	15.554	41.450	1.070	4.623
EBIT	0.982	10.380	-4.535	1.696	1.426	9.349	-8.183	1.575
LT	0.903	0.989	0.705	0.034	0.902	0.997	0.756	0.033

Table 09: Descriptive Statistics of Bank Characteristics (*Continued*)

Panel B: Bank Characteristics by Bank Ranking

Year: 2001	Small				Medium				Large				Welch t-stat.		
Variable	Mean	Max.	Min.	Std Dev.	Mean	Max.	Min.	Std Dev.	Mean	Max.	Min.	Std. Dev.	Big-Small	Big-Middle	Middle-Small
AT	281.30	487.20	86.48	108.42	858.75	1509.48	487.67	297.96	59457.04	695877.00	1604.13	144786.02	**3.70**	**3.66**	**16.48**
CAPR3	14.98	35.70	9.40	4.80	14.32	31.00	9.78	4.23	13.57	49.90	9.20	5.06	-1.79	-1.01	-0.90
EBIT	1.88	3.97	-2.76	0.86	2.06	3.63	-1.66	0.73	2.27	4.85	0.89	0.65	**3.16**	**1.88**	1.40
LT	0.90	0.94	0.81	0.03	0.91	0.95	0.74	0.03	0.92	0.96	0.86	0.02	**3.98**	1.94	1.39
Year: 2002	Small				Medium				Large						
AT	321.80	551.92	110.52	122.54	959.27	1743.70	553.82	323.77	80962.40	759246.00	1785.98	188621.58	**3.94**	**3.91**	**16.96**
CAPR3	14.41	38.60	8.70	4.23	14.45	48.20	8.20	5.27	13.66	30.90	9.50	3.52	-1.18	-1.10	0.06
EBIT	1.94	3.39	-0.51	0.67	2.10	4.10	-3.02	0.89	2.47	4.48	0.95	0.66	**4.64**	**2.85**	1.26
LT	0.90	0.94	0.81	0.02	0.90	0.96	0.56	0.05	0.91	0.97	0.87	0.02	**3.32**	1.71	0.38
Year: 2003	Small				Medium				Large						
AT	335.72	573.55	51.30	127.04	1020.33	1838.84	583.75	337.25	94085.69	1034216.00	1846.50	225769.05	**3.87**	**3.84**	**17.71**
CAPR3	14.41	28.41	7.20	3.69	14.15	27.16	10.54	3.12	13.63	25.00	9.70	2.66	-1.46	-1.10	-0.46
EBIT	1.93	4.61	-1.06	0.81	2.07	4.35	0.74	0.69	2.58	13.65	1.08	1.55	**3.14**	**2.53**	1.18
LT	0.91	0.97	0.81	0.03	0.91	0.94	0.60	0.04	0.91	0.97	0.76	0.03	1.13	0.61	0.30
Year: 2004	Small				Medium				Large						
AT	356.36	609.12	75.95	140.77	1070.37	1964.44	610.09	362.45	116418.90	1276778.00	2058.04	293492.81	**3.77**	**3.75**	**17.52**
CAPR3	15.10	41.01	10.20	6.19	14.20	57.71	8.85	6.06	13.25	38.69	10.00	3.44	**-2.22**	-1.18	-0.88
EBIT	1.79	3.89	-2.93	0.90	1.97	3.51	0.53	0.58	2.46	14.12	0.94	1.57	**3.28**	**2.61**	1.49
LT	0.90	0.97	0.69	0.04	0.91	0.94	0.65	0.04	0.91	0.97	0.80	0.03	**2.64**	0.93	1.58
Year: 2004	Small				Medium				Large						
AT	378.38	650.25	82.18	149.57	1158.53	2081.16	660.65	416.42	128464.24	1588784.81	2107.01	343260.12	3.66	3.63	17.28
CAPR3	15.51	42.36	10.10	6.31	13.72	50.83	10.12	5.11	13.08	39.39	10.08	3.51	**-3.13**	-0.95	-2.04
EBIT	1.92	7.90	-2.20	1.09	1.99	3.74	0.54	0.63	2.52	14.91	0.44	1.66	**2.80**	**2.75**	0.54
LT	0.90	0.94	0.72	0.05	0.91	0.95	0.76	0.03	0.91	0.97	0.73	0.04	**1.93**	-0.26	2.35

Table 09: Descriptive Statistics of Bank Characteristics (*Continued*)

Panel B: Bank Characteristics by Bank Ranking

Year: 2006	Small				Medium				Large				Welch t-stat.		
Variable	Mean	Max.	Min.	Std Dev.	Mean	Max.	Min.	Std Dev.	Mean	Max.	Min.	Std. Dev.	Big-Small	Middle-Small	Big-Middle
AT	407.59	710.01	116.71	153.80	1219.33	2176.00	713.24	454.67	162740.03	1952307.02	2190.65	432555.53	**3.75**	**3.73**	**16.90**
CAPR3	15.77	41.92	10.02	5.52	14.04	48.90	10.20	5.74	13.35	30.92	10.49	3.49	**-3.64**	-1.02	-2.16
EBIT	1.83	6.13	-1.28	0.83	1.89	3.72	0.30	0.68	2.35	12.28	0.37	1.38	**3.02**	**2.81**	0.52
LT	0.89	0.94	0.76	0.04	0.91	0.96	0.76	0.03	0.91	0.97	0.75	0.03	**2.37**	-0.12	2.60
Year: 2007	Small				Medium				Large						
AT	414.87	709.90	119.36	153.84	1249.76	2291.63	709.95	447.70	184961.87	2474411.18	2317.25	508400.67	**3.72**	**3.70**	**18.07**
CAPR3	15.96	58.97	10.00	7.23	13.91	46.70	10.12	5.57	12.67	25.00	9.28	3.00	**-4.23**	-2.00	-2.27
EBIT	1.63	13.56	-0.70	1.42	1.63	3.70	-1.50	0.71	2.24	11.35	-0.71	1.48	**2.98**	**3.74**	0.02
LT	0.89	0.95	0.67	0.05	0.90	0.95	0.76	0.03	0.91	0.97	0.73	0.04	**3.13**	0.81	2.53
Year: 2008	Small				Medium				Large						
AT	431.32	756.40	45.24	168.87	1313.04	2302.68	761.01	448.24	203950.34	3001251.46	2341.50	582795.10	**3.66**	**3.65**	**19.31**
CAPR3	15.26	49.24	9.20	6.51	13.86	45.02	8.73	4.86	13.69	23.00	8.88	2.72	**-2.29**	-0.31	-1.79
EBIT	1.04	12.27	-3.40	1.49	0.94	2.86	-8.67	1.31	1.58	9.29	-2.21	1.52	**2.53**	**3.20**	-0.51
LT	0.89	0.96	0.66	0.05	0.91	0.96	0.77	0.03	0.91	0.98	0.81	0.03	**2.47**	0.32	2.17
Year: 2009	Small				Medium				Large						
AT	450.75	765.49	47.52	178.48	1368.65	2401.20	808.97	453.55	211510.68	2949092.77	2423.97	569174.90	**3.96**	**3.94**	**20.18**
CAPR3	14.82	45.50	9.23	5.47	14.62	42.04	3.00	5.11	15.04	25.60	8.10	3.03	0.38	0.75	-0.28
EBIT	0.84	6.49	-4.26	1.30	0.77	3.42	-4.05	1.38	1.34	10.38	-4.54	2.22	**2.06**	**2.33**	-0.41
LT	0.90	0.94	0.70	0.04	0.91	0.99	0.75	0.03	0.90	0.97	0.81	0.03	0.88	-0.51	1.31
Year: 2010	Small				Medium				Large						
AT	445.11	797.25	49.35	180.78	1377.91	2395.09	801.47	441.29	209903.22	2651355.85	2395.72	555195.85	**4.17**	**4.15**	**21.60**
CAPR3	15.66	36.50	7.06	5.24	15.21	41.45	1.07	5.09	15.81	32.26	9.00	3.19	0.28	1.10	-0.68
EBIT	1.19	5.02	-8.18	1.30	1.25	7.19	-3.07	1.32	1.79	9.35	-6.25	1.92	**2.85**	**2.55**	0.36
LT	0.90	1.00	0.76	0.04	0.91	0.99	0.79	0.03	0.90	1.00	0.82	0.03	0.87	-1.03	1.79

1.7.2 Monetary Shocks and Bank Stock Returns: Evidence from Overall Sample

This paper extends from Bernanke and Kuttner (2005) framework to analyze the monetary impact on bank stocks. Table 10 reports panel estimation of equation (4) as given in Bernanke and Kuttner (2005); monetary shocks and bank stock returns are daily frequency. Column (1) reports panel estimation for the overall sample period without differentiating the bank size effects. Column (1) estimates show that for the overall sample period of December 18, 2002 to November 30, 2011. Results suggest that expected monetary shock has positive effect on bank stock return; however, unexpected shock component has otherwise negative impact. Such findings are identical to Bernanke and Kuttner (2005) findings. Later, Column (2), (3) and (4) report panel estimation of equation (5) that considers smaller banks as base case and include medium size banks and large size banks as "medium" and "large" dummies respectively. Finally, column (5) includes both medium size and large size banks. Results from column (2) and (3) suggest that none of the monetary shock components has any significant impact on either the small size banks or the medium banks. Once large size banks are included, coefficient estimates suggest that both expected and unexpected components of monetary shocks have significant impact on stocks of large banks. To summarize, regression estimates from table 10 suggest that the significant monetary impact on overall sample may be contributed by significant impact that monetary shocks have over the large banks.

1.7.2 Bank Size and Monetary Shocks during Pre-QE and QE regime

Earlier, section six provides the supporting evidence of the differential impact of monetary shocks under QE regime and otherwise conventional monetary regimes. Hypothesis III of this paper aims at analyzing the same at bank stock level. Table 11 reports the panel estimates for equation (6). Overall Sample period is December 18, 2002 to November 30, 2011. "PreQE" dummy is used for pre-QE period from December 18, 2002 to December 24, 2008, and "QE" dummy is used for QE period from December 31, 2008 to November 30, 2011. Weekly data is used as change in Federal Reserve's asset holding in special programs is only available at weekly frequency.

Column (1) reports the panel estimations for overall sample; column (2), (3) and (4) present the results for the "small", the "medium" and the "large" ranked banks separately to analyze the impact of bank size effect. Results from column (1) suggest that during both conventional and QE regime, monetary shocks are not significant in explaining weekly stock returns; however change in FED's total asset holding in special programs is significant during the QE regime. Results from column (2), (3) and (4) commend for some explanations as well. Implications of monetary shocks for the "large" size banks are in general similar for the overall sample. Such patters may be consistent with the fact that FEDs asset purchase windows aim at purchasing a diversified range of assets and larger banks are more likely to be the recipients of such benefits. However, as the bank size decreases, monetary shocks have more explanatory power. The "medium" size banks exhibit responsiveness to monetary shocks during QE period; the "small" bank stocks are responsive to monetary shocks in both QE and pre-QE periods.

Table 10
Bank Size and Monetary Shocks: Overall Sample

Table 10 presents panel estimations of the equation (4) and (5):

$$\tilde{R}_{jt} = \beta_{0j} + \beta_{1j}\widetilde{ExShock}_{It} + \beta_{2j}\widetilde{UnExShock}_{It} + \tilde{\varepsilon}_{jt} \quad (4)$$

$$\tilde{R}_{jt} = \beta_{0j} + \beta_{1j}\widetilde{ExShock}_{It} + \beta_{2j}\widetilde{UnExShock}_{It} + D_i + D_i * \beta_{1j}\widetilde{ExShock}_{It} + D_i * \beta_{2j}\widetilde{UnExShock}_{It} + \tilde{\varepsilon}_{jt} \quad (5)$$

where EXSH and UNEXSH are expected and unexpected monetary shocks, respectively. Column (1) reports coefficient estimates for overall sample. For equation (5), small bank sample is held as base case and estimates are reported in column (2); later medium-size banks and large-size banks are included by introducing "medium" and "large" dummies and reported in column (3) and column(4). Finally, in column (4), both "medium" and "large" dummies are added to the base case of small bank sample. All data are daily; sample period is from December 18, 2002 to November 30, 2011. For each estimate, first row is the coefficient estimate that is followed by t-statistics presented within parenthesis. [a], [b] and [c] are statistical significance at 10%, 5% and 1%.

	Col (1)	**Col (2)**	**Col (3)**	**Col (4)**	**Col(5)**
	Co-eff.	Co-eff.	Co-eff.	Co-eff.	Co-eff.
C	-0.0626	0.1098	0.2776	-1.2183	-1.8587
	(-0.106)	(0.187)	(0.348)	(-1.3299)	(-1.382)
EXSH	**0.2270** [c]	0.0599	0.0606	0.0577	0.0555
	(3.524)	(0.533)	(0.539)	(0.5141)	(0.494)
UNEXSH	**-0.2592** [c]	0.1089	0.1097	0.1069	0.1048
	(-4.218)	(1.016)	(1.023)	(0.9978)	(0.977)
Medium		---	-0.5771	---	1.1065
			(-0.357)		(0.606)
Medium *EXSH		---	0.0187	---	0.0184
			(0.167)		(0.1653)
Medium *UNEXSH		---	-0.0583	---	-0.0579
			(-0.547)		(-0.544)
Large		---	---	**3.4390** [a]	**4.1495** [a]
				(1.659)	**(1.771)**
Large *EXSH		---	---	**0.5998** [c]	**0.5997** [c]
				(5.411)	**(5.410)**
Large *UNEXSH		---	---	**-0.8122** [c]	**-0.8122** [c]
				(-7.674)	**(-7.674)**
R-sq.	0.0057	0.0057	0.0057	0.0058	0.0058
Cross Section FE	Yes	Yes	Yes	Yes	Yes
Period FE	Yes	Yes	Yes	Yes	Yes
Cross Section	186	62	124	124	186

Table 11
Bank Size and Monetary Shocks during Pre-QE and QE regime

Table 11 presents panel estimation of the equation (6):

$$\tilde{R}_{jt} = \beta_{0j} + \beta_{1j}\,\widetilde{ExShock}_{It} + \beta_{2j}\,\widetilde{UnExShock}_{It} + \beta_{3j}\,\Delta\, in\, FEDtotalAsset_{It} + QE + QE * \beta_{1j}\,\widetilde{ExShock}_{It} + QE * \beta_{2j}\,\widetilde{UnExShock}_{It} + QE * \beta_{3j}\,\Delta\, in\, FEDtotalAsset_{It} + \tilde{\varepsilon}_{jt} \quad (6)$$

Column (1) reports coefficient estimates for overall sample; column (2), (3) and (4) present coefficient estimates of equation (6) for small, medium and large banks separately. Weekly data is used as change in Federal Reserve's asset holding in special programs is a only available at weekly frequency. Overall Sample period is December 18, 2002 to November 30, 2011. "PreQE" dummy is used for pre-QE period from December 18, 2002 to December 24, 2008, and "QE" dummy is used for QE period from December 31, 2008 to November 30, 2011. For each estimate, first row is the coefficient estimate that is followed by t-statistics presented within parenthesis. [a], [b] and [c] are statistical significance at 10%, 5% and 1%.

	Col (1)	Col (2)	Col (3)	Col (4)
	Overall	Small	Medium	Large
	Co-eff.	Co-eff.	Co-eff.	Co-eff.
C	0.0011	0.0000	-0.0016	-0.0018
	(0.031)	(0.369)	(-0.079)	(-0.270)
EXSH	0.0003	**0.0003** [c]	0.0023	0.0005
	(0.117)	**(5.004)**	(0.324)	(0.864)
UEXSH	0.0001	**-0.0003** [c]	-0.0001	-0.0007
	(0.040)	**(-3.836)**	(-0.017)	(-1.070)
ChangeTOT	-0.0048	**0.0153** [c]	-0.0021	0.0085
	(-0.023)	**(3.889)**	(-0.003)	(0.190)
QEE	0.0127	**0.0032** [c]	**0.5921** [c]	0.0028
	(0.182)	**(2.808)**	**(2.522)**	(0.190)
QEE*EXSH	-0.0111	**-0.0015** [b]	**-0.3805** [c]	0.0098
	(-0.242)	**(-1.841)**	**(-2.522)**	(1.014)
QEE*UEXSH	0.0201	**0.0076** [c]	**0.3919** [c]	0.0003
	(0.551)	**(12.264)**	**(3.131)**	(0.035)
QEE*ChangeTOT	**-4.9067** [c]	**-1.3987** [c]	**-73.0919** [c]	**-1.0540** [c]
	(-17.306)	**(-23.893)**	**(-8.513)**	**(-17.594)**
R-sq.	0.0696	0.8656	0.5120	0.0710
Cross Section FE	Yes	Yes	Yes	Yes
Period FE	Yes	Yes	Yes	Yes
Cross Section	186	62	62	62

Table 12
Bank Size, Monetary Shocks and Asset Purchase Programs

Table 12 presents panel estimation of the equation (7):

$$\tilde{R}_{jt} = \beta_{0j} + \beta_{mj}\tilde{R}_{mt} + \beta_{1j}\,\widetilde{ExShock}_{It} + \beta_{2j}\,\widetilde{UnExShock}_{It} + \gamma_{2,j,i}\,EventDummy_{i,t} + \tilde{\varepsilon}_{jt} \quad (7)$$

Column (1) reports coefficient estimates for overall sample; later column (2), (3) and (4) present coefficient estimates of equation (7) for small, medium and large banks respectively. All data are daily. For each estimate, first row is the coefficient estimate that is followed by t-statistics presented within parenthesis. [a], [b] and [c] are statistical significance at 10%, 5% and 1%.

		Col (1)	Col (2)	Col (3)	Col (4)
		Overall	Small	Middle	Big
		Co-eff.	Co-eff.	Co-eff.	Co-eff.
	C	-0.7503	-0.3767	-0.1294	-0.2597
		(-1.266)	(-1.100)	(-0.371)	(-0.799)
	EXSH	**0.1968**[c]	0.0824	-0.0180	**0.5099**[c]
		(2.995)	(1.232)	(-0.266)	**(8.149)**
	UNEXSH	**-0.2954**[c]	0.0109	-0.0749	**-0.8016**[c]
		(-4.550)	(0.165)	(-1.123)	**(-12.969)**
1	UNEXSH*OpenTAF	**22.7851**[a]	**30.6835**[b]	-2.3575	**35.7171**[c]
		(1.775)	**(2.356)**	(-0.178)	**(2.917)**
2	UNEXSH*OpenTSLF	**2.4958**[c]	1.0783	**1.8692**[b]	**4.6340**[c]
		(3.080)	(1.301)	**(2.257)**	**(6.004)**
4	UNEXSH*OpenAMLF	**-8.4219**[c]	**-2.8320**[c]	**-6.9370**[c]	**-15.5309**[c]
		(-15.251)	**(-5.037)**	**(-12.234)**	**(-29.518)**
5	UNEXSH*__OpenCPFF__	**1.7838**[c]	**1.2694**[c]	**1.4716**[c]	**2.5162**[c]
		(10.712)	**(7.534)**	**(8.587)**	**(15.821)**
6	UNEXSH*__OpenMMIFF__	**-5.5588**[c]	-0.4767	**-4.8256**[c]	**-11.3329**[c]
		(-10.204)	(-0.863)	**(-8.626)**	**(-21.734)**
7	UNEXSH*OpenTALF	-3.3883	**-22.2092**[c]	1.1426	11.9951
		(-0.477)	**(-3.111)**	(0.156)	(1.754)
8,9,10	UNEXSH*CloseAMLF	13.9152	-6.6837	**24.8365**[c]	**22.9665**[c]
		(1.558)	(-0.735)	**(2.696)**	**(2.6986)**
11	UNEXSH*CloseTAF	13.1253	-1.4205	26.4193	14.2109
		(0.802)	(-0.085)	(1.564)	(0.910)
12	UNEXSH*CloseTSLF	4.7695	-0.5716	0.7764	**12.7814**[c]
		(1.509)	(-0.178)	(0.237)	**(4.250)**
	R-sq.	0.0065	0.0059	0.0060	0.0089
	Cross Section FE	Yes	Yes	Yes	Yes
	Period FE	Yes	Yes	Yes	Yes
	Cross Sections	186	62	62	

1.7.3 Bank Size, Monetary Shocks and Asset Purchase Programs

We extend from Bernanke and Kuttner (2005) to analyze the set of Asset purchase programs initiated by the FED following the 2008 global financial crisis; equation (7) includes event dummies for the opening and closing dates of the asset purchase windows. Column (1) in Table 12 reports the panel estimation of equation (7) for the overall sample; later column (2), (3) and (4) present estimates for small size banks, medium size banks and large size banks respectively.

Among the opening events, opening of Term Auction Facility (TAF) on December 12, 2007 has positive stock reaction from large and small banks and for the overall sample as well. Term Auction Facility (TAF) is a window where FED would auction term funds to depository institutions; all depository institutions that are eligible to borrow. Similarly, there is a positive stock reaction for the opening of Term Security Lending Facility (TSLF) window. On March 11, 2008, The Federal Reserve Board announces the creation of the TSLF that would lend up to $200 billion of Treasury securities for 28-day terms against federal agency debt, federal agency residential mortgage-backed securities (MBS), non-agency AAA/Aaa private label residential MBS, and other securities. Later, opening of Commercial Paper Funding Facility (CPFF) on October 7, 2008 also exhibit positive stock reaction for all types of banks; creation of CPFF was intended to provide a liquidity backstop to U.S. issuers of commercial paper through a special purpose vehicle that will purchase three-month unsecured and asset-backed commercial paper directly from eligible issuers.

For two other opening windows, the bank stock reactions are otherwise negative. On September 19, 2008, FED discloses the creation of the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) to extend non-recourse loans at the primary credit rate to U.S. depository institutions and bank holding companies to finance their purchase of high-quality asset-backed commercial paper from money market mutual funds. On October 21, 2008, FED Board discloses creation of the Money Market Investor Funding Facility (MMIFF) that aims at senior secured funding to a series of special purpose vehicles to facilitate the purchase of assets from eligible primary dealers.

For the other opening window event, there is no robust stock reaction in the selected bank sample; on March 3, 2009, FED announces the creation of the Term Asset-Backed Securities Lending Facility (TALF) to lend up to $200 billion on a non-recourse basis to holders of AAA-rated asset-backed securities. Findings on bank stock reaction on the different asset purchase window opening events can be better summarized as inconclusive. However, bank stock reaction on closure of asset purchase windows are rather easy to summarize. Closures of asset purchase windows have positive stock reaction from large banks and medium size banks for CPFF, MMIFF AMFLF windows. For closure of TSLF, there is positive and significant reaction from only large banks. Among the closure of six asset purchase windows, there is no significant stock reaction on the closure of TAF window from any type of banks.

1.8 Summary Findings

This paper analyzes the impact of FED's monetary policy actions following the 2008 global financial crisis with specific focus on the Quantitative Easing policy during the zero-bound interest rate regime. Following Bernanke and Kuttner (2005), we calculate the expected and unexpected monetary shocks. Summary statistics suggests that both expected and unexpected shocks are significantly different in terms of their means and variances during pre-QE and QE regime; besides this, the means and their variances of all conventional and unconventional monetary tools are generally different during pre-QE and QE regime which is consistent with the regime change argument in monetary shocks and monetary policy tools in a

QE monetary regime. Granger causality analysis exhibits some key causality patterns. Out of three conventional policy tools, only M1 have significant causality relationship over TOT during all the three regimes, while TOT has significant causality over all conventional during QE period only. Causality within expected and unexpected monetary shocks are more pronounced and robust during QE regime, and during the QE regime, monetary shocks work as efficient transmission channels for monetary policy only for bond spreads and have no significant causality over market indexes. Monetary shocks do have causality effect on commercial papers, for both financial and non-financial and for different maturities, but only during the QE regime.

Both expected and unexpected shocks have statistically and economically significant effects on DJIA and SNP500 returns in all three sample periods but their economic magnitudes during pre-QE and overall period are much lower. For example, 1% change in previous period expected shock is likely to impart 1.77 basis changes in DJIA and 1.85 basis changes in SNP500 return during overall period; and the impact is similar during pre-QE sample. During all three sample periods, monetary shocks have no significant impact on changes in trade-weighted exchange index. However, for VIX, expected monetary shocks are significant in all three samples but unexpected shocks are rather significant in only QE sample period at their previous periods. Among all the monetary policy tools both conventional and unconventional, only % changes in Federal Reserve's Total Asset held under Special programs in their previous period and previous second period are statistically significant in explaining DJIA and SNP500 returns, during the overall period. But, during pre-QE and overall sample period, impact of percentage changes of special asset holding is not robust and in some cases, other monetary tools are also significant.

We also analyze the impact of monetary actions at bank stock level to complement our prior analysis of monetary impact on aggregate level. We use a set of 186 banks that discloses financial information on COMPUSTAT Bank Annual database and have stock return data on CRSP database. Banks are sorted by their asset sizes and divided into three classes: "small", "medium" and "large" represented by lowest 33%, middle 34% and highest 33% ranks of the sample sorted by the total bank assets for each year. Results suggest that, in general, banks with larger asset size tend to have higher EBIT; however, for CAPR and LT variables, there is no much difference among the "large", "medium" and "small" ranked banks. We extend the analysis of monetary actions on bank stock return in three different ways.

First, we analyze the impact of monetary shocks without differentiating the monetary regimes for the overall sample period of December 18, 2002 to November 30, 2011. Results suggest that, in general, expected monetary shock has positive effect on bank stock return; however, unexpected shock component has otherwise negative impact. Such findings are identical to Bernanke and Kuttner (2005) findings. However, for "small" and "medium" size banks, such findings are not as robust as evident for "large" banks.

Second, we investigate impact of monetary shocks and change in FED's total asset holding in special asset purchase window during the pre-QE and QE regimes for the overall bank sample as well as for the three bank sub-samples, both individually and collectively. Results suggest that during both conventional and QE regime, monetary shocks are not significant in explaining weekly stock returns; however change in FED's total asset holding in special programs is significant during the QE regime and such findings are more robust for the "large" banks when compared to "medium" and "small" banks. However, as the bank size decreases, monetary shocks have more explanatory power. "Middle" size banks exhibit responsiveness to monetary shocks during QE period; "small" bank stocks are responsive to monetary shocks in both QE and pre-QE periods.

Finally, we analyze whether any abnormal return exists for the announcement events of opening and closure of different the asset purchase windows by the FED. For the opening events, out of six asset purchase windows, we find three events have positive stock response in the bank sample. For example: the opening of Term Auction Facility (TAF) on December 12, 2007, Term Security Lending Facility (TSLF) window on March 11, 2008 and Commercial Paper Funding Facility (CPFF) on October 7, 2008, have positive response. However, two other window opening events of the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) on September 19, 2008 and the Money Market Investor Funding Facility (MMIFF) On October 21, 2008, have rather negative response. Findings on bank stock reaction on the different asset purchase window opening events can be better summarized as inconclusive. However, bank stock reaction on closure of asset purchase windows are rather easy to summarize; the closures of asset purchase windows have positive stock reaction from large banks and medium size banks for CPFF, MMIFF AMFLF windows. For closure of TSLF, there is positive and significant reaction from only large banks.

To summarize, the results are, in general, consistent with Bernanke (2004) argument that even during a zero-bound interest rate regime; FED may still affect target variables through managing its asset-side components at aggregate level. At bank stock level, we find the response to opening of assets purchase programs are rather mixed; however, the closure information of asset purchase programs are generally perceived as good signal. Besides, there are significant variations among bank stock response once bank sizes are considered; large banks stocks are generally more responsive as they are recipients of greater benefits of asset purchase programs.

2. Chapter 02: Prudential Regulatory Regimes, Accounting Standards and Loan Loss Provision in Banking Industry

2.1 Introduction

Prudential regulations and accounting standards provide specific guidelines for loan loss accounting in the banking industry; the bank managers are required to keep provisions from the earning to cover up expected loan losses based on a certain loan quality matrix given by the regulators. Current literature in bank earning management and accounting documents that bank managers often use their discretion in loan loss provisioning (hereafter cited as LLP); extant studies provide three major explanations: income smoothing, capital management, and signaling. However, the empirical evidences in bank earning management in terms of LLP can be best summarized as inconclusive as documented in Wahlen (1994), Ahmed et al (1999), Anandarajan et al (2003), Bouvatier and Lepetit (2006), and more recently Das and Ghosh (2007).

While the impact of managerial discretion in LLP still remains debatable, a recent set of literature, for example: Bikker and Metzemakers (2005), Pérez, Fumás, and Saurina (2006), Bouvatier and Lepetit (2010), and Égert and Sutherland (2012), looks into the implications of prudential regulations over bank earning management. Prudential regulations are important for banking industry for two explicit reasons. First, as banks and financial institutions are highly leveraged and deal with depositors investments, the banking industry is subjected to higher regulatory oversights. So, prudential regulations are often aimed at bringing in better industry disciplines. Second, the probability of loan delinquencies is correlated with macro-economic cycles or business cycles that eventually lead bank managers keeping aside higher amount of loan loss provision during the downturn. The latter phenomenon is often cited as the "pro-cyclicality of loan loss provisioning" that can be eventually counter-effective during the times of credit crunch and thus undermine monetary authorities' initiatives to add additional liquidity in the credit channel. Risk-based capital adequacy requirements fostered by Basel I and subsequently Basel II standards imparts pro-cyclicality components in loan loss provisioning and capital requirements (see: Kero (2011) for more on Basel I and II regulations).

Although the regulators and researchers begin focusing on the challenges of pro-cyclicality in prudential regulations since 2000, this issue has gained much more importance right after the financial crisis of 2007. Regulators in Spain are the first to initiate the concept dynamic provisioning in 2000 as an alternative regulatory framework that requires bank managers' to set aside LLP using a formula that estimates provisions through forward looking forecasts. Following the dynamic prudential framework of Spain, regulators in other countries, like: Chile, Colombia and Peru initiates similar approach in 2003, 2007 and 2009 respectively with some variations to adjust for country-specific customizations. As dynamic provisioning regime is still an evolving prudential framework, a trend of recent literature focuses on single country simulation studies, for example: Burroni et al (2009), Torsten Wezel (2010), and Lau (2011). A few multi-country studies provide rather empiric analyses because of data availability (Bikker and Metzemakers (2005), Pérez et al (2006), Bouvatier and Lepetit (2010) and Égert and Sutherland (2012)). More recently, a trend of studies also focuses on plausible impact of dynamic provisions if implemented on United States that are largely based on simulation analysis (see: Fillat and Garriga (2010)).

Fonseca and Gonza´lez (2008) paper is closely related to this study; using a panel database of 3221 bank-year observations from 40 countries, Fonseca and Gonza´lez (2008) identify that income smoothing of loan loss provision depends on investor protection,

disclosure, regulation and supervision, financial structure, and financial development, after controlling for country GDP growth, year fixed effect and bank specific variables.

In line with this emerging trend of studies, this paper is motivated to analyze how a change in prudential regulatory regimes may affect LLP. We differ from the extant studies in one important way that we analyze the change in prudential regime change in cross country set up that includes countries with both pro-cyclic and dynamic regimes. Besides, core to the motivation of this study, we also analyze if change in accounting standards impart any impact on bank earning management. As US GAAP, UK GAAP, and IFRS and other prevailing accounting standards are converging to a more principle-based accounting standard by the end of 2015, analyzing the impact of different accounting standards may provide different insight to the bank earning management literature. Existing accounting literature shows that the migration from a rule-based to a principal-based accounting standard has otherwise reduced managerial discretion in earning managements in non-financial firms during the mandatory migration of accounting standards of 2004-2005 for EU countries (Capkun et al (2010)). To our best knowledge, this study is one of the few studies to explicitly analyze impact of similar migration of accounting standards in banking industry.

Two reasons, intertwined with each other, commend for a global perspective of analysis on bank earning management in terms of LLP. First, changes in prudential regulations or moving from one accounting standard to another accounting standard involve significant change in regulatory regimes and, for any given country, such events are rather infrequent. To analyze how such changes may affect, we use a larger cross section of countries to bring in more information to analyze the phenomenon empirically. Second, as we control for country effects in a cross-country approach, it allows us to provide a bigger picture on how changes in accounting standards and prudential regulatory regimes may affect LLP in general. While existing studies on the bank earning literature provide a few cross-country analyses, we argue the latter reason makes contribution of this paper worthy to extant literature.

Consistent with the core arguments, we analyze three explicit questions: Whether a change in regulatory stance in terms of loan loss provisioning, from a pro-cyclical regime to a dynamic regime, can affect bank earning management via LLP? Whether changes in accounting standards affect managerial discretion over managing earnings in banking sector? What is the joint effect of changes in accounting standards and changes in regulatory regimes?

Accordingly, we expect this study to contribute to the extant bank earning management literature in three different ways. First, core to the arguments in earning management literatures, this is one of the few early studies to analyze how these two competing loan provisioning regulatory framework may affect managerial discretion in LLP. Second, instead of country specific analysis, this study provides a cross-country analysis that allows us to draw information from additional cross-sections. Third, to our best knowledge, this study is one of the early studies to analyze the implications of the provision regulations following the 2007 financial crisis with a reasonably large global dataset. Our dataset covers a time period of 12 years from 1999 to 2010 that provides us with reasonably large and recent information as compared to extant studies that generally use dataset ending at 2004.

The remainder of the study is organized as following. Section two provides a brief overview of extant literature. Later, section three presents the core research questions and related hypotheses in the methodology section; next section three provides a brief description of data and plausible econometric techniques to analyze the research questions. Section four presents the descriptive statistics and section five discusses the regression analysis. Finally, section six, summarizes the key findings.

2.2 Literature Review

Three sets of literature on financial institutions and accounting standards are relevant to this study. The first set focuses on definitions of loan loss provisions and their implications as core to the bank earning management arguments. The second set summarizes the key arguments in dynamic provisioning and pro-cyclical provisioning and related empiric evidences. The third set is related with accounting standards and implications of changes in accounting standards on earnings management, in general.

2.2.1 Loan Loss Provisioning and Bank Earnings Management

Extant literature on bank earning management, generally, provides three major explanations: a) income smoothing, b) capital management, and c) signaling hypothesis. First, Income smoothing hypothesis argues that bank managers tend to set aside loan loss provisions during good times so that they can use them as buffer during downward business cycle to cover higher loan delinquencies. Greenawalt and Sinkey (1988), Wahlen (1994) and Beaver and Engel (1996), among others, provide supporting evidence that LLP has positive relation with earning before tax and provision. However, Beatty et al (1995), Ahmed et al (1999), among others, provide otherwise contrasting evidence.

Second, capital management hypothesis argues that bank managers use LLP as a buffer to the bank capital requirement and when faced with minimum capital requirement tends to use LLP to cover for the capital shortfall. Kim and Kross (1998), Ahmed et al (1999), Cortavarria et al (2000), and Das and Ghosh (2007), among others, document a negative relationship between loan loss provision and bank capital supporting the capital management argument. Third, signaling hypothesis argues that managers can use higher loan loss provisioning as a proxy for financial strength and accordingly LLP is positively related with the change in earnings. Although, Bouvatier and Lepetit (2006) provide supporting evidence for signaling arguments using banking data of France, UK, Germany and Italy, Anandarajan et al (2003) documents otherwise contradictory evidences for a Spanish sample.

More recently, a set of studies focuses on multi-country comparisons in managerial discretion in Loan Loss reporting. Leuz et al (2003) is one of the earlier studies to analyze the existence of earning management in a global setting in non-financial firms. Later, using a Bankscope dataset for a sample period of 1993 to 1999, Chih and Shen (2005) analyze the earning management phenomenon in banking industry in US and 47 other countries. Using three alternate measures and regression technique controlling for per capita GDP, legal framework, disclosure index from LLSV(1994), and country and year fixed effects, Chih and Shen (2005) document that earnings management is rather a global phenomenon.

2.2.2 Prudential regulatory regimes: pro-cyclic and dynamic provisioning

Prudential regulations set by the regulators provide explicit guidelines about how bank managers need to classify their loan portfolios, and accordingly set aside a segment of their earnings based on the probability of loan delinquency and risk weighted matrix in terms of Loan Loss Provisions. Loan loss provisions are intended to be the first frontier of buffers that bank managers are required to set aside and required minimum threshold of capital is the ultimate buffer that is supposed to provide cushion if loan delinquency increases. Extant studies on prudential regulations document that the nature of Basel I and II capital adequacy requirements and the underlying benchmark risk matrices are the reasons of pro-cyclicality in loan loss provisioning. Although pro-cyclicality of loan loss provisioning is well-documented as early as Bikker and Metzemakers(2005); the global financial crisis of 2007 provides additional impetus in prudential regulation literature.

Using a banking sample of OECD member countries, United States of America, European Union countries, Japan, France and Italy over a period of 1991-2001, Bikker and Metzemakers (2005) document that loan loss provisioning is generally pro-cyclic and bank managers, others than from Spain and United Kingdom, engage in income smoothing. Later, using a dataset of banks from European Union countries over 1992 to 2004 in a panel data analysis, Bouvatier and Lepetit (2008) show that pro-cyclicality still persists and managers engage in income smoothing. Their sample excludes 2004-2005 transition period of mandatory migration of accounting standard for firms as required by EU regulators.

Following the 2007 financial crisis, a recent trend of literature provides survey of prudential regulations, policy recommendations and simulations of dynamic provision, if implemented, in different geographic location (see: Aliaga-Diaz et al (2011), Haocong Ren (2011), Bouvatier and Lepetit (2010)). In a recent study, Égert and Sutherland (2012) provide empirical evidence in favor of pro-cyclicality of loan loss provisioning by using a dataset of banks from OECD countries. Égert and Sutherland (2012) also document that dynamic provisioning may reduce the risk of pro-cyclicality imparted into loan loss provisioning and may be preferred over the existing Basel I and II pro-cyclic requirements. To summarize, the debate over pro-cyclical and dynamic loan provisioning still remains an open agenda in the extant prudential regulations literature.

2.2.3 Accounting standards and earnings management

Changes in accounting standards and plausible implication in earnings management is a well-researched phenomenon in accounting literature. Earlier accounting literature rather documents the limited abilities of regulatory changes on discouraging or encouraging earnings management (see: Healy and Wahlen (1999) for a survey). Some later studies, like: Hung and Subramanyam (2004) and Bartov et al. (2004), among others, however, document that changes in accounting standards may add value to accounting information, specially, in the developed economy. Following the 'Norwalk' agreement between the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) signed to create more principles-based accounting standards for global financial reporting by the end of 2015, a recent surge of accounting literature focus on plausible implication of convergence of accounting standard convergence.

More recently, Beest (2009) analyzes the effects of discretion in accounting standards on both the level and nature of earnings management by representing manipulations of IAS 32 and IAS 36 as proxies for the rules based and the principles-based setting. Empirical results show that both the rules-based and principles-based treatments lead to comparable levels of earnings management. Such findings are consistent with argument that changing discretion in accounting standards can affect the nature of earnings management. However, Beest (2009) also document that probability of earnings management through transaction decisions is higher in a rules-based setting rather than in a principles-based setting.

In a contemporaneous study, Ganguli et. al. (2009) analyze whether changes in accounting standards add values to accounting information in an emerging and transitional economy like: China. Comparing the characteristics of accounting data of IAS-adopting firms with the same of non-adopting firms, they conclude that adopting firms are less likely to smooth earnings in the post-adoption period. They analyze three core hypotheses. First, firms adopting IAS are less likely to smooth earnings compared to their counterparts adhering to local GAAP. Second, IAS-adopting firms are less likely to manage earnings upwards than their local GAAP counterparts. And finally, firms adopting IAS are more likely to recognize loss in a timely manner than firms adopting local GAAP. Using a sample of 913 firms listed in the

Shanghai Stock Exchange and the Shenzhen Stock Exchange from 1994 to 2000, from the Taiwan Economic Journal (TEJ) database, Ganguli et. al. (2009) finds empiric evidence supporting their arguments.

Capkun et al (2010) analyzes the use of flexibility of IFRS by 1,635 European Union firms during 2004-2005 mandatory transition from Local GAAPs to IFRS. They find evidence supporting three hypotheses: a) current earning management hypothesis, b) Income Smoothing hypothesis; and c) setting the bar hypothesis. Current earning management hypothesis argues that, on average, Local GAAP firms with negative earnings are more likely to show positive earnings reconciliations than Local GAAP firms with positive earnings. Income Smoothing argument hypothesize that, given the distribution of Local GAAP firms with positive earnings, better performing firms are likely to have a higher probability of reporting negative Local GAAP-to-IFRS reconciliations than their other counterparts. Setting the bar explanation augments the income smoothing explanation and hypothesize that, higher probability of earnings managed upward in a given period is related to otherwise lower probability of beating such earnings in the subsequent periods.

To summarize, recent evidences in extant accounting literature are supportive of the arguments that rule-based accounting standards, in general, allow more managerial discretion in managing earnings as compared to principle-based accounting standards for both developed and transitional or emerging economies.

2.3 Methodology

2.3.1 Hypothesis development

Three major hypotheses are often cited in bank earning management and loan loss provisioning literature: Income smoothing hypothesis, capital management hypothesis, and signaling hypothesis. Consistent with core arguments, this study analyzes whether and how these three explanations of LLP are affected by the changes in prudential regulatory regimes and accounting standards individually and jointly.

Hypothesis I: Prudential Regulatory Regimes and Loan Loss Provision

Extant literature suggests that, the nature of prudential regulatory regimes, whether a pro-cyclical or dynamic one, theoretically may impart different impacts on bank earning management in terms of LLP. Consistent with this argument, our first hypothesis analyzes if there is any significant change in LLP explanations during two different prudential regimes. Accordingly, we hypothesize that:

Hypothesis I: Income smoothing, Capital Management and Signaling interpretations of LLP are systematically different in two different prudential regulatory regimes (i.e. pro-cyclical and counter-cyclical regime) controlling for bank specific factors, country specific factors and year fixed effects.

Hypothesis II: Difference in Accounting Standards and Loan Loss Provision

Extant literature on accounting standard and earnings management document that migration from rule-based to principal-based accounting standards can affect managerial discretion in managing earnings in non-financial firms. We extend from this evidence in non-financial firms for banks and argue that difference in accounting standards, being a rule-based or a principal-based, may affect bank earning managements in terms of LLP. Accordingly, our second hypothesis is:

Hypothesis II: Difference in accounting standards, being a rule-based or a principal-based, affects bank earning management in terms of LLP, after controlling for bank specific factors, country specific factors and year fixed effects

Hypothesis III: Joint effect of changes in Prudential Regimes and changes in Accounting Standards

Accounting standards are converging towards a more principal based eventuality as countries using local GAAP are migrating to principle based IFRS standards. For some countries, banking industry may have to go through both changes jointly. Thus, our third hypothesis evolves from a combination of the first two hypotheses such that we analyze the joint effect of changes in prudential regulatory regime and changes in accounting standards. Accordingly, we hypothesize that:

Hypothesis III: Changes in prudential regimes and changes in accounting standards jointly affect bank earning management in terms of LLP, after controlling for bank specific factors, country specific factors and year fixed effects.

2.3.2 Empiric specification and variable definitions

2.3.2.1 Country specific and Bank specific Control Variables

Empiric studies analyzing bank earning management with multi-country dataset, generally, control for country specific variables, GDP, per capita GDP, growth of per capita GDP, and inflation rate to capture country specific business cycles (see:). Following the seminal research by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997 JF, 1998 JPE, and 1999 JL), hereafter cited as LLSV; and Shleifer et al (JFE, 2007), recent multi-country studies also include country legal framework, level of investor protection, financial development and others aspects into the analysis (see: Fonseca et al (JBF, 2008) among others). Bank asset size and net income are two frequently cited control variables used in the bank earning management literature. We include both bank specific control variables and country specific control variables in our analysis. Besides, in all through our analysis, we include year fixed affect and country dummies. Table 01 provides a brief summary of variable description and their sources.

2.3.2.2 Empiric Specification

<u>*Hypothesis I*</u>

The following Equation (1) represents the generic form of empiric specification most frequently cited in the extant bank earning literature (see: Ahmed et al. (1999), Wahlen, J. (1994), and more recently Ghosh (2007) among others). Equation (1) holds Loan Loss Provision (LLP) as the dependent variable:

$$LLP_{i,t} = \gamma_0 + \gamma_1 LLP_{i,(t-1)} + \gamma_2 OP_{i,t} + \gamma_3 CRAR_{i,(t-1)} + \gamma_4 \Delta EBTP_{i,(t-1)} + \gamma_5 Bank\ Controls_{i,(t-1)} + \gamma_6 Country\ Controls_{i,(t-1)} + \gamma_t YearDummy_t + \varepsilon_{it} \quad (1)$$

Bank managers are required to classify delinquent loans in different categories and set aside provision based on the level of default risk before they can classify and write-off a loan as bad and loss. So, because of the nature of prudential regulations and the risk matrix, LLP are generally auto-correlated and accordingly Lags of LLP are included as explanatory variable.

Table 13
Variable Description and Data source

	Variable Name	Variable Description	Source	Expected Signs
1. Dependent Variable:				
	LLP	Ratio of Loan Loss Provision over lag total assets	Bank Scope	
2. Bank Characteristics variables				
	LLP (-1) & (-2)	Lags of the dependent variable	"	+ ve
	CRAR	Required Tier I capital	"	- ve for capital management
	OProfit	Operating profit over lag total assets	"	+ ve for income smoothing
	ΔEBTP	change in Earning Before Tax and Provisioning over lag total assets	"	+ ve for signalling
3. Prudential Regulation Variable				
	DynamicDummy	is 1 if country is implementing Dynamic provision		Opposite/ not significant
	and Interaction of DynamicDummy with interest variables			
4. Accounting Standard Variable				
	PrincipleDummy	is 1 if a bank uses a principle based accounting standard, zero otherwise		Opposite/ not significant
	and Interaction of PrincipleDummy with interest variables			
Country Specific Control Variables				
A. Macro Control variables				
	GDPGR	real growth in per capita GDP	IMF	
	GDP	real GDP in billion dollar	IMF	
	Inflation		IMF	
B. Regulatory control variables				
	DISCLOSURE	accounting disclosure index	*La Porta et al. (1998)*	
	RESTRICT	measure of regulatory restrictions on bank activities	*Barth et al. (2001)*	
	OFFICIAL	measures the power of official bank supervision	"	
	MONITOR	an index of private bank monitoring	"	
	STRUCT	measures market-orientation of the financial system	"	
C. Legal control variables				
	LEGAL	measure of legal enforcement	*La Porta et al. (1998)*	
	ANTIDIRECTOR	measure of protection of minority shareholders	"	
	CREDITOR	measures creditor rights	"	
	LegalDummy	a set of five dummies capturing five country legal origin, as alternate to LEGAL index	"	

La Porta et al. (1998) and Barth et al. (2001) provide points in time estimates of the variables that are generally constant over time. However, La Porta et al (2008) provides an update on La Porta et al (1998) indices.

Operating Profit is expected to have positive sign for the income smoothing explanations to hold. Tire-II Capital Requirement (CRAR) is included and is expected to have a negative to justify the capital management explanation. Change in Earning before tax and provision is expected to be positive if bank managers implicitly use LLP as a signal of future earnings.

Hypothesis II

We extend from the generic empiric set up as shown Equation (1) to test the three hypotheses core to our analysis. *Hypothesis I* argues that in different prudential regulatory regimes, i.e. pro-cyclic and dynamic regimes, managerial discretion over LLP varies. Accordingly, we consider pro-cyclic prudential regime as the base case and introduce a dynamic prudential regulation dummy ("DynDum") and interact with the lag of LLP, and the three variables of interests, i.e. Operating Profit (OP), Tier I capital requirement (CRAR). Theory suggests that dynamic provisioning may have differential impact on managerial discretion and earning management explanations.

$$\begin{aligned} LLP_{i,t} = \; & \gamma_0 + \gamma_1 LLP_{i,(t-1)} + \gamma_2 OP_{i,t} + \gamma_3 CRAR_{i,(t-1)} + \gamma_4 \Delta EBTP_{i,(t-1)} \\ & + \beta_1 DynDum * LLP_{i,(t-1)} + \beta_2 DynDum * OP_{i,t} + \beta_3 DynDum * CRAR_{i,(t-1)} \\ & + \beta_4 DynDum * \Delta EBTP_{i,(t-1)} + \gamma_5 Bank\ Controls_{i,(t-1)} \\ & + \gamma_6 Country\ Controls_{i,(t-1)} + \gamma_t YearDummy_t + \varepsilon_{it} \end{aligned} \quad (2)$$

Hypothesis II argues that, for different types accounting standards, i.e. a rule based or a principal based accounting standards, managerial discretion in terms of LLP may vary. As accounting standards are generally converging to a principal based approach, we use rule-based accounting as base case and include principal based accounting standard as a dummy in a similar set up as given by equation (2). In Equation (3), we provide the specification where we interact the PrincipleDummy with the lag of LLP, and the three variables of interests, i.e. Operating Profit (OP), Tier I capital requirement (CRAR). Empirical evidences suggest that principal based accounting standards provide fewer opportunities for earnings management. Accordingly, we expect, otherwise a different implications of the three major explanations of loan loss provisioning during a principle based accounting standard.

$$\begin{aligned} LLP_{i,t} = \; & \gamma_0 + \gamma_1 LLP_{i,(t-1)} + \gamma_2 OP_{i,t} + \gamma_3 CRAR_{i,(t-1)} + \gamma_4 \Delta EBTP_{i,(t-1)} \\ & + \beta_1 PrincipleDummy * LLP_{i,(t-1)} + \beta_2 PrincipleDummy * OP_{i,t} \\ & + \beta_3 PrincpleDummy * CRAR_{i,(t-1)} + \beta_4 PrincipleDummy * \Delta EBTP_{i,(t-1)} \\ & + \gamma_5 Bank\ Controls_{i,(t-1)} + \gamma_6 Country\ Controls_{i,(t-1)} + \gamma_t YearDummy_t \\ & + \varepsilon_{it} \end{aligned} \quad (3)$$

Hypothesis III

Hypothesis III analyzes the combined effect of changes in prudential regulatory regimes and accounting standards on managerial discretion over LLP. In Equation (2) and (3), we do not include principle based accounting dummy and dynamic prudential regulation dummy, respectively. To analyze the combined effect, we use two alternate specifications. In the first specification, as in Equation (2) where we analyze impact of prudential regulation, we include accounting dummy as fixed effect. In the second and alternate specification, as in Equation (3) where we analyze the impact of accounting standard, we include a prudential regulation dummy as fixed effect.

Given that the rank conditions being fulfilled, we may also analyze a more robust specification where we assume a pro-cyclic prudential set up with a rule-based accounting standard (for example: as USA and many other countries) as a base case and allow both the prudential dummy and accounting dummy to interact.

2.3.3 Data

We collect Bank earnings and balance sheet data from BankScope database for a sample period of 12 years from 1999 to 2010. Table 01 presents a summary of variable descriptions and their data source and expected signs and implications.

2.3.4 Econometric techniques

To start with our analysis, we use panel data approach to analyze the empiric specifications mentioned in Equation (1), (2) and (3). By using Haussmann-Taylor Test to analyze whether a Fixed Effect or a Random Effect model is more appropriate. However, we also use a GMM technique to obtain more robust estimates as auto-correlation of LLP and endogeneity among bank ratios may impart some biases. In GMM estimation, we use two lags of dependent variable (i.e. LLP) as instrumental variables.

2.4 Descriptive Statistics

2.4.1 Sample composition

Overall sample comprises 11 year panel data over 1999 to 2010 period for 7,343 banks in 107 countries. BankScope Database reports five major types of accounting standards used in the banking industry: U.S. GAAP, Local GAAP that are country specific GAAP), Regulatory Standard that are different from country GAAP and set up the regulatory authority, IAS (International Accounting Standards), and IFRS (International Financial Reporting Standards). Current accounting literature categorizes these four accounting standards into two major types; local GAAPs and regulatory standards are classified as Rule-based, and IAS and IFRS are identified as principles-based standards. Prudential regulations are broadly categorized into two types: pro-cyclic regimes that require managers to set aside loan loss provisions based on historical defaults rates; and dynamic regimes that use a forward looking probability matrix to incorporate the impact of possible future business cycles.

Panel A of Table 14 summarizes the distribution of banks in the sample: by bank specialization and accounting standard, and by prudential regulatory regimes. At present, regulatory authorities in 11 countries like: Bolivia, Chile, Colombia, India, Italy, Korea, Paraguay, Peru, Spain, Uruguay and Venezuela pursue dynamic prudential regulatory regime; however, these countries have shifted from pro-cyclic regime to dynamic regime at different times. For example, regulators in Spain, one of the pioneer countries in implementing dynamic provisioning, start using dynamic rules as early as 2001. However, Uruguay is relatively recent country to initiate such rules in 2007 year. As such the frequency distributions of the sample composition depicts the banks in countries that have changed prudential regimes. Panel A shows that 206 commercial banks from these 11 countries have shifted from the pro-cyclic provisioning regime to the dynamic provisioning regime; the remaining 7,137 banks of the other 96 countries in the sample comply with the pro-cyclic rules.

Table 14
Composition of Sample

Overall sample comprises 11 year panel data over 1999 to 2010 period for 7,343 banks in 107 countries. Panel A of table 02 summarizes the distribution of banks in the sample: by bank specialization and accounting standard, and by prudential regulatory regimes. BankScope Database reports five major types of accounting standards used in the banking industry: U.S. GAAP, Local GAAP (that are country specific GAAP), Regulatory Standard (that are different from country GAAP and set up the regulatory authority), IAS (International Accounting Standards), and IFRS (International Financial Reporting Standards). Current accounting literature categorizes these four accounting standards into two major types; local GAAPs and regulatory standards are classified as Rule-based, and IAS and IFRS are identified as principles-based standards. Prudential regulations are broadly categorized into two types: pro-cyclic regimes that require managers to set aside loan loss provisions based on historical defaults rates; and dynamic regimes that use a forward looking probability matrix to incorporate the impact of possible future business cycles. Panel B and Panel C report accounting practices across the countries using Dynamic prudential framework and pro-cyclic prudential framework respectively.

Panel A: Distribution of Number of Banks by Prudential Regimes and Accounting Practices

		Rule Based		Principle Based		Total	Total
	Prudential Regimes	Local GAAP	Regulatory	IFRS	IAS	Rule	Principle
a)	Pro-cyclic Regime						
	USA	235	5703	-	-	5938	-
	Non US Pro-cyclic	874	-	270	55	874	325
a)	Pro-cyclic	1109	5703	270	55	6812	325
b)	Dynamic	108	5	93	-	113	93
	Total	1217	5708	363	55	6925	418

Panel B: Accounting Practices in Dynamic Prudential Regime

		Rule Based		Principle Based	
Sl.	Country	Local GAAP	Regulatory	IFRS	IAS
1	Bolivia	8	-	-	-
2	Chile	1	-	-	-
3	Colombia	10	-	-	-
4	India	46	-	-	-
5	Italy	-	-	68	-
6	Korea, Rep. of	6	-	-	-
7	Paraguay	10	-	-	-
8	Peru	5	5	-	-
9	Spain	-	-	23	-
10	Uruguay	9	-	2	-
11	Venezuela	13	-	-	-
	Total	108	5	93	-

Table 14
Composition of Sample (Continued)

Panel C: Accounting Practices in Pro-cyclic Prudential Regime

		Rule Based		Principle Based				Rule Based		Principle Based	
Sl.	Country	Local GAAP	Reg.	IFRS	IAS	Sl.	Country	Local GAAP	Reg.	IFRS	IAS
1	Albania	-	-	2	-	27	Costa-Rica	13	-	-	-
2	Algeria	4	-	-	-	28	Croatia	-	-	17	-
3	Angola	1	-	-	-	29	Cyprus	1	-	3	-
4	Argentina	22	-	-	-	30	Czech Rep.	4	-	6	-
5	Armenia	-	-	1	2	31	Denmark	25	-	-	-
6	Austria	25	-	4	-	32	Dominican Rep.	12	-	-	-
7	Azerbaijan	-	-	5	-	33	Ecuador	16	-	-	-
8	Bahamas	-	-	3	2	34	Egypt	16	-	-	4
9	Bahrain	-	-	8	-	35	El Salvador	5	-	-	-
10	Bangladesh	18	-	-	-	36	Estonia	-	-	3	-
11	Barbados	-	-	1	-	37	Ethiopia	1	-	1	1
12	Belarus	-	-	4	-	38	France	53	-	-	-
13	Belgium	12	-	-	-	39	Georgia Rep.	-	-	5	-
14	Benin	2	-	-	-	40	Germany	69	-	5	-
15	Bhutan	2	-	-	-	41	Guatemala	12	-	-	-
16	Bosnia	1	-	5	-	42	Guyana	-	-	1	1
17	Botswana	-	-	1	1	43	Honduras	10	-	-	-
18	Brazil	44	-	-	-	44	Hungary	5	-	5	-
19	Brunei	1	-	-	-	45	Indonesia	27	-	-	-
20	Bulgaria	-	-	9	-	46	Iran	4	-	-	-
21	Burkina-Faso	3	-	-	-	47	Israel	10	-	-	-
22	Burundi	1	-	-	-	48	Japan	110	-	-	-
23	Cambodia	-	-	-	1	49	Jordan	1	-	10	1
24	Cameroon	2	-	-	-	50	Kazakhstan	-	-	9	-
25	Canada	27	-	-	-	51	Kenya	-	-	8	4
26	China	12	-	1	1	52	Kuwait	-	-	5	-
27	Costa-Rica	13	-	-	-	53	Kyrgyzstan	-	-	-	1

Table 14
Composition of Sample (Continued)

Panel C: Accounting Practices in Pro-cyclic Prudential Regime (Continued)

		Rule Based		Principle Based				Rule Based		Principle Based	
Sl.	Country	Local GAAP	Reg.	IFRS	IAS	Sl.	Country	Local GAAP	Reg.	IFRS	IAS
54	Latvia	-	-	6	-	81	Rwanda	-	-	-	2
55	Lebanon	1	-	8	8	82	Saudi Arabia	1	-	9	-
56	Lithuania	0	-	6	-	83	Senegal	2	-	-	-
57	Luxembourg	35	-	-	-	84	Serbia	1	-	3	-
58	Malawi	0	-	-	3	85	Sierra Leone	-	-	-	3
59	Malaysia	25	-	-	-	86	Slovakia	-	-	8	-
60	Mali	3	-	-	-	87	Slovenia	-	-	10	-
61	Malta	-	-	2	-	88	South Africa	1	-	-	-
62	Mauritius	-	-	2	1	89	Sri Lanka	9	-	-	-
63	Mexico	22	-	-	-	90	St. Kitts & Nevis	-	-	-	2
64	Moldova Rep.	-	-	1	1	91	Sudan	5	-	-	-
65	Mongolia	-	-	1	-	92	Suriname	2	-	-	-
66	Morocco	2	-	-	-	93	Swaziland	-	-	-	3
67	Mozambique	-	-	2	-	94	Sweden	3	-	-	-
68	Nepal	8	-	-	-	95	Switzerland	75	-	5	-
69	Netherlands	3	-	-	-	96	Taiwan	11	-	-	-
70	Nicaragua	2	-	-	-	97	Thailand	13	-	-	-
71	Niger	2	-	-	-	98	Togo	1	-	-	-
72	Nigeria	6	-	-	-	99	Tunisia	3	-	-	-
73	Norway	2	-	-	-	100	Turkey	-	-	5	-
74	Oman	-	-	5	-	101	Uganda	-	-	1	8
75	Pakistan	5	-	-	-	102	Ukraine	2	-	14	-
76	Panama	2	-	7	-	103	UAE	-	-	15	-
77	Poland	4	-	-	-	104	United Kingdom	40	-	-	-
78	Qatar	1	-	5	-	105	USA	235	5703	-	-
79	Romania	-	-	8	-	106	Uzbekistan	-	-	2	-
80	Russian Fed.	4	-	21	-	107	Zambia	7	-	2	5
								1109	5703	270	55

Table 15
Descriptive Statistics

Panel A of Table 15 reports the descriptive statistics for the overall bank sample for the period of 2003 to 2010. Both **LLP** and **EBTP** are in percentage; **LLP** is calculated as the loan loss provisioning normalized to the bank total asset and **EBTP** refers to earnings before tax and provision normalized to the total asset. **Tier1CAP** and **TotCAP** are the Tier-I regulatory capital and the total regulatory capital respectively, both normalized to RWA (*Risk Weighted Asset*). **TotAsset** is the total asset (*in thousands US Dollars*). ROA is return of average asset and ROAE is return on average equity. Later, Panel B and C present descriptive statistics for: the banks under pro-cyclic regimes vis-à-vis the banks under dynamic provisioning regimes and the banks using IFRS accounting standards vis-à-vis the banks using local GAAP. Welch t-statistics of the difference in mean is reported at the rightmost column. (***), (**) and (*) refer to 1%, 5% and 10% level of significance based on two-tailed test statistics.

Panel A: Overall Sample

	Mean	Median	Std. Dev.	Bank Years
LLP	40.79	17.11	101.96	85,870
EBTP	17.66	13.60	24.56	77,961
Tier1Cap	18.96	14.80	24.14	79,762
TotalCap	1.76	1.50	4.51	86,758
ROAA	1.05	1.01	2.64	87,296
ROAE	9.61	9.83	17.44	87,286
TotalAsset	4,625,954.00	141,568.00	52748,755.00	87,329

Panel B: Banks under Pro-cyclic provisioning regime vs. banks under Dynamic Regime

	Pro-cyclic				Dynamic				Welch
	Mean	Median	Std. Dev.	Obs.	Mean	Median	Std. Dev.	Obs.	t-stat
LLP	39.96	16.74	101.42	84143	81.46	48.63	118.78	1727	-14.41
EBTP	17.74	13.60	24.63	76962	12.09	8.85	17.17	999	10.25
Tier1CAP	19.01	14.88	24.23	78607	15.09	12.34	16.00	1155	8.21
TotCAP	1.75	1.50	4.32	85066	2.20	2.01	10.26	1692	-1.82
ROAA	1.05	1.01	2.64	85477	1.13	0.90	2.68	1819	-1.35
ROAE	9.57	9.81	17.04	85467	11.60	12.11	30.80	1819	-2.80
TotAsset	4,164,919.00	136,951.00	49,836,865.00	85509	26,286,730.00	2,831,166.00	128,000,000.00	1820	-7.36

Panel C: Banks using Rule-based Accounting Standard vs. Banks using Principle-based Accounting Standard

	Rule				Principle				Welch t-
	Mean	Median	Std. Dev.	Obs.	Mean	Median	Std. Dev.	Obs.	stat
LLP	37.97	16.41	91.98	81638	95.32	44.89	211.27	4232	-17.58
EBTP	17.69	13.60	24.82	75473	16.82	13.71	14.74	2488	2.81
Tier1CAP	18.92	14.71	24.46	76538	19.77	16.16	14.73	3224	-3.11
TotCAP	1.70	1.50	4.56	82483	2.83	2.26	3.24	4275	-21.82
ROAA	1.03	1.00	2.54	82839	1.50	1.27	4.03	4457	-7.74
ROAE	9.51	9.76	15.64	82835	11.52	12.09	37.55	4451	-3.55
TotAsset	3,772,834.00	133,023.00	46,303,099.00	82865	20,462,381.00	1,122,938.00	120,000,000.00	4464	-9.26

Out of 7,347 commercial banks in the sample, 6,925 banks use Local GAAP and mandatory regulatory reporting suggested by the respective regulatory that generally conform to rule-based accounting standards. On the other hand, the remaining 418 banks use principle based accounting standards, like: IFRS and IAS. Out of 6,925 banks complying with rule-based accounting standards, 113 banks fall under the purview of dynamic regulations while the remaining 6812 banks adhere to pro-cyclic provisioning. Among 418 banks using principle-based accounting standards, 325 banks fall under pro-cyclic provisioning while 93 banks comply with dynamic provisioning. In the overall sample, 5938 US banks constitute a significant portion and fall under pro-cyclic provisioning and comply with rule-based accounting standards. However, there is some diversity among US banks in using accounting standards. While 235 US banks comply with USGAAP, 5703 banks adhere to the regulatory standard suggested by the regulatory authorities; accounting literature identifies both USGAAP and regulatory standards as rule-based standards. Later, Panel B and Panel C report accounting practices across the countries using Dynamic prudential framework and pro-cyclic prudential framework respectively.

2.4.2 Bank characteristics

Table 15 reports the descriptive statistics for the overall bank sample for the period of 2000 to 2010. LLP and EBTP are loan loss provisioning and earnings before tax and provision normalized to bank total assets respectively; Tier1Cap and TotCAP are respectively Tier-I regulatory capital and total regulatory capital, both normalized with respect to Risk Weighted Asset (RWA). TotalAsset is the bank total asset; ROAA and ROAE are respectively return on average asset and return on average equity. LLP, EBTP, Tier1Cap, TotalCap, ROAA and ROAE are measured in percentile. TotalAsset is presented in thousand dollars. Panel A presents the summary statistics of these variables for the overall sample in general. Mean bank asset size is around 4.63 billion USD while the median bank size is 141.6 million; the standard deviation of bank asset reveals the large variations among the banks in terms of their sizes. Similar to bank asset sizes, the distribution of LLP is also right skewed, unlike the other variables, like: EBTP, Tier1Cap, TotalCap, ROAA and ROAE.

Panel B of Table 15 reports the summary statistics of bank asset size, and other variables: LLP, EBTP, Tier1CAP, TotCAP, ROAA and ROAE for banks under pro-cyclic loan loss provisioning regime and banks under dynamic provisioning regime. Bank managers under dynamic provisioning regime generally tend to set aside higher loan loss provision compared to their counterpart managers under pro-cyclic regime. While bank managers set aside an average of 39.96% of total asset for LLP in pro-cyclic regimes, managers under dynamic regime keep an average of 81.46% in LLP. Such findings complement with the fact that EBTP in banks under pro-cyclic regime are generally higher than the banks under dynamic provisioning regime. On the average, banks under pro-cyclic exhibit higher Tier-I regulatory capital (Tier1CAP) but otherwise lower total regulatory capital (TotCAP) as compared to banks under dynamic provisioning regime. Such findings suggest that managers are more likely to use LLP in managing capital adequacy requirements if LLP is allowed to be considered as part of the capital adequacy requirements. Bank asset size information in two different regulatory regimes suggests that banks under dynamic regime are generally bigger in asset size. While average bank size under dynamic regime is 26.29 billion USD, it is around 4.16 billion USD for banks under pro-cyclic regime.

Panel C of Table 15 summarizes the descriptive statistics of the banks classified by two broader type of accounting standards: rule-based standards and principle-based standards. Bank managers using principle based accounting standards tend to set aside an average 95.32% of

total assets as LLP that is significantly higher than their counterpart managers using rule-based accounting, an average of 37.97%. Tier-I regulatory capital, total regulatory capital, ROAA and ROAE, all these ratios are generally higher in banks following principle-based accounting standards. Average asset size for banks using principle-based accounting standard is 20.46 billion USD that is significantly larger than average asset size of rule-based accounting standard of 3.77 billion USD.

2.4.3 Country control variables

Table 16 summarizes the descriptive statistics of two broader types of country control variables: a) Country macro-economic control variables such as per capita GDP, per capita GDP growth, and inflation, and b) country financial and regulatory control variables following LLSV(1998 and 2008) variables such as: disclosure, case efficiency, property right, legal origin, market capitalization, privatization and spread. Average per capita GDP of the sample countries increases steadily as early as in 2000 till 2008. Following the financial crisis of 2008, average per capita GDP decreases by 7.15%. Average inflation has a decreasing trend beginning since 1999 till 2007; however average inflation increases sharply during 2008 and then remains below 5% during 2009 and 2010. While the country macro-economic variables are generally time variant as shown in the different panels in Table 16, country financial and regulatory control variables are rather constant for given countries; Panel D of Table 04 presents the summary statistics.

2.4.4 Pearson correlation

Table 17 presents the Pearson correlation matrix among the key variables of interest and different control variables. In general, larger banks tend to set aside higher LLP; they have higher EBTP and otherwise lower EBTP growth. LLP is positively related with EBTP and bank asset size and otherwise negatively related with regulatory capital requirement ratio; country macro-economic variables, such as: inflation and per capita GDP growth have negative impact on LLP. Bank earning is positively related with EBTP growth, bank asset size, country macro-variables like: per capita GDP growth, inflation.

While bank managers may use their discretion in classifying the loan portfolios that eventually influences the LLP reporting, EBTP as a definition of earning is less prone to managerial discretion and country financial control variables that may define the level of managerial discretion. Consistent with this argument, we find that although country financial control variables generally have no significant impact on EBTP and change in EBTP

Table 16
Descriptive Statistics of Country Control Variables

PerCapGDP	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mean	6971.73	7066.68	6947.00	7298.50	8493.46	9707.51	10549.54	11605.55	13245.68	14879.22	13140.74	13699.81
Median	1982.54	2027.11	2095.58	2285.06	2621.74	3011.83	3470.52	3918.30	4772.41	5806.00	5414.77	5859.71
Max	49053.28	46360.39	45789.99	50781.69	64675.97	74516.56	81092.71	90714.82	106983.30	118570.10	105917.80	104390.30
Min	123.38	110.35	98.13	89.73	82.64	90.48	106.88	120.34	125.12	146.51	164.08	177.66
Std. Dev.	10178.27	10120.64	9885.74	10560.99	12500.38	14215.22	15225.66	16602.77	18777.49	20755.50	18186.67	18798.37
Obs.	118	119	119	119	119	119	120	120	120	120	120	120
PerCapGDPGrw	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mean	-0.75	2.03	1.17	5.36	14.60	15.82	14.04	13.55	17.39	16.95	-7.15	6.56
Median	0.48	1.21	0.32	6.50	14.79	14.27	11.67	11.01	14.24	17.10	-6.38	5.57
Max	44.53	44.24	38.73	48.51	52.39	38.74	52.76	57.03	55.67	40.83	18.09	36.11
Min	-32.89	-20.56	-27.82	-62.19	-20.46	-5.01	-2.38	-4.16	0.34	-11.51	-35.26	-14.14
Std. Dev.	11.40	11.58	9.44	12.37	11.74	8.08	10.51	9.50	9.68	10.11	10.70	9.55
Obs.	117	118	119	119	119	119	119	120	120	120	120	120
INFL	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Mean	13.15	12.09	8.55	6.38	6.40	5.76	5.88	5.63	5.84	10.00	4.68	4.89
Median	3.20	3.79	3.85	2.64	3.09	3.91	4.62	4.46	5.28	8.74	2.99	3.99
Max	293.73	325.03	152.59	108.89	98.34	51.46	22.96	14.22	18.70	30.37	36.40	29.18
Min	-8.53	-1.77	-5.21	-7.22	-1.79	-3.11	-0.72	0.05	-0.25	1.40	-4.87	-1.42
Std. Dev.	37.51	35.25	18.24	12.29	10.64	7.06	4.49	3.69	4.13	6.24	5.78	4.06
Obs.	120	120	120	120	120	120	120	120	120	120	120	120
	DISCL	CaseEff	PtyRIGHT	LEG_UK	LEG_FR	LEG_GE	LEG_SC	LEG_SO	MCAP	PRIVO	SPRD	
Mean	0.58	48.44	2.89	0.22	0.57	0.17	0.03	0.01	0.37	0.45	21.12	
Median	0.58	45.15	3.00	0.00	1.00	0.00	0.00	0.00	0.20	0.28	12.60	
Max	1.00	95.50	5.00	1.00	1.00	1.00	1.00	1.00	1.60	2.05	149.24	
Min	0.00	1.20	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	2.96	
Std. Dev.	0.24	24.41	1.13	0.42	0.50	0.38	0.17	0.10	0.41	0.41	25.56	
Obs.	38	74	106	107	107	107	107	107	85	106	43	

Table 17
Pearson Correlation Matrix

Variable Name	LLP	EBTP	ΔEBTP	Tier1eCap	Ln_TotAss	PerCapGDP	PerCapGDPGrw	INFL	DISCL	CaseEff	PtyRIGHT	MCAP	PRIVO	SPRD
LLP	1.000													

EBTP	0.076	1.000												
	(0.00)	-----												
ΔEBTP	-0.002	0.105	1.000											
	(0.61)	(0.00)	-----											
Tier1Cap	-0.067	0.163	0.020	1.000										
	(0.00)	(0.00)	(0.00)	-----										
Ln_TotAss	0.148	0.009	-0.008	-0.203	1.000									
	(0.00)	(0.01)	(0.04)	(0.00)	-----									
PerCapGDP	-0.006	-0.024	-0.005	-0.004	-0.078	1.000								
	(0.13)	(0.00)	(0.16)	(0.29)	(0.00)	-----								
PerCapGDPGrw	-0.141	0.031	0.021	0.015	-0.032	-0.334	1.000							
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	-----							
INFL	-0.074	0.018	0.017	-0.002	0.066	-0.246	0.568	1.000						
	(0.00)	(0.00)	(0.00)	(0.64)	(0.00)	(0.00)	(0.00)	-----						
DISCL	-0.080	0.000	0.004	0.036	-0.403	0.407	-0.139	-0.333	1.000					
	(0.00)	(0.99)	(0.34)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	-----					
CaseEff	-0.059	-0.020	0.001	0.000	-0.111	0.437	-0.218	-0.350	0.580	1.000				
	(0.00)	(0.00)	(0.81)	(0.90)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	-----				
PtyRIGHT	-0.097	-0.002	0.000	0.034	-0.382	0.554	-0.162	-0.385	0.779	0.607	1.000			
	(0.00)	(0.57)	(0.97)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	-----			
MCAP	-0.091	0.003	0.006	0.041	-0.450	0.468	-0.124	-0.298	0.928	0.558	0.864	1.000		
	(0.00)	(0.42)	(0.14)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	-----		
PRIVO	-0.089	0.001	0.006	0.035	-0.452	0.476	-0.133	-0.305	0.918	0.562	0.836	0.972	1.000	
	(0.00)	(0.83)	(0.13)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	-----	
SPRD	0.034	0.002	-0.005	-0.017	0.166	-0.258	0.051	0.095	-0.421	-0.361	-0.350	-0.408	-0.419	1.000
	(0.00)	(0.62)	(0.22)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	-----

Table 18
Panel Regression on LLP for Overall Sample

Table 18 reports Panel Regression results on LLP for the following model:

$$LLP_{i,t} = \gamma_0 + \gamma_1 LLP_{i,(t-1)} + \gamma_2 EBTP_{i,t} + \gamma_3 CRAR_{i,(t-1)} + \gamma_4 \Delta EBTP_{i,(t-1)} + \gamma_5 Bank\ Controls_{i,(t-1)} + \gamma_6 Country\ Controls_{i,(t-1)} + \varepsilon_{it} \quad (1)$$

where, LLP is Loan Loss Provisioning normalized to Total Asset, EBTP is Earnings before Tax and Provision normalized to Total Asset and Tier1CAP is Tire I Regulatory Capital normalized to Risk-weighted asset. ΔEBTP is percentage change in EBTP. Ln_TotAsset is natural logarithm of total asset (in thousands dollars) of the sample Banks used as Bank specific control variable. PerCapGDP, PerCapGDPGr and INFL are per capita GDP (Gross Domestic Product) in US Dollar of the country under the sample, growth in per capita GDP (in percentage) and Inflation rate (in percentage), used as country control variables. (Description about LLSV variables)

Income smoothing hypothesis suggests that bank managers tend to set aside higher LLP during the good times and accordingly LLP is positively related with EBTP. *Signaling hypothesis* suggests that managers may use LLP as a signal of higher supervision and hence LLP is positively related with ΔEBTP. *Capital management hypothesis* argues that managers tend to use LLP as part of Tier-I capital requirement during capital shortfalls and hence negatively related with Tier1Cap. *Pro-cyclicality* of LLP suggests that LLP is positively related with its previous lags.

Sample period is 1999 to 2010 with 7,343 banks and a total of 57,967 bank years in 107 countries. Column (7) reports Haussmann and Taylor (1981) test of difference in coefficients for Random Effect versus Fixed Effect estimates. For each variable, first row corresponds to coefficient estimates, and second row reports standard deviation. (***), (**) and (*) refer to 1%, 5% and 10% level of significance respectively based on two-tailed test statistics.

	(1) Pooled OLS	(2) Panel GMM	(3) Pooled OLS	(4) Period FE	(5) Cross FE	(6) Cross FE	(7) Hausman Test	(8) Panel GMM
Bank Control	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes
Country Macro	Yes	Yes	Yes	Yes	Yes	Yes	-	Yes
Country Financial	No	No	Yes	Yes	Yes	Yes	-	Yes
Period FE	No	-	No	Yes	No	No	-	-
Period RE	No	-	No	No	No	No	-	-
Cross Section FE	No	-	No	No	Yes	No	-	-
Cross Section RE	No	-	No	No	No	Yes	-	-

Table 18
Panel Regression on LLP for Overall Sample (*continued*)

		(1) Pooled OLS		(2) Panel GMM		(3) Pooled OLS		(4) Period FE		(5) Cross FE		(6) Cross FE		(7) Hausman Test		(8) Panel GMM	
C		-14.835	***	-42.427	***	64.790	***	-29.902	***	64.790	***		***	-249.188	***	63.432	***
		2.673		2.867		8.990		10.110		8.730				11.653		10.086	
LLP(1)	(+)	0.535	***	0.510	***	0.510	***	0.498	***	0.510	***	0.000	***	0.332	***	0.506	***
		0.004		0.005		0.005		0.005		0.004		0.000		0.005		0.005	
LLP(2)	(+)	0.145	***	0.180	***	0.176	***	0.187	***	0.176	***	0.000	***	0.034	***	0.183	***
		0.004		0.005		0.005		0.005		0.005		0.000		0.005		0.005	
Tier1Cap	(-)	-0.102	***	-0.086	***	-0.091	***	-0.093	***	-0.091	***	0.001	***	-0.214	***	-0.089	***
		0.012		0.011		0.011		0.011		0.010		0.000		0.028		0.011	
EBTP	(+)	0.808	***	0.552	***	0.556	***	0.590	***	0.556	***	0.006	***	0.039	***	0.537	***
		0.075		0.068		0.068		0.067		0.066		0.000		0.100		0.068	
Δ EBTP	(+)	-0.014		-0.027		-0.009		0.062		-0.009		0.002	***	0.237		0.004	
		0.142		0.137		0.137		0.135		0.133		0.000		0.142		0.137	

Table 18
Panel Regression on LLP for Overall Sample (*continued*)

	(1) Pooled OLS		(2) Panel GMM		(3) Pooled OLS		(4) Period FE		(5) Cross FE		(6) Cross FE		(7) Hausman Test		(8) Panel GMM	
a. Bank Control																
Ln_TotAsset	3.750	***	3.800	***	3.635	***	3.583	***	3.635	***	1.166	***	23.898	***	3.683	***
	0.155		0.150		0.191		0.189		0.186		0.000		1.096		0.192	
b. Country Macro-economic																
GDP	0.000	***	0.001	***	0.001	***	0.000	***	0.001	***	0.000	***	0.000	***	0.001	***
	0.000		0.000		0.000		0.000		0.000		0.000		0.000		0.000	
GDPGROWTH	-2.068	***	-3.597	***	-3.294	***	0.349	***	-3.294	***	0.001	***	-3.336	***	-3.581	***
	0.067		0.100		0.098		0.149		0.095		0.213		0.101		0.102	
INFL	0.464	***	-0.489	***	-1.376	***	-0.724	***	-1.376	***	0.011	***	-2.455	***	-1.160	***
	0.149		0.198		0.201		0.318		0.195		0.000		0.222		0.210	
c. Country Financial																
PRIVO	--		--		-22.513	***	5.193		-22.513	***			--		-20.694	***
					4.561		5.015		4.429						5.077	
MCAP	--		--		34.833	***	12.110	*	34.833	***			--		33.549	***
					7.327		7.389		7.115						8.313	

Table 18
Panel Regression on LLP for Overall Sample (*continued*)

		(1) Pooled OLS	(2) Panel GMM	(3) Pooled OLS		(4) Period FE		(5) Cross FE		(6) Cross FE	(7) Hausman Test	(8) Panel GMM	
SPREAD		--	--	-0.058		0.008		-0.058			--	-0.099	**
				0.044		0.046		0.043				0.045	
PTYRGHT		--	--	-11.727	***	1.965		-11.727			--	-10.512	***
				1.926		2.574		1.870				2.098	
REG		--	--	0.767		0.469		0.767			--	-0.100	
				1.360		1.347		1.321				1.363	
DISCL		--	--	19.693	*	-9.766		19.693			--	19.918	*
				10.563		11.747		10.258				11.726	
CaseEFF		--	--	-1.034	***	-0.210	***	-1.034	***		--	-1.092	***
				0.061		0.073		0.060				0.066	
Adj. R-sq.		0.390	0.397	0.400		0.413		0.400			0.434	0.402	
Period F	(8,55356)					149.967							
						0							

2.5 Empirical Evidence

2. 5.1 Evidence on Loan Loss Provisioning: Overall Sample

First we analyze the evidence of LLP in the overall sample without differentiating the accounting standards and prudential regulatory regimes. We analyze empiric evidence for three major explanations: a) income smoothing, b) signaling and c) capital management. Income smoothing hypothesis suggests that bank managers tend to set aside higher LLP during the good times; accordingly LLP is positively related with EBTP. Signaling hypothesis argues that managers may use LLP as a signal of higher supervision and hence LLP is positively related with ΔEBTP. Capital management hypothesis suggests that managers tend to use LLP as part of Tier-I capital requirement during capital shortfalls and hence negatively related with Tier1Cap. Besides these three explanations of LLP, we also analyze the evidence of pro-cyclicality in LLP which suggests that LLP should be positively related with its own lags.

Overall sample period is 1999 to 2010 with 7,343 banks and a total of 57,967 bank years in 107 countries. Table 18 presents the Panel regression estimates of equation (1). First, we find that LLP is positively related with its own lag at first degree and second degree; such finding is consistent with the pro-cyclicality of LLP. As only 21 countries out of the 107 countries have initiated some sort of dynamic provisioning and other countries generally follow prudential regulations that are primarily pro-cyclic, for the overall sample we find a robust evidence of pro-cyclicality of LLP. Second, we note that, in general, LLP is negatively related with Tier1Cap calculated as Tier-I Capital normalized to Risk Weighted Assets (RWA). This suggests that bank managers generally use LLP as part of capital management tool by including LLP as part of tier I capital requirement.

Third, LLP is positively related with EBTP (Earning before tax and provisions) which suggests that managers tend to set aside higher provisioning during the good times to smoothen the earning during bad times; this finding is consistent with the Income Smoothing argument. Fourth, we find week or no evidence supporting the signaling argument that suggest managers tend to signal better earning quality by setting aside higher provisioning during a period preceding the good times. All the findings are generally robust of regression techniques and after controlled for bank size effects, country macro-economic and financial and legal factors.

2.5.2 Changes in Prudential Regulations and LLP

In Hypothesis II, we argue that LLP under different prudential regulations may be systematically different. Accordingly in equation (2), we consider most commonly prevalent pro-cyclic regime as the base case and include a dummy for Dynamic provision in the analysis; Table 19 presents the regression estimates for equation (2). We find that change in prudential regime, from a pro-cyclic to a dynamic one, shows little or week evidence of pro-cyclicality in LLP as LLP becomes weakly or little related with its own lags at order one and two. For capital management and income smoothing hypothesis, we find that managers under dynamic provisioning also use LLP as tool for capital management and income smoothing like their counterparts in otherwise pro-cyclic prudential regimes. Besides, empirical evidence for LLP being used as a tool for signaling earning quality is also weak. Finally, we find significant negative fixed effect for "dynamic dummy" supporting the argument that managerial discretion in bank earning management in LLP is much lower under dynamic regime.

Table 19
LLP and prudential regulatory regimes

Table 18 reports Panel Regression results on LLP for the following model:

$$LLP_{i,t} = \gamma_0 + \gamma_1 LLP_{i,(t-1)} + \gamma_2 EBTP_{i,t} + \gamma_3 CRAR_{i,(t-1)} + \gamma_4 \Delta EBTP_{i,(t-1)} + \beta_1 Dynamic + \beta_2 Dynamic * LLP_{i,(t-1)} + \beta_3 Dynamic * EBTP_{i,t} + \beta_4 Dynamic * CRAR_{i,(t-1)} + \beta_5 Dynamic * \Delta EBTP_{i,(t-1)} + \gamma_5 Bank\ Controls_{i,(t-1)} + \gamma_6 Country\ Controls_{i,(t-1)} + \varepsilon_{it} \quad (2)$$

where, LLP is the loan loss provisioning normalized to the bank total asset, EBTP is the earnings before tax and provision normalized to the bank total Asset; and Tier1CAP is the Tire I regulatory capital normalized to risk-weighted asset. ΔEBTP is percentage change in EBTP. Ln_TotAsset is the log of the total asset of the sample Banks (in thousand dollars) used as a bank-specific control variable. used as Three country control variables are PerCapGDP, PerCapGDPGr and INFL that are the per capita GDP (Gross Domestic Product) in US Dollar of the countries under the sample, their growth in per capita GDP (in percentage) and inflation rate (in percentage), respectively. DYNAMIC is a dummy variable which is 1 if the prudential regulatory regime of a country follows a dynamic regime and otherwise zero for a pro-cyclical regime. Sample period is 1999 to 2010 with 7,343 banks and a total of 57,967 bank years in 107 countries. Column (5) reports Haussmann and Taylor (1981) test of difference in coefficients for Random Effect versus Fixed Effect estimates. For each variable, first row corresponds to coefficient estimates, and second row reports standard deviation. (***), (**) and (*) refer to 1%, 5% and 10% level of significance respectively based on two-tailed test statistics.

		(1) Pooled OLS Coeff.		(2) Per FE Coeff.		(3) Cross RE Coeff.		(4) Cross FE Coeff.		(5) Haus Var(Diff.)		(6) Panel GMM Coeff.	
Bank Contol		Yes		Yes		Yes		Yes		-		Yes	
Country Macro Control		Yes		Yes		Yes		Yes		-		Yes	
Country Financial & Legal Control		Yes		Yes		Yes		Yes		-		Yes	
Period FE		No		Yes		No		No		-		-	
Period RE		No		No		No		No		-		-	
Cross Section FE		No		No		Yes		No		-		-	
Cross Section RE		No		No		No		Yes		-		-	
C		100.346	***	7.217		100.346	***	-248.685	***			117.403	***
		10.110		12.584		9.828		11.658				11.448	
LLP(1)	(+)	0.508	***	0.498	***	0.508	***	0.333	***	0.000	***	0.505	***
		0.005		0.005		0.004		0.005		0.000		0.005	
LLP(2)	(+)	0.176	***	0.187	***	0.176	***	0.034	***	0.000	***	0.183	***
		0.005		0.005		0.005		0.005		0.000		0.005	

Table 19
LLP and prudential regulatory regimes (continued)

		(1) Pooled OLS		(2) Per FE		(3) Cross RE		(4) Cross FE		(5) Haus		(6) Panel GMM	
Tier1Cap	(-)	-0.091	***	-0.093	***	-0.091	***	-0.212	***	0.001	***	-0.089	***
		0.011		0.011		0.010		0.028		0.000		0.011	
EBTP	(+)	0.542	***	0.580	***	0.542	***	0.033		0.006	***	0.530	***
		0.068		0.067		0.066		0.100		0.000		0.068	
Δ EBTP	(+)	-0.030		0.049		-0.030		0.236		0.002	***	-0.021	
		0.138		0.137		0.135		0.143		0.000		0.138	
a. Impact of Dynamic Provisioning													
DYNAMIC		-47.187	***	-28.628	***	-47.187	***	NA				-42.269	***
		6.231		6.612		6.057						6.597	
DYNAMIC*LLP(1)		-0.042		0.007		-0.042		-0.202	***	0.001	***	-0.098	
		0.058		0.057		0.056		0.063		0.000		0.065	
DYNAMIC*LLP(2)		0.041		-0.057		0.041		0.085		0.001	***	0.020	
		0.055		0.055		0.054		0.060		0.000		0.062	
DYNAMIC*Tier1CAP		-1.030	***	-0.429		-1.030	***	-2.105	***	0.692	***	-0.914	***
		0.348		0.346		0.339		0.898		0.000		0.353	
DYNAMIC*EBTP		11.253	***	7.353	***	11.253	***	6.178	***	4.511	***	6.889	***
		1.775		1.767		1.725		2.736		0.000		1.921	
DYNAMIC*Δ EBTP		0.292		0.184		0.292		-0.385		0.319	***	0.637	
		0.845		0.837		0.821		0.997		0.000		0.846	
b. Bank Control													
Ln_TotAsset		3.700	***	3.637	***	3.700	***	23.879	***	1.167		3.715	***
		0.191		0.190		0.186		1.096		0.000		0.192	

Table 19
LLP and prudential regulatory regimes (continued)

	(1)		(2)		(3)		(4)		(5)		(6)	
	Pooled OLS		Per FE		Cross RE		Cross FE		Haus		Panel GMM	
c. Country Macro												
PerCapGDP	0.001	***	0.000		0.001	***	0.000		0.000	***	0.001	***
	0.000		0.000		0.000		0.000		0.000		0.000	
PerCapGDPGr	-3.167	***	0.355	***	-3.167	***	-3.371	***	0.001	***	-3.440	***
	0.099		0.150		0.097		0.101		0.000		0.104	
INFL	-2.051	***	-1.509	***	-2.051	***	-2.413	***	0.007	***	-1.869	***
	0.212		0.352		0.206		0.222		0.000		0.221	
d. Country Financial & Legal Control												
PRIVO	-25.236	***	-1.230		-25.236	***	NA				-24.555	***
	4.588		5.184		4.460		NA				5.107	
MCAP	38.455	***	19.569	***	38.455	***	NA				43.156	***
	7.378		7.574		7.172		NA				8.391	
SPREAD	-0.113	***	-0.015		-0.113	***	NA				-0.163	***
	0.044		0.046		0.043		NA				0.046	
PTYRGHT	-14.264	***	-5.053	*	-14.264	***	NA				-15.715	***
	2.107		2.967		2.048		NA				2.291	
REGULATORY	0.521		0.488		0.521		NA				-0.320	
	1.359		1.347		1.321		NA				1.361	
DISCL	11.693		-7.737		11.693		NA				4.349	
	10.768		11.891		10.468		NA				11.897	
CaseEff	-1.254	***	-0.425	***	-1.254	***	NA				-1.352	***
	0.066		0.085		0.064		NA				0.071	
Adj. R-sqd	0.402		0.413		0.402		0.435				0.403	
Period FE Fstat (8,55350)			137.310									
			0.000									

Table 20
LLP and Bank accounting standards

Table 20 reports Panel Regression results on LLP for the following model:

$$\begin{aligned} LLP_{i,t} = \quad & \gamma_0 + \gamma_1 LLP_{i,(t-1)} + \gamma_2 EBTP_{i,t} + \gamma_3 CRAR_{i,(t-1)} + \gamma_4 \Delta EBTP_{i,(t-1)} \\ & + \beta_1 Principle + \beta_2 Principle * LLP_{i,(t-1)} + \beta_3 Principle * EBTP_{i,t} \\ & + \beta_4 Principle * CRAR_{i,(t-1)} + \beta_5 Principle * \Delta EBTP_{i,(t-1)} \\ & + \gamma_5 Bank\ Controls_{i,(t-1)} + \gamma_6 Country\ Controls_{i,(t-1)} + \varepsilon_{it} \end{aligned} \qquad (3)$$

where, LLP is the loan loss provisioning normalized to the bank total asset, EBTP is the earnings before tax and provision normalized to the bank total Asset; and Tier1CAP is the Tire I regulatory capital normalized to risk-weighted asset. ΔEBTP is percentage change in EBTP. Ln_TotAsset is the log of the total asset of the sample Banks (in thousand dollars) used as a bank-specific control variable. used as Three country control variables are PerCapGDP, PerCapGDPGr and INFL that are the per capita GDP (Gross Domestic Product) in US Dollar of the countries under the sample, their growth in per capita GDP (in percentage) and inflation rate (in percentage), respectively. IFRS is a dummy variable that is 1 if a bank follows IFRS accounting standard and otherwise 0 for other standards. Sample period is 1999 to 2010 with 7,343 banks and a total of 57,967 bank years in 107 countries. For each variable, first row corresponds to coefficient estimates, and second row reports standard deviation. (***), (**) and (*) refer to 1%, 5% and 10% level of significance respectively based on two-tailed test statistics.

Panel A: Description of Regression Equations and control variables

	(1) OLS	(2) Per FE	(3) Cross RE	(4) Cross FE	(5) Panel GMM
Bank Control	Yes	Yes	Yes	Yes	Yes
Country Macro Control	Yes	Yes	Yes	Yes	Yes
Country Financial & Legal Control	Yes	Yes	Yes	Yes	Yes
Period FE	No	Yes	No	No	-
Period RE	No	No	No	No	-
Cross Section FE	No	No	Yes	No	-
Cross Section RE	No	No	No	Yes	-

Table 20
LLP and Bank accounting standards (continued)

Panel B: Regression Estimates														
		(1)		(2)		(3)		(4)		(5)				
		OLS		Per FE		Cross RE		Cross FE		Panel GMM				
C		107.926	***	12.536		107.926	***	--		117.843	***			
		9.692		11.470		9.422				11.133				
LLP(1)	(+)	0.508	***	0.497	***	0.508	***	0.000	***	0.504	***			
		0.005		0.005		0.004		0.000		0.005				
LLP(2)	(+)	0.177	***	0.187	***	0.177	***	0.000	***	0.183	***			
		0.005		0.005		0.005		0.000		0.005				
Tier1CAP	(-)	-0.091	***	-0.092	***	-0.091	***	0.001	***	-0.089	***			
		0.011		0.011		0.010		0.000		0.011				
EBTP	(+)	0.543	***	0.580	***	0.543	***	0.006	***	0.524	***			
		0.068		0.067		0.066		0.000		0.068				
ΔEBTP	(+)	-0.030		0.051		-0.030		0.002	***	-0.019				
		0.139		0.137		0.135		0.000		0.138				
a. Bank Control														
Ln_TotAsset		3.810	***	3.758	***	3.810	***	1.169	***	3.851	***			
		0.194		0.192		0.188		0.000		0.194				

Table 20
LLP and Bank accounting standards (continued)

Panel B: Regression Estimates										
	(1) OLS		(2) Per FE		(3) Cross RE		(4) Cross FE		(5) Panel GMM	
b. Impact of Principle based Standard										
PRINCIPLE	**-59.484**	*	**3.390**		**-59.484**	*	**--**		**-66.383**	**
	30.213		**30.777**		**29.371**				**31.939**	
PRINCIPLE*LLP(1)	-0.115		0.068		-0.115		0.003	***	-0.130	
	0.095		0.094		0.092		0.001		0.105	
PRINCIPLE*LLP(2)	-0.138		-0.165	*	-0.138		0.004	***	-0.167	
	0.098		0.098		0.096		0.000		0.105	
PRINCIPLE*Tier1CAP	0.208		-0.043		0.208		0.131		0.247	
	0.257		0.257		0.250		0.872		0.273	
PRINCIPLE*EBTP	1.360		0.229		1.360		3.446		1.424	
	1.912		1.894		1.858		0.534		1.976	
PRINCIPLE*ΔEBTP	1.166		0.662		1.166		0.291		1.236	
	0.837		0.829		0.813		0.182		0.837	
PRINCIPLE*Ln_TotAsset	0.955		-2.129		0.955		301.708	***	1.098	
	1.666		1.687		1.620		0.003		1.757	
c. Country Macro Controls										
PerCapGDP	0.001	***	0.000		0.001	***	0.000	***	0.001	***
	0.000		0.000		0.000		0.000		0.000	

Table 20
LLP and Bank accounting standards

Panel B: Regression Estimates												
	(1) OLS			(2) Per FE			(3) Cross RE			(4) Cross FE			(5) Panel GMM		
PerCapGDPGr	-3.202	***		0.328	**		-3.202	***		0.001	***		-3.506	***	
	0.098			0.149			0.096			0.000			0.103		
INFL	-1.943	***		-1.645	***		-1.943	***		0.009	***		-1.660	***	
	0.207			0.339			0.201			0.000			0.215		
d. Country Financial Control															
PRIVO	-32.570	***		-2.765			-32.570	***		--			-32.082	***	
	4.692			5.278			4.562						5.253		
MCAP	49.069	***		25.130	***		49.069	***		--			49.773	***	
	7.475			7.633			7.266						8.495		
SPREAD	-0.151	***		-0.073			-0.151	***		--			-0.212	***	
	0.045			0.046			0.043						0.046		
PTYRGHT	-9.800	***		2.007			-9.800	**		--			-8.253	***	
	1.951			2.632			1.897						2.125		
REG	0.501			0.533			0.501			--			-0.261		
	1.362			1.349			1.324						1.364		
DISCL	-1.858			-30.207	*		-1.858			--			-7.440		
	10.935			12.283			10.631						12.289		
CaseEff	-1.431	***		-0.526	***		-1.431	***		--			-1.577		
	0.070			0.085			0.068						0.077		
Adj. R-sq.	0.402			0.414			0.402						0.403		
				139.381						6800.692					
				(8,55349)						(15)					
				0						0					

Table 21
Combined Impact of changes in Prudential Regulation and changes in Accounting Standards on LLP

Table 21 reports Panel Regression results on LLP for the following model:

$$\begin{aligned} LLP_{i,t} = \; & \gamma_0 + \gamma_1 LLP_{i,(t-1)} + \gamma_2 EBTP_{i,t} + \gamma_3 CRAR_{i,(t-1)} + \gamma_4 \Delta EBTP_{i,(t-1)} \\ & + \alpha_1 Dynamic + \beta_1 Principle + \beta_2 Dynamic * Principle * LLP_{i,(t-1)} \\ & + \beta_3 Dynamic * Principle * EBTP_{i,t} + \beta_4 Dynamic * Principle * CRAR_{i,(t-1)} \\ & + \beta_5 Dynamic * Principle * \Delta EBTP_{i,(t-1)} + \gamma_5 Bank\ Controls_{i,(t-1)} + \gamma_6 Country\ Controls_{i,(t-1)} + \varepsilon_{it} \end{aligned} \quad (3)$$

where, LLP is the loan loss provisioning normalized to the bank total asset, EBTP is the earnings before tax and provision normalized to the bank total Asset; and Tier1CAP is the Tire I regulatory capital normalized to risk-weighted asset. ΔEBTP is percentage change in EBTP. Ln_TotAsset is the log of the total asset of the sample Banks (in thousand dollars) used as a bank-specific control variable. used as Three country control variables are PerCapGDP, PerCapGDPGr and INFL that are the per capita GDP (Gross Domestic Product) in US Dollar of the countries under the sample, their growth in per capita GDP (in percentage) and inflation rate (in percentage), respectively. DYNAMIC is a dummy variable which is 1 if the prudential regulatory regime of a country follows a dynamic regime and otherwise zero for a pro-cyclical regime. IFRS is a dummy variable that is 1 if a bank follows IFRS accounting standard and otherwise 0 for other standards.

Sample period is 1999 to 2010 with 7,343 banks and a total of 57,967 bank years in 107 countries. Column (5) reports Haussmann and Taylor (1981) test of difference in coefficients for Random Effect versus Fixed Effect estimates. For each variable, first row corresponds to coefficient estimates, and second row reports standard deviation. (***), (**) and (*) refer to 1%, 5% and 10% level of significance respectively based on two-tailed test statistics.

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS Coeff.	Per FE Coeff.	Cross RE Coeff.	Cross FE Coeff.		Panel GMM Coeff.
Bank Contol	Yes	Yes	Yes	Yes		Yes
Country Macro Control	Yes	Yes	Yes	Yes		Yes
Country Financial & Legal Control	Yes	Yes	Yes	Yes		Yes
Period FE	No	Yes	No	No		-
Period RE	No	No	No	No		-
Cross Section FE	No	No	Yes	No		-
Cross Section RE	No	No	No	Yes		-

Table 21
Combined Impact of changes in Prudential Regulation and changes in Accounting Standards on LLP (Continued)

	(1)		(2)		(3)		(4)		(5)		(6)	
	OLS Coeff.		Per FE Coeff.		Cross RE Coeff.		Cross FE Coeff.		Haus.		Panel GMM Coeff.	
C	80.102	***	6.729		80.102	***	-249.763	***			94.560	***
	11.001		12.919		10.702		11.874				12.553	
LLP(1)	0.506	***	0.497	***	0.506	***	0.332	***	0.000	***	0.503	***
	0.005		0.005		0.004		0.005		0.000		0.005	
LLP(2)	0.176	***	0.186	***	0.176	***	0.034	***	0.000	***	0.183	***
	0.005		0.005		0.005		0.005		0.000		0.005	
Tier1Cap	-0.091	***	-0.092	***	-0.091	***	-0.211	***	0.001	***	-0.089	***
	0.011		0.011		0.010		0.028		0.000		0.011	
EBTP	0.546	***	0.580	***	0.546	***	0.041		0.006	***	0.529	***
	0.068		0.067		0.066		0.100		0.000		0.068	
ΔEBTP	-0.020		0.052		-0.020		0.236		0.002		-0.011	
	0.138		0.137		0.135		0.143		0.000		0.138	
a. Bank Size Control												
Ln_Tot_Asset	3.813	***	3.747	***	3.813	***	23.980	***	1.166	***	3.823	***
	0.192		0.191		0.187		1.096		0.000		0.193	
b. Country Macro-economic control												
PerCapGDP	0.001	***	0.000		0.001	***	0.000		0.000	***	0.001	***
	0.000		0.000		0.000		0.000		0.000		0.000	
PerCapGDPGr	-3.339	***	0.251		-3.339	***	-3.497	***	0.001	***	-3.660	***
	0.102		0.158		0.099		0.104		0.000		0.107	

Table 21
Combined Impact of changes in Prudential Regulation and changes in Accounting Standards on LLP (Continued)

	(1)		(2)		(3)		(4)		(5)		(6)	
	OLS Coeff.		Per FE Coeff.		Cross RE Coeff.		Cross FE Coeff.				Panel GMM Coeff.	
INFL	-2.002	***	-1.574	***	-2.002	***	-2.301	***	0.007	***	-1.700	***
	0.214		0.356		0.208		0.223		0.000		0.222	
c. Accounting standard fixed effect												
PRINCIPLE	-21.131	***	-32.944	***	-21.131	***	NA				-19.97	***
	6.309		6.528		6.137		NA				7.457	
d. Prudential regulation fixed effect												
DYNAMIC	-32.19	***	-10.97		-32.19	***	NA				-23.61	**
	8.583		8.629		8.349		NA				10.033	
DYNAMIC*PRINCIPLE*LLP(1)	0.285		0.278		0.285	*	-0.272		0.021		0.295	*
	0.174		0.172		0.169		0.222		0.000		0.175	
DYNAMIC*PRINCIPLE*LLP(2)	0.009		-0.006		0.009		-0.535		0.074		0.017	
	0.222		0.220		0.216		0.348		0.046		0.226	
DYNAMIC*PRINCIPLE*Tier1CAP	0.194		0.154		0.194		0.464		0.870		0.153	
	0.384		0.381		0.373		1.004		0.773		0.389	
DYNAMIC*PRINCIPLE*EBTP	0.245		0.047		0.245		1.024		4.025		0.165	
	2.142		2.123		2.084		2.893		0.698		2.157	
DYNAMIC*PRINCIPLE*ΔEBTP	0.532		0.398		0.532		-0.152		0.393		0.490	
	0.857		0.850		0.834		1.044		0.276		0.857	

Table 21
Combined Impact of changes in Prudential Regulation and changes in Accounting Standards on LLP (Continued)

	(1)		(2)		(3)		(4)		(5)		(6)	
	OLS		Per FE		Cross RE		Cross FE				Panel GMM	
DYNAMIC*PRINCIPLE*Ln_TotAsset	0.116		-0.819		0.116		6.134		1699.904		0.200	
	1.662		1.686		1.617		41.262		0.884		1.737	
DYNAMIC*PRINCIPLE*PerCapGDP	-0.003	***	0.000		-0.003	***	0.004		0.000	**	-0.003	***
	0.001		0.001		0.001		0.003		0.021		0.001	
DYNAMIC*PRINCIPLE*PerCapGDPGr	1.188		0.358		1.188	**	2.165	***	0.167	**	1.629	***
	0.558		0.561		0.543		0.679		0.017		0.584	
DYNAMIC*PRINCIPLE*INFL	17.277	***	3.143		17.277	***	0.578		20.800	***	17.054	***
	3.271		3.348		3.182		5.561		0.000		3.499	
g. Country Financial Control												
PRIVO	-36.339	***	-5.984		-36.339	***	--				-34.528	***
	4.722		5.478		4.593						5.241	
MCAP	29.471	***	22.848	***	29.471	***	NA				30.864	***
	7.767		7.809		7.555		NA				8.859	
SPREAD	-0.169	***	-0.073		-0.169	***	NA				-0.228	***
	0.045		0.047		0.043		NA				0.046	
PTYRIGHT	-1.369		3.294		-1.369		NA				-1.385	
	2.487		3.213		2.420		NA				2.781	
REG	0.559		0.469		0.559		NA				-0.288	
	1.359		1.348		1.322		NA				1.361	
DISCL	37.163	***	-18.027		37.163	***	NA				29.306	**
	11.874		14.181		11.551		NA				13.146	
CaseEff	-1.658	***	-0.603		-1.658	***	NA				-1.773	***
	0.076		0.102		0.074		NA				0.084	
Adjusted R-squared	0.403		0.414		0.403		0.435				0.404	

Table 22
Joint Impact of changes in prudential regime and changes in Accounting Standards: Spanish Evidence

Table 22 reports Panel Regression results on LLP for the following model:

$$LLP_{i,t} = \gamma_0 + \gamma_1 LLP_{i,(t-1)} + \gamma_2 EBTP_{i,t} + \gamma_3 CRAR_{i,(t-1)} + \gamma_4 \Delta EBTP_{i,(t-1)} + \beta_1 Spain + \beta_2 Spain * LLP_{i,(t-1)} + \beta_3 Spain * EBTP_{i,t} + \beta_4 Spain * CRAR_{i,(t-1)} + \beta_5 Spain * \Delta EBTP_{i,(t-1)} + \gamma_5 Bank\ Controls_{i,(t-1)} + \gamma_6\ Country\ Controls_{i,(t-1)} + \varepsilon_{it} \quad (4)$$

where, LLP is the loan loss provisioning normalized to the bank total asset, EBTP is the earnings before tax and provision normalized to the bank total Asset; and Tier1CAP is the Tire I regulatory capital normalized to risk-weighted asset. ΔEBTP is percentage change in EBTP. Ln_TotAsset is the log of the total asset of the sample Banks (in thousand dollars) used as a bank-specific control variable. used as Three country control variables are PerCapGDP, PerCapGDPGr and INFL that are the per capita GDP (Gross Domestic Product) in US Dollar of the countries under the sample, their growth in per capita GDP (in percentage) and inflation rate (in percentage), respectively. SPAIN is a dummy variable which is 1 if the bank belongs to Spain and otherwise zero for non-Spanish banks.

Sample period is 1999 to 2010 with 7,343 banks and a total of 57,967 bank years in 107 countries. Column (5) reports Haussmann and Taylor (1981) test of difference in coefficients for Random Effect versus Fixed Effect estimates. For each variable, first row corresponds to coefficient estimates, and second row reports standard deviation. (***), (**) and (*) refer to 1%, 5% and 10% level of significance respectively based on two-tailed test statistics.

Panel A: Description of Regression Equations and control variables

	(1) OLS Coeff.	(2) Per FE Coeff.	(3) Cross RE Coeff.	(4) Cross FE Coeff.	(5) Haus	(6) Panel GMM Coeff.
Bank Contol	Yes	Yes	Yes	Yes	-	Yes
Country Macro Control	Yes	Yes	Yes	Yes	-	Yes
Country Financial & Legal Control	Yes	Yes	Yes	Yes	-	Yes
Period FE	No	Yes	No	No	-	-
Period RE	No	No	No	No	-	-
Cross Section FE	No	No	Yes	No	-	-
Cross Section RE	No	No	No	Yes	-	-

Table 22
Joint Impact of changes in prudential regime and changes in Accounting Standards: Spanish Evidence

Panel B: Regression Estimates												
	(1) OLS Coeff.		(2) Per FE Coeff.		(3) Cross RE Coeff.		(4) Cross FE Coeff.		(5)		(6) Panel GMM Coeff.	
C	64.884	***	-25.944	**	64.884	***	-252.229	***			63.228	***
	9.223		10.336		8.956		11.967				10.397	
LLP(1)	0.510	***	0.498	***	0.510	***	0.332	***	0.000	***	0.506	***
	0.005		0.005		0.004		0.005		0.000		0.005	
LLP(2)	0.176	***	0.187	***	0.176	***	0.034	***	0.000	***	0.183	***
	0.005		0.005		0.005		0.005		0.000		0.005	
Tier1Cap	-0.091	***	-0.093	***	-0.091	***	-0.214	***	0.001	***	-0.089	***
	0.011		0.011		0.010		0.028		0.000		0.011	
EBTP	0.556	***	0.590	***	0.556	***	0.040		0.006	***	0.537	***
	0.068		0.067		0.066		0.100		0.000		0.068	
ΔEBTP	-0.008		0.062		-0.008		0.238	*	0.002	***	0.004	
	0.137		0.135		0.133		0.142		0.000		0.137	
Ln_TotAsset	3.637	***	3.599	***	3.637	***	23.899	***	1.166	***	3.684	***
	0.192		0.190		0.186		1.096		0.000		0.192	

Table 22
Joint Impact of changes in prudential regime and changes in Accounting Standards: Spanish Evidence

Panel B: Regression Estimates							
	(1)	(2)	(3)	(4)	(5)		(6)
	OLS	Per FE	Cross RE	Cross FE			Panel GMM
SPAIN	5.004	102.652	5.004	NA			-18.614
	168.890	167.273	163.997	NA			194.897
SPAIN*LLP(1)	0.391	0.402	0.391	-1.244	0.695	*	0.356
	0.723	0.715	0.702	1.089	0.050		0.767
SPAIN*LLP(2)	0.213	0.201	0.213	0.082	0.577		0.339
	0.752	0.744	0.730	1.054	0.863		0.994
SPAIN*Tier1Cap	2.390	2.392	2.390	31.359	382.014		2.447
	4.140	4.096	4.020	19.954	0.138		6.150
SPAIN*EBTP	6.191	6.157	6.191	-34.397	1447.102		7.006
	4.096	16.837	16.524	41.475	0.286		44.502
SPAIN*ΔEBTP	-10.776	-10.847	-10.776	25.832	365.107	*	18.291
	21.768	21.537	21.137	28.494	0.055		68.840
SPAIN*Ln_TotAsset	-3.305	-3.266	-3.305	231.090	43768.159		-3.059
	6.547	6.478	6.357	209.305	0.263		11.011
SPAIN*PerCapGDP	0.000	-0.003	0.000	-0.007	0.000		0.000
	0.004	0.004	0.004	0.008	0.336		0.004
SPAIN*PerCapGDPGr	2.746	0.843	2.746	3.068	0.852		2.999
	1.890	1.873	1.836	2.055	0.727		2.008
SPAIN*INFL	-2.434	-3.414	-2.434	14.704	129.524		1.938
	10.304	10.201	10.005	15.154	0.132		11.648

Table 22
Joint Impact of changes in prudential regime and changes in Accounting Standards: Spanish Evidence

Panel B: Regression Estimates												
	(1)		(2)		(3)		(4)		(5)		(6)	
PerCapGDP	0.001	***	0.000		0.001	***	0.000		0.000	***	0.001	***
	0.000		0.000		0.000		0.000		0.000		0.000	
PerCapGDPGr	-3.312	***	0.371	**	-3.312	***	-3.359	***	0.001		-3.604	***
	0.098		0.150		0.096		0.101		0.167		0.103	
INFL	-1.365	***	-0.832	**	-1.365	***	-2.439	***	0.011	***	-1.144	***
	0.202		0.323		0.196		0.222		0.000		0.211	
PRIVO	-22.515	***	5.477		-22.515	***	NA				-20.634	***
	4.567		5.019		4.435		NA				5.089	
MCAP	34.873	***	15.042	**	34.873	***	NA				33.311	***
	7.510		7.551		7.292		NA				8.555	
SPREAD	-0.058		0.000		-0.058		NA				-0.099	
	0.044		0.046		0.043		NA				0.045	
PTYRIGHTS	-11.679	***	2.153		-11.679	***	NA				-10.420	***
	1.935		2.579		1.879		NA				2.110	
REGULATORY	0.770		0.520		0.770		NA				-0.102	
	1.361		1.347		1.321		NA				1.363	
DISCLOSE	19.534	*	-18.738		19.534	*	NA				20.248	
	11.154		12.705		10.831		NA				12.427	
CASEAEFFICIENCY	-1.036	***	-0.183	**	-1.036	***	NA				-1.094	***
	0.062		0.075		0.060		NA				0.066	
Adj. R-sq.	0.400		0.413		0.400		0.434				0.402	

2.5.3 Changes in Accounting Standards and LLP

In Hypothesis III, we argue that LLP under different accounting standards may be systematically different. Accordingly in equation (2), we consider most commonly prevalent rule-based accounting standards as the base case and include a dummy for principle-based accounting standard in the analysis; Table 20 presents the regression estimates for equation (3). We find that change in accounting standards, from a rule-based standard to a principle-based standard, does not exhibit significant difference in the interaction terms. However, we do find significant negative fixed effect supporting the argument that managerial discretion in bank earning management in LLP is much lower under principles-based accounting standard.

2.5.4 Joint effect of changes in prudential regime and accounting standard

Finally in Hypothesis IV, we analyze what type of systematic impact a joint change in prudential regime and accounting standard may have over bank earning management. We include both Dynamic dummy and Principle based accounting standard dummies in a set up given in equation (4); Table 21 reports the regression estimates. We find that change in prudential regime from a pro-cyclic to a dynamic regime has a significant positive fixed effect on LLP. For change in accounting standard from a rule-based to a principle-based one, we rather find has a negative fixed effect on LLP. However, the interaction of Dynamic and Principle dummies with the lags of LLP, EBTP, change in EBTP and Tier1Cap, do not reveal much of significant differences.

In our dataset, Spain represents the only country to have gone both changes in prudential regime and accounting standards; accordingly we include a dummy for Spanish banks and report regression estimates for equation (5) in Table 22. Consistent with our findings from Table 21, from Table 22, we do not find much of difference in earning management by bank managers in Spain.

2.6 Summary

This paper analyzes the systematic impact of changes in accounting standards and changes in prudential regulations on bank earning management in terms of loan loss provisioning (LLP). Earlier literature in bank earning management finds rather conflicting evidence about LLP and generally presents three commonly cited arguments: a) income smoothing hypothesis, b) capital management hypothesis and c) signaling hypothesis. We extend this bank earning management by revisiting these three arguments with more recent data and a larger sample that includes 7,343 individual banks in 107 countries. Throughout the analysis, we control for bank size effect, country macro-economic factors and country financial and legal factors.

We find that bank managers, in general, engage in LLP for income smoothing and capital management purposes. However, we find little or weak evidence supporting signaling argument that managers may use LLP as a signal of better earning quality. On change in prudential regime from a pro-cyclic to a dynamic regime, we find significant negative fixed effect supporting the argument that managerial discretion in bank earning management in LLP is much lower under dynamic regime. On the impact of changes in accounting standards, we find significant negative fixed effect on LLP supporting the argument that managerial discretion in bank earning management in LLP is much lower under principles-based accounting standard. Such findings are consistent with Capkun et al (2010) who find principles-based accounting standard provide less managerial discretion in earning management.

To conclude, we argue that differences in prudential regulatory regimes and accounting standards may have some systematic impact on bank earning management in LLP; accordingly such differences may be impo to be included in future earning management research.

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Appendix A

Asset Purchase windows by Federal Reserve and Description of Key Events

Event	Date	Event Description	CODE	Type
1.	August 17, 2007	Fed increases the maximum primary credit borrowing term to 30 days, renewable by borrower. FOMC also cuts the discount rate by 50 basis points	DW	Pre-QE
Program	Program Description			
A	*Term Auction Facility: (TAF)* FED will auction term funds to depository institutions. All depository institutions that are eligible to borrow under the primary credit program will be eligible to participate in TAF auctions. All advances must be fully collateralized. Each TAF auction will be for a fixed amount, with the rate determined by the auction process (subject to a minimum bid rate). Bids will be submitted by phone through local Reserve Banks.			
Events	Date	Event Description	CODE	Type
2	December 12, 2007	Fed announces the creation of a TAF	OpenTAF	Pre-QE
3	December 12, 2007	Fed announces that TAF auctions will be conducted every 2 weeks as long as financial market conditions warrant	ExtTAF1	Pre-QE
4	March 7, 2008	Fed announces $50 billion TAF auctions on March 10 and March 24 and extends the TAF for at least 6 months	ExtTAF2	Pre-QE
	March 8, 2010	Closed	CloseTAF	QE
Program	Program Description			
B.	*Term Security Lending Facility (TSLF)* The Federal Reserve Board announces the creation of the Term Securities Lending Facility (TSLF), which will lend up to $200 billion of Treasury securities for 28-day terms against federal agency debt, federal agency residential mortgage-backed securities (MBS), non-agency AAA/Aaa private label residential MBS, and other securities. The FOMC increases its swap lines with the ECB by $10 billion and the Swiss National Bank by $2 billion and also extends these lines through September 30, 2008.			
Events	Date	Event Description	CODE	Type
	March 11, 2008	Fed announces the creation of the TSLF	OpenTSLF	Pre-QE
	March 31, 2010	Closed	CloseTSLF	QE
Program	Program Description			
C.	*Primary Dealer Credit Facility (PDCF)* FED Board establishes Primary Dealer Credit Facility (PDCF), extending credit to primary dealers at the primary credit rate against a broad range of investment grade securities. The Federal Reserve Board votes to reduce the primary credit rate 25 basis points to 3.25 percent, lowering the spread between the primary credit rate and FOMC target for the federal funds rate to 25 basis points. The Board also votes to increase the maximum maturity of primary credit loans to 90 days.			
Events	Date	Event Description	CODE	Type
	March 16, 2008	PDCF Open	OpenPDCF	Pre-QE
	February 1, 2010	PDCF Closed	ClosePDCF	QE

Asset Purchase windows by Federal Reserve and Description of Key Events (continued)

Program	Program Description			
D.	*Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF)* FED Board announces the creation of the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) to extend non-recourse loans at the primary credit rate to U.S. depository institutions and bank holding companies to finance their purchase of high-quality asset-backed commercial paper from money market mutual funds. The Federal Reserve Board also announces plans to purchase federal agency discount notes (short-term debt obligations issued by Fannie Mae, Freddie Mac, and Federal Home Loan Banks) from primary dealers.			
Events	Date	Event Description	CODE	Type
	Sept. 19, 2008	AMLF opened	OpenAMLF	Pre-QE
	February 1, 2010	AMLF closed	CloseAMLF	QE
Program	Program Description			
E	*Commercial Paper Funding Facility (CPFF)* FED Board announces the creation of the Commercial Paper Funding Facility (CPFF), which will provide a liquidity backstop to U.S. issuers of commercial paper through a special purpose vehicle that will purchase three-month unsecured and asset-backed commercial paper directly from eligible issuers.			
Events	Date	Event Description	CODE	Type
	October 7, 2008	CPFF opened	OpenCPFF	Pre-QE
	February 1, 2010	CPFF Closed	ClosedCPFF	QE
Program	Program Description			
F	*Money Market Investor Funding Facility(MMIFF)* FED Board announces creation of the Money Market Investor Funding Facility (MMIFF). Under the facility, the Federal Reserve Bank of New York provides senior secured funding to a series of special purpose vehicles to facilitate the purchase of assets from eligible			
Events	Date	Event Description	CODE	Type
	October 21, 2008	MMIFF Opened	OpenMMIFF	Pre-QE
Program	Program Description			
G	*Term Asset-Backed Securities Lending Facility (TALF)* FED Board announces the creation of the Term Asset-Backed Securities Lending Facility (TALF), under which the Federal Reserve Bank of New York will lend up to $200 billion on a non-recourse basis to holders of AAA-rated asset-backed securities and recently originated consumer and small business loans. The U.S. Treasury will provide $20 billion of TARP money for credit protection.			
Events	Date	Event Description	CODE	Type
	March 3, 2009	TALF opened	OpenTALF	

Appendix B
Granger Causality Results

Table I
Granger Causality between Expected, Unexpected Monetary Shocks and Monetary Policy Tools

Panel A of Table I reports Granger Causality between Monetary Shocks and conventional monetary policy tools: i) DFF as Federal Fund Rate (in %) , and Federal Reserve System's liability side tools such as: ii) log(M1) in natural logarithm of Narrow Money (in billion dollars), iii) log(NONM1) as natural logarithm of components of M2 not included in M1 (in billion dollars). Panel B reports Granger Causality between conventional and unconventional monetary policy tools: ii) log(TOTSPEC) as natural logarithm of total holding (in billion dollars) in special asset purchase programs by Federal Reserve System. Panel C presents Granger Causality between the two Monetary Shocks and conventional monetary policy tools; log(TOTSPEC). *,** and *** correspond to statistical significance of 10%, 5% and 1% respectively. All data are daily frequency. All index returns and bond spreads are in percentage.

Panel A: Monetary Shocks and Conventional Monetary Policy Tools						
	All		Pre-QE		QE Regime	
Ho: .. does not Granger Cause EXPSHOCK						
DFF …	**reject**	***	**reject**	***	**reject**	***
LOG(M1) …	--		--		--	
LOG(NONM1) …	reject	***	reject	***	reject	***
Other Conventional Monetary Tools …	--		--		--	
Ho: EXPSHOCK does not Granger Cause ..						
.. DFF	**reject**	***	**reject**	***	**reject**	***
.. LOG(M1)	--		--		--	
.. LOG(NONM1)	--		reject	*	--	
.. Other Conventional Monetary Tools	--		--		--	
Ho: .. does not Granger Cause UNEXPSHOCK						
DFF …	reject	**	--		--	
LOG(M1) …	--		--		--	
LOG(NONM1) …	reject	***	reject	***	--	
Other Conventional Monetary Tools …	--		--		--	
Ho: UNEXPSHOCK does not Granger Cause ..						
.. DFF	reject	***	reject	***	reject	***
.. Other Conventional Monetary Tools	--		--		--	
EXSHOCK does not Granger Cause UNEXPSHOCK	reject	**	--		reject	***
UNEXPSHOCK does not Granger Cause EXSHOCK	reject	***	reject	**	reject	***
No. of Obs.	462		314		148	

Panel B: Conventional and Unconventional (Asset-side) Monetary tools

	All		Pre-QE		QE Regime	
Ho: .. does not Granger Cause log(TOTSPEC)						
DFF …	--		--		reject	***
LOG(M1) …	--		--		reject	**
LOG(NONM1) …	reject	**	reject	**	reject	**
Ho: log(TOTSPEC) does not Granger Cause ..						
DFF …	reject	**	reject	**	--	
LOG(M1) …	--		reject	***	--	
LOG(NONM1) …	--		--		--	

Panel C: Monetary Shocks and Unconventional (Asset-side) Monetary tools

	All		Pre-QE		QE Regime	
Ho: .. does not Granger Cause log(TOTSPEC)						
UNEXPSHOCK …	--		--		reject	***
EXSHOCK …	--		--		reject	***
Ho: log(TOTSPEC) does not Granger Cause ..						
.. UNEXPSHOCK	--		--		reject	**
.. EXSHOCK …	--		reject	**	reject	***

Table II
Causality between Expected and Unexpected Monetary Shocks and Target Variables

Panel A of Table II reports Granger Causality between Monetary Shocks and four Major market indices: Four Market Indices are: i) DJIA as return on Dow Jones Industrial Average Index, ii) DTWEXM as change in major trade-weighted exchange index, iii) SNP500 as return on S&P500 Index and iv) VIX as Implied Volatility Index on S&P500. Panel B reports Granger Causality between Monetary Shocks and Three bond spreads: i) AAA as AAA option-adjusted spread, ii) BBB as BBB option-adjusted spread, and iii) CCC as CCC option-adjusted spread. Panel C reports Granger Causality between Monetary Shocks and daily swap rates for 8 maturities, 1 yr, 2 yr, 3 yr, 4 yr, 5 yr, 7 yr, 10 yr and 30 yr (DSWP1 through DWSP30) while Panel D presents the same for different maturities of Commercial Papers both financial and non-financial firms with AA-ratings. DCPF1M, DCPF2M, DCPF3M are return on 1 month AA-rating financial commercial paper and DCPN30, DCPN2M, DCPN3M are return on similar maturities non-financial commercial papers.

*,** and *** correspond to statistical significance of 10%, 5% and 1% respectively. All data are daily frequency. All index returns and bond spreads are in percentage.

Panel A: Monetary Shocks and SNP, DJIA, VIX, EXCH Index						
	Overall		Pre-QE		QE Regime	
Ho: Market Indices does not Granger Cause EXPSHOCK	--		--		--	
Ho: EXPSHOCK does not Granger Cause Market Indices	--		--		--	
Ho: Market Indices does not Granger Cause UNEXPSHOCK	--		--		--	
Ho: UNEXPSHOCK does not Granger Cause ..						
.. DJIARET	reject	**	reject	**	Reject	**
.. SP5RET	reject	***	reject	**	Reject	**
.. VXDCLSRET	reject	***	reject	***	--	
Causality between Expected and Unexpected Shocks						
UNEXPSHOCK does not Granger Cause EXSHOCK	reject	***	reject	***	reject	***
EXSHOCK does not Granger Cause UNEXPSHOCK	reject	***	reject	***	--	
Panel B: Monetary Shocks and AAA, BBB and CCC Bond Spreads						
	Overall		Pre-QE		QE Regime	
Ho: .. does not Granger Cause EXPSHOCK						
AAASPREAD …	--		reject	***	reject	**
BBBSPREAD …	reject	**	reject	***		
CCCSPREAD …	reject	***	reject	***		
Ho: EXPSHOCK does not Granger Cause ..						
.. AAASPREAD	--		reject	***		
.. BBBSPREAD	--		--		reject	**
.. CCCSPREAD	--		reject	***	reject	***
Ho: .. does not Granger Cause UNEXPSHOCK						
CCCSPREAD …	reject	***	reject	***	reject	***
Ho: UNEXPSHOCK does not Granger Cause ..						
.. AAASPREAD	--		reject	***	reject	***
.. BBBSPREAD	--		--		reject	***
.. CCCSPREAD	--		reject	***	reject	***
No. of Obs.	1858		1355		503	

Panel C: Monetary Shocks and Daily SWAP Rate

	Overall		Pre-QE		QE Regime	
Ho: .. does not Granger Cause EXPSHOCK						
DSWP1 …	--		--		reject	**
DSWP2 …	--		--		reject	**
DSWP3 …	--		--		reject	**
DSWP4 …	--		reject	**	reject	**
DSWP5 …	--		reject	**	--	
DSWP7 …	--		reject	**	--	
DSWP10 …	--		reject	**	--	
DSWP30 …	reject	**	--		--	
Ho: EXPSHOCK does not Granger Cause ..						
… DSWP1	--		--		reject	***
… DSWP2	--		--		reject	***
… DSWP3	--		--		reject	**
… DSWP4	reject	**	--		--	
… DSWP7	reject	**	--		--	
… DSWP10	reject	**	--		--	
Ho: .. does not Granger Cause UNEXPSHOCK						
DSWP1 ..	reject	***	reject	***	--	
DSWP2 ..	reject	***	reject	***	--	
DSWP3 ..	reject	***	reject	***	--	
DSWP4 ..	reject	***	reject	***	--	
DSWP5 ..	reject	***	reject	***	--	
DSWP7 ..	reject	***	reject	***	--	
DSWP10 ..	reject	***	reject	***	--	
DSWP30 ..	reject	***	reject	***	--	
Ho: UNEXPSHOCK does not Granger Cause ..						
.. DSWP1	reject	**	--		reject	***
.. DSWP2	reject	***	--		reject	***
.. DSWP3	reject	***	reject	**	reject	***
.. DSWP4	reject	***	reject	**	reject	***
.. DSWP5	reject	***	reject	**	reject	***
.. DSWP7	reject	***	reject	**	reject	**
.. DSWP10	reject	**	reject	**	--	
.. DSWP30	--		--		reject	**

Panel D: Monetary Shocks and Daily Commercial Paper Rate

	Overall		Pre-QE		QE Regime	
Ho: .. does not Granger Cause EXPSHOCK						
DCPF2M …	reject	***	reject	***	--	
Other Financial Commercial Papers	--		--		--	
DCPN2M …	reject	**	--		--	
DCPN3M …	reject	***	reject	**	--	
DCPN30 …	reject	***	reject	***	reject	***
Other Non-Financial Commercial Papers	--		--		--	
Ho: EXPSHOCK does not Granger Cause ..						
… DCPF1M	reject	***	reject	***	reject	***
… DCPF2M	reject	***	reject	***	--	
… DCPF3M	--		reject	***	reject	***
.. Other Financial Commercial Papers	--		--		--	
… DCPN2M	reject	***	reject	***	reject	***
… DCPN3M	reject	**	reject	**	--	
… DCPN30	reject	***	reject	**	reject	***
.. Other Non-Financial Commercial Papers	--		--		--	
Ho: .. does not Granger Cause UNEXPSHOCK						
DCPF1M ..	reject	***	reject	**	--	
Other Financial CP …	--		--		--	
DCPN30 ..	reject	**	--		--	
Other Non-Financial CP …	--		--		--	
Ho: UNEXPSHOCK does not Granger Cause ..						
.. DCPF1M	reject	**	reject	**	reject	***
.. DCPF2M	reject	***	reject	***	reject	**
.. DCPF3M	reject	***	reject	***	reject	***
.. Other Financial Commercial Papers	--		--		--	
.. DCPN2M	reject	***	reject	***	reject	***
.. DCPN3M	--		--		reject	***
.. DCPN30	reject	***	reject	***	reject	***
.. Other Non-Financial Commercial Papers	--		--		--	

Table III
Monetary Policy Tools with Market Indices and Bond Spreads

Panel A of Table III reports Granger Causality between unconventional monetary policy tools: log(TOTSPEC) as natural logarithm of total holding (in billion dollars) in special asset purchase programs by Federal Reserve System; and four Major market indices: Four Market Indices are: i) DJIA as return on Dow Jones Industrial Average Index, ii) EXM as change in major trade-weighted exchange index, iii) SNP500 as return on S&P500 Index and iv) VIX as Implied Volatility Index on S&P500. Panel B reports Granger Causality between Monetary Shocks and Three bond spreads: i) AAA as AAA option-adjusted spread, ii) BBB as BBB option-adjusted spread, and iii) CCC as CCC option-adjusted spread. Panel B: Market Indices, Bond spreads and conventional monetary tools: i) DFF as Federal Fund Rate (in %) , and Federal Reserve System's liability side tools such as: ii) log(M1) in natural logarithm of Narrow Money (in billion dollars), iii) log(NONM1) as natural logarithm of components of M2 not included in M1 (in billion dollars).

*,** and *** correspond to statistical significance of 10%, 5% and 1% respectively. All data are daily frequency. All index returns and bond spreads are in percentage.

Panel A: Market Indices, Bond spreads and conventional Monetary tools

	All		Pre-QE		QE Regime	
Ho: .. does not Granger Cause DFF						
AAASPREAD …	reject	***	reject	***	--	
BBBSPREAD …	reject	***	reject	***	reject	**
CCCSPREAD …	reject	***	reject	***	--	
DJIARET …	reject	***	reject	***	--	
EXMRET …	reject	***	reject	***	--	
SP5RET …	reject	***	reject	***	--	
VIXRET …	reject	**	reject	**	--	
Ho: DFF does not Granger Cause ..						
.. AAASPREAD	--		reject	***	--	
.. VIXRET	--		--		reject	**
.. Other Market Indexes and Bond Spreads	--		--		--	
Ho: .. does not Granger Cause log(M1)						
AAASPREAD …	--		reject	***	--	
BBBSPREAD …	reject	***	reject	***	--	
CCCSPREAD …	reject	***	reject	***	--	
DJIARET …	--		reject	**	--	
EXMRET …	--		--		--	
SP5RET …	--		reject	**	--	
VIXRET …	--		--		--	
Ho: log(M1) does not Granger Cause ..						
.. VIXRET	--		--		reject	**
.. Other Market Indexes and Bond Spreads	--		--		--	

Panel A: Market Indices, Bond spreads and conventional Monetary tools						
Ho: .. does not Granger Cause log(NONM1)						
AAASPREAD …			reject	**	--	
BBBSPREAD …			reject	**	--	
CCCSPREAD …	reject	***	--		reject	**
Other Market Indexes and Bond Spreads	--		--		--	
Ho: log(NONM1) does not Granger Cause ..						
.. BBBSPREAD	--				--	
.. CCCSPREAD	--		reject	**	--	
.. VIXRET	--		--		reject	**
.. Other Market Indexes and Bond Spreads	--		--		--	

Panel B: Market Indices, Bond Spreads and Unconventional Monetary tools						
	All		Pre-QE		QE Regime	
Ho: .. does not Granger Cause log(TOTSPEC)						
AAASPREAD …	reject	***	reject	***	--	
BBBSPREAD …	reject	***	reject	***	reject	**
CCCSPREAD …					--	
DJIARET …					--	
EXMRET …					--	
SP5RET …					--	
VIXRET …	--				--	
Ho: log(TOTSPEC) does not Granger Cause ..						
.. AAASPREAD					reject	***
.. BBBSPREAD	reject	***	reject	***	reject	**
.. CCCSPREAD	reject	***			reject	**
.. DJIARET	reject	***	reject	***		
.. EXMRET						
.. SP5RET	reject	***	reject	***		
.. VIXRET						

Vita

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